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Compilation of Nuclear Decay Data Used for Dose Calculations: Data for Radionuclides not Listed in ICRP Publication 38

Akira ENDO, Tsutomu TAMURA* and Yasuhiro YAMAGUCHI

Department of Health Physics
Tokai Research Establishment
Japan Atomic Energy Research Institute
Tokai-mura, Naka-gun, Ibaraki-ken

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Nuclear decay data used for dose calculations were compiled for 162 nuclides with half-lives greater than or equal to 10 min that are not listed in ICRP Publication 38 (Publ. 38) and their 28 daughter nuclides. Additional 14 nuclides that are considered to be important in fusion reactor facilities were also included. The data were compiled using decay data sets of the Evaluated Nuclear Structure Data File (ENSDF), the latest version in August 1997. Investigations of the data sets were performed to check their consistency by referring to recent literature and NUBASE, the database for nuclear and decay properties of nuclides, and by using the utility programs of ENSDF. Possible revisions of the data sets were made for their format and syntax errors, level schemes, normalization records, and so on. The revised data sets were processed by EDISTR in order to calculate the energies and intensities of α particles, β particles, γ rays including annihilation photons, internal conversion electrons, X rays, and Auger electrons emitted in nuclear transformations of the radionuclides. For spontaneously fissioning nuclides, the average energies and intensities of neutrons, fission fragments, prompt γ rays, delayed γ rays, and β particles were also calculated. The compiled data were presented in two types of format; Publ. 38 and NUCDECAY formats. This report provides the decay data in the Publ. 38 format along with decay scheme drawings. The data will be widely used for internal and external dose calculations in radiation protection.

Keywords: Dose Calculation, Radionuclide, Nuclear Decay Data, ENSDF, Internal Exposure, External Exposure, ICRP Publication 38

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線量計算に用いる崩壊データの整備: ICRP Publication 38 に収録されていない核種のデータ

日本原子力研究所東海研究所保健物理部
遠藤　章・田村　務*・山口　恭弘

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半減期 10 分以上の核種の中で、ICRP Publication 38 (Publ. 38) に収録されていない 162 核種とそれらの 28 娘核種、また、核融合炉施設において重要な 14 核種について、線量計算に用いる崩壊データを編集した。データの編集には、1997 年 8 月版の評価済核構造データファイル (ENSDF) の崩壊データセットを用いた。編集対象とする核種の崩壊データセットについて、それらの整合性を確認するために、最近の文献の調査、核レベル・崩壊データベース NUBASE との照会、ENSDF 評価用プログラムを用いた解析等を行い、データセットのフォーマット、レベルスキーム、規格化定数等の分析及び修正を行った。分析・修正後の崩壊データセットを基に、EDISTR コードを用い、崩壊に伴い放出される α 線、β 線、γ 線、内部転換電子、X 線、Auger 電子のエネルギー及び放出率を計算した。自発核分裂核種に対しては、中性子、核分裂片、即発 γ 線、遅発 γ 線、β 線の平均エネルギー及び放出率も計算した。計算結果は、Publ. 38 及び NUCDECAY の 2 種類のフォーマットのデータファイルとして整備した。本報告書は、これらの中で、Publ. 38 フォーマットのデータを崩壊図とともにまとめたものである。本データは、放射線防護における内部及び外部被ばく線量評価に幅広く利用することができる。

東海研究所：〒 319-1195　茨城県那珂郡東海村白方白根 2-4
* (財) 高度情報科学技術研究機構

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1 Introduction

Nuclear decay data for extensive kinds of radionuclides are required in dose calculations for radiation exposure from radionuclides. The decay database most widely used in dose calculations is that compiled by the Dosimetry Research Group of the Health Science Research Division at Oak Ridge National Laboratory (ORNL). The abridged form of the database was published as Publication 38 (Publ. 38)[1] of the International Commission on Radiological Protection (ICRP) in 1983, and the complete listing along with β particle spectra was published as the "ICRP 38 collection"† of NUCDECAY[3] in 1993. The database has been used in calculating dose coefficients for internal exposure from inhaled and ingested radionuclides[4–10] and for external exposure from radionuclides distributed in the environment.[11] The database is also used as a built-in database in the computer programs LUDEP,[12] IDSS,[13] and GENMOD,[14] for internal dose calculation.

The nuclear decay database of Publ. 38 was compiled from decay data sets of the Evaluated Nuclear Structure Data File (ENSDF)[15,16] using the computer program EDISTR,[17] which was designed to calculate energies and intensities of the nuclear and atomic radiations associated with the nuclear transformation. The ENSDF used as input data in Publ. 38 was mainly prepared in the 1970s. Publ. 38 covers the decay data for radionuclides with half-lives $\geq$ 10 min and their daughters; the total number of radionuclides listed is 820. The decay database has been adequate for dose calculations for radionuclides which are important in medical, environmental, and occupational exposures. It is required, however, to enhance the database for dose calculations for radionuclides which will be important in the development of accelerator-based intense neutron beam[18] and thermal fusion reactors.[19] A great deal of data on nuclear structure and decay has been reported after the publication of Publ. 38. These data have been compiled in the ENSDF and are available now for the enhancement of Publ. 38.

In the present study, the nuclear decay data for radionuclides that are not listed in Publ. 38 are compiled from the recent ENSDF. As the first step, this report presents the decay data for the radionuclides with half-lives $\geq$ 10 min. Several radionuclides, such as ^{52}V, ^{94m}Nb, ^{185m}W, etc., which have half-lives $<$ 10 min but are important for the safety assessment of fusion reactor facilities are also included. The compiled data are presented in two types of format, Publ. 38 and NUCDECAY formats. The data will be widely used for internal and external dose calculations in radiation protection.

2 Method

2.1 Decay Data Sets of the ENSDF and Data Evaluation

According to NUBASE,[20] the database for nuclear and decay properties of nuclides in their ground and isomeric states, the number of radionuclides with half-lives $\geq$ 10 min is 1020 for the mass numbers, A, up to 277. Figure 1 shows the distributions of the number of radionuclides,

†The number of nuclides involved and data format are different between Publ. 38 and the "ICRP 38 collection" of NUCDECAY. The "ICRP 38 collection" of NUCDECAY contains the decay data for 820 nuclides listed in Publ. 38 plus 18 additional nuclides. The data format of the "ICRP 38 collection" is designed to be used in computing the specific effective energy (SEE) by the computer program SEECAL.[2] In this report, however, the "ICRP 38 collection" of NUCDECAY is called "Publ. 38", unless otherwise stated.

as a function of the half-life ranges. The total number of radionuclides with half-lives $\geq$ 10 min that are listed in Publ. 38 is 763,[‡] and therefore, the remaining 257 radionuclides and their daughters are the subject of the present compilation.

Tables 1 and 2 show the lists of the decay data sets for the radionuclides studied. The decay mode and the branching fraction of each decay mode are taken from NUBASE. Figure 2 shows the flow of the compilation of the decay data in this study. The latest version of ENSDF for $A = 1 \sim 266$ was obtained from the National Nuclear Data Center (NNDC) of the Brookhaven National Laboratory (BNL) in August 1997. The decay data sets were extracted from the ENSDF for the radionuclides with half-lives $\geq$ 10 min that are not listed in Publ.38 and their daughters and 14 radionuclides that are important in fusion reactor facilities. In Publ. 38, the isomeric states are defined as the excited states with half-lives $\geq$ 1 min, and therefore, these isomers were treated as different data sets from those of the parent nuclides.

The ENSDF data sets are the compilation of experimentally measured data, and many decay data sets are incomplete for calculating the absolute energies and intensities of radiations because of limited data from experiments. Therefore, the analysis and possible revision were performed for all the data sets, as described below.

Literature sources relating to the nuclides of interest issued after 1990 were searched by Nuclear Science Reference (NSR)[21)] and were reflected in the data evaluation. The information in ENSDF has been reviewed and updated by mass chains with a cycle of approximately 6 years, and the literature sources issued before 1990 are referred in the latest ENSDF of 1997.

To achieve unified data expression, decay energies (Q values), excitation energies of isomers, half-life and spin and parity values of initial and final states were referred to those of NUBASE and updated, if any differences were found.

The analysis of the data sets was performed using utility programs distributed from NNDC. The programs used are:

FMTCHK: This program checks the format of an ENSDF formatted file to verify that it conforms to the manual for preparation of the ENSDF data sets.[15,16)] Format and syntax errors found were corrected.

GTOL: This program calculates the net feedings at the ground and excited levels from the input γ-ray intensities and internal conversion coefficients and compares them with the input values of the `BETA`, `EC`, or `ALPHA record`.[§] The difference in the net feedings given in the data sets from those calculated by GTOL were analyzed, and the input values were revised if necessary.

LOGFT: This program calculates $\log ft$ values for β decay, the partial capture fractions for electron capture, the electron capture to positron ratio in the case of positron decay, and the average β particle energies.

HSICC: This program calculates internal conversion coefficients from the tabulated values calculated by Hager and Seltzer[22)] and Dragoun *et al.*.[23)] It is noted that HSICC gives

[‡] ^{180}Ta is an electron capture decay nuclide of half-life 1.0×10^{13} y in Publ. 38. On the other hand, the nuclide is considered to be a stable one in NUBASE, and therefore is not included in Figure 1.

[§] In this report, symbols used in ENSDF records are denoted by the characters of `typewriter face`. Definitions of the symbols are described in the ENSDF manual.[15,16)]

the internal conversion coefficients for γ rays of electric transitions E1 – E4 and magnetic transitions M1 – M4 due to the limitation of the original data tables.

EDISTR does not refer to the information of continuation records,[¶] such as average β particle energies, partial capture fractions for electron capture and internal conversion coefficients calculated by LOGFT and HSICC. However, the calculation and addition of the continuation records were carried out using LOGFT and HSICC, if these records were missing in the original data sets. The quantities of the continuation records are used in the calculation by RADLST,[24] as discussed in subsection 3.3.

In the cases where spontaneous fission occurs, EDISTR calculates the energies and intensities of radiations concomitant with spontaneous fission. To calculate these quantities, EDISTR requires the fission decay fraction, f_{SF}, the average number of neutrons emitted per fission, $\bar{\nu}$, and the atomic number, Z, and the mass numbers, A, of the parent nuclide. Since the ENSDF does not contain the information on $\bar{\nu}$, the values of $\bar{\nu}$ were taken from a data table presented by Hoffman *et al.*,[25] and the data sets for spontaneous fission were created.

2.2 Calculation by EDISTR

After the analysis and revision, the decay data sets were processed by EDISTR in order to calculate the energies, $E(i)$ (MeV), and intensities, $y(i)$ ([Bq s]$^{-1}$), of α particles, β particles, γ rays including annihilation photons, internal conversion electrons, X rays, and Auger electrons. For spontaneously fissioning nuclides, the average energies and intensities of neutrons, fission fragments, prompt γ rays, delayed γ rays, and β particles were also calculated. A comprehensive description of the theoretical and numerical techniques employed in EDISTR is described elsewhere.[17]

The following improvements were made to EDISTR. First, internal conversion coefficients for γ rays of E5 and M5 transitions was incorporated into a built-in data table. EDISTR uses the built-in data table of theoretical internal conversion coefficients[22,23,26] to calculate the $E(i)$ and $y(i)$ of internal conversion electrons. The table covers the internal conversion coefficients for γ rays of multipolarities E1 – E4 and M1 – M4. To calculate the emission of internal conversion electrons for the E5 and M5 transitions, the table was extended using the data calculated by Band and Trzhaskovskaya.[27] Second, the maximum storage capacities for ENSDF records were increased in order to process complicated decay schemes. The original numbers are 100 for the `LEVEL record`, 400 for the `GAMMA record`, and 100 for the `ALPHA`, or `BETA`, or `EC record`. Since the capacities were not adequate for processing the decay data sets of ^{153}Dy and ^{167}Lu, these numbers were increased up to 300, 900, and 300, respectively;

Decay scheme drawings were prepared by the computer program SCHEME using output files from EDISTR. SCHEME was improved to produce the decay scheme drawings as the Postscript file.

[¶]If all the information for a given record type cannot be contained on a single card, additional cards, called "continuation record", are used to describe the quantities such as average β particle energies, internal conversion coefficients, etc.

3 Results and Discussion

3.1 Evaluation of Decay Data Sets

The results of the evaluation of the decay data sets are shown in Tables 1 and 2. Remarks relating to the data evaluation are described in the comment column. For the nuclides whose decay data were not compiled, the mass number and element symbol are shadowed in the tables and the reasons are given in the comment column. The remark of "No data set" means that the corresponding data set was not included in the ENSDF. "No scheme" means that the decay mode and the half-life are given but the decay scheme is not proposed. "Insufficient information" means that a tentative decay scheme is proposed but is not adequate to calculate the absolute energies and intensities of radiations.

There are several nuclides whose decay data are not compiled but no remarks are given in the comment column. It indicates that the data sets showed intensity and energy imbalances. EDISTR calculates the intensity and energy balances of the decay data sets in the diagnosis of their consistency and provides a warning for the following cases:

(1) The total intensity to the ground and isomeric states of the daughter differs from 100% by more than 10%.

(2) The total intensity from the parent differs from 100% by more than 5%.

(3) The total energy of all radiations differs from the Q value by more than 5%.

In such cases, the reasons for the differences were analyzed, and the decay data were excluded from the compilation if the reasons for the differences were not resolved.

In the decay data set of ^{130}Ce, last updated in 1990, only one γ ray of 0.1308 MeV has been assigned to the decay of ^{130}Ce. Recently, Xu *et al.*[28] proposed a detailed decay scheme for ^{130}Ce. The full list of the decay data set was prepared based on the proposal, and is given in Table 3. The format and definition of the list are described elsewhere.[15,16]

3.2 Compiled Data

The compiled data were prepared in two types of format, Publ. 38 and NUCDECAY formats, and are available as ASCII files. Of these, the data in the Publ. 38 format along with the decay scheme drawings are presented in Appendix A. Radiation type abbreviations used in the data tables are given in Table 4.

The total number of the decay data compiled in this study is 204, which consist of 162 nuclides with half-lives $\geq$ 10 min, 28 daughters and 14 nuclides for the fusion facilities. It is shown from Figure 1 that the decay data compiled in Publ. 38 and the present report cover 925 radionuclides out of 1020 ones with half-lives $\geq$ 10 min in NUBASE.

It is noted that an important difference between Publ. 38 and NUCDECAY formats is that the former limits the number of radiations listed while the latter does not. As described in Appendix A, the data in the Publ. 38 format omits radiations below a specified cutoff value of energy in order to limit the number of radiations to 175. Then, the use of the data in the Publ. 38 format causes the underestimation of dose for radionuclides that emit a number of radiations. For instance, in the case of ^{153}Dy that emits 3620 radiations per decay, the radiations that contribute less than 0.2% to the total energy of radiations are omitted in the data with the

Publ. 38 format, and the energy of the omitted radiations reaches 30.4% of the total energy of all the radiations. The information for the listed and omitted radiations are shown in the last part of the table in Appendix A for each nuclide. This helps to see the percentage of the energy of the omitted radiations.

The decay data of several nuclides that constitute the decay chains of ^{158}Er, ^{160}Er, ^{171}Ta, ^{221}Rn, ^{232}Pu and ^{252}Es were not compiled because of the limitation of the available decay data sets. The compilation of the missing data will be executed when their decay data sets are completed.

3.3 Comparison with RADLST

The computer program RADLST[24] calculates the energies, intensities and dose rates for the nuclear and atomic radiations from the ENSDF and produces listings and computer files in variety of forms. The mathematical and physical bases of both EDISTR and RADLST are similar. However, EDISTR recalculates such quantities as internal conversion coefficients, average β particle energies, and electron capture fractions, while RADLST relies upon these data given as the continuation records by the evaluators of the data sets. It was pointed out that a significant difference is found in the calculated results between EDISTR and RADLST in the case that the internal conversion coefficients are not given in the data set.[29] This is because RADLST does not calculate the emission of internal conversion electrons for such data sets.

In the present study, the continuation records for the **BETA**, **EC** and **GAMMA records** were calculated by LOGFT and HSICC and inserted into the data sets, if the records were missing in the original ones. It was found using these data sets that the agreement of the calculated results between EDISTR and RADLST is good. The results indicate the validity of the revised data sets for use as the input data of dose calculations.

4 Summary

The nuclear decay data used for dose calculations have been compiled for 204 radionuclides from the recent ENSDF. The compiled data are presented in two types of format, Publ. 38 and NUCDECAY formats, and are available as ASCII files. The data in the Publ. 38 format along with the decay scheme drawings are presented in this report, which enhances the decay database of ICRP Publ. 38. The compiled data in this study will be widely used for internal and external dose calculations in radiation protection.

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References

1) ICRP. *Radionuclide Transformations: Energy and Intensity of Emissions.* ICRP Publication 38. Ann. ICRP **11–13** (1983).

2) Cristy, M. and Eckerman, K.F. *SEECAL: Program to Calculate Age-dependent Specific Effective Energies.* ORNL/TM-12351 (1993).

3) Eckerman, K.F., Westfall, R.J., Ryman, J.C. and Cristy, M. *Nuclear Decay Data Files of the Dosimetry Research Group.* ORNL/TM-12350 (1993).

4) ICRP. *Limits for Intakes of Radionuclides by Workers.* ICRP Publication 30, Part 1. Ann. ICRP **2**(3 & 4) (1979); Part 2. Ann. ICRP **4**(3 & 4) (1980); Part 3. Ann. ICRP **6**(2 & 3) (1981); Part 4. Ann. ICRP **19**(4) (1988).

5) ICRP. *Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 1.* ICRP Publication 56. Ann. ICRP **20**(2) (1989).

6) ICRP. *Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 2.* ICRP Publication 67. Ann. ICRP **23**(3 & 4) (1993).

7) ICRP. *Dose Coefficients for Intakes of Radionuclides by Workers.* ICRP Publication 68. Ann. ICRP **24**(4) (1994).

8) ICRP. *Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 3.* ICRP Publication 69. Ann. ICRP **25**(1) (1995).

9) ICRP. *Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 4.* ICRP Publication 71. Ann. ICRP **25**(3 & 4) (1996).

10) ICRP. *Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 5.* ICRP Publication 72. Ann. ICRP **26**(1) (1996).

11) Eckerman, K.F. and Ryman, J.C. *External Exposure to Radionuclides in Air, Water, and Soil.* Federal Guidance Report No.12, EPA 402-R-93-081 (1993).

12) Jarvis, N.S., Birchall, A., James, A.C., Bailey, M.R. and Dorrian, M.-D. *LUDEP 2.0: Personal Computer Program for Calculating Internal Doses Using the ICRP Publication 66 Respiratory Tract Model.* NRPB-SR287 (1996).

13) Berkovski, V., Likhtarev, I., Ratia, G. and Bonchuk, Y. *Internal Dosimetry Support System: Multipurpose Research Computer Code.* Radiat. Prot. Dosim. **79**, 371–374 (1998).

14) Richardson, R.B. and Dunford, D.W. *Incorporation of Current ICRP Recommendations in the GENMOD Internal Dosimetry Code.* Radiat. Prot. Dosim. **79**, 375–378 (1998).

15) Ewbank, W.B. and Schmorak, M.R. *Evaluated Nuclear Structure Data File: A Manual for Preparing of Data Sets.* ORNL-5054/R1 (1978).

16) Tuli, J.K. *Evaluated Nuclear Structure Data File: A Manual for Preparing of Data Sets.* BNL-NCS-51655-Rev.87 (1987).

17) Dillman, L.T. *EDISTR: A Computer Program to Obtain a Nuclear Decay Data Base for Radiation Dosimetry.* ORNL/TM-6689 (1980).

18) Gloris, M., Michel, R., Herpers, U., Sudbrock, F. and Filges, D. *Production of Residual Nuclei from Irradiation of Thin Pb-targets with Protons up to 1.6 GeV.* Nucl. Instr. and Meth. **B113**, 429–433 (1996).

19) Noguchi, H. private communication.

20) Audi, G., Bersillon, O., Blachhot, J. and Wapstra, A.H. *The NUBASE Evaluation of Nuclear and Decay Properties.* Nucl. Phys. **A624**, 1–124 (1997).

21) Nuclear Science Reference File (NSR). An electronic database containing nuclear structure references with keyword abstracts. The file is maintained by the NNDC of BNL, on behalf of the International Network for Nuclear Structure and Decay Data Evaluation.

22) Hager, R.S. and Seltzer, E.C. *Internal Conversion Tables. Part 1: K-, L-, M-Shell Conversion Coefficients for $Z = 30$ to $Z = 103$.* Nucl. Data **A4**, 1–198 (1968).

23) Dragoun, O., Plajner, Z. and Schmutzler, F. *Contribution of Outer Atomic Shells to Total Internal Conversion Coefficients.* Nucl. Data Tables **A9**, 119–135 (1971).

24) Burrows, T.W. *The Program RADLST.* BNL-NCS-52142 (1988).

25) Hoffman, D.C., Hamilton, T.M. and Lane, M.R. *Spontaneous Fission.* Nuclear Decay Modes. Ed. D.N. Poenaru (Bristol: Institute of Physics Publishing), 393–432 (1996).

26) Band, I.M., Trzhaskovskaya, M.B. and Listengarten, M.A. *Internal Conversion Coefficients for Atomic Numbers $Z \leq 30$.* At. Data Nucl. Data Tables **18**, 433–457 (1976).

27) Band, I.M. and Trzhaskovskaya, M.B. *Internal Conversion Coefficients for E5 and M5 Nuclear Transitions, $30 \leq Z \leq 104$.* At. Data Nucl. Data Tables **21**, 1–47 (1978).

28) Xu, S., Zhang, T., Xie, Y., Ma, R., Ge, Y., Guo, Y., Wang, C., Li, Z., Guo, B., Xing, J., Guo, T., Zhu, S., Xu, W. and Du, J. *$(EC + \beta^+)$ Decay of ^{130}Ce.* Z. Phys. **A356**, 35–43 (1996).

29) Endo, A. and Yamaguchi, Y. *Comparison of Nuclear Decay Data Derived from Recent Nuclear Structure Data Files with Those of ICRP Publication 38.* Radiat. Prot. Dosim. **82**, 59–64 (1999).

Table 1. List of radionuclides studied and comments on the evaluation of the decay data sets.

No.*1	Nuclide	Decay mode*2 (%)	Half-life	Comment
1	^{38}S	β^- 100	170.3 m	
2	^{34m}Cl	EC, β^+ 55.4	32.00 m	
3		IT 44.6		
4	^{34}Cl	EC, β^+ 100	1.5264 s	
5	^{42}Ar	β^- 100	32.9 y	
6	^{44}Ar	β^- 100	11.87 m	
7	^{48}Ca	$2\beta^-$?	5.1E+19 y	Insufficient information.
8		β^- ?		Insufficient information.
9	^{50}V	EC, β^+ 83	1.5E+17 y	
10		β^- 17		
11	^{76}Ge	$2\beta^-$ 100	1.09E+21 y	No data set.
12	^{72}Se	EC 100	8.40 d	
13	^{82}Se	$2\beta^-$ 100	1.21E+20 y	No scheme.
14	^{78}Rb	EC, β^+ 100	17.66 m	L (3064keV) and G (1086.79keV) records were removed.
15	^{84m}Rb	IT 100	20.26 m	
16	^{84}Y	EC, β^+ 100	40 m *3	NB was added.
17	^{84}Y	EC, β^+ 100	4.6 s *3	
18	^{85m}Y	EC, $\beta^+ \approx 100$	4.86 h	Two L records (743.13, 767.27keV) were added.
19	^{85}Y	EC, β^+ 100	2.68 h	IBE*4 was recalculated.
20	^{87m}Y	EC, β^+ 1.57	13.37 h	
21		IT 98.43		
22	^{84}Zr	EC, β^+ 100	25.9 m	No scheme.
23	^{87}Zr	EC, β^+ 100	1.68 h	
24	^{96}Zr	$2\beta^-$ 100	3.9E+19 y	No data set.
25	^{91m}Nb	EC, β^+ 7	60.86 d	IBE was recalculated. BR of both decay modes were revised based on a new reference.*5
26		IT 93		
27	^{91}Nb	EC, β^+ 100	6.8E+2 y	
28	^{92m}Nb	EC, β^+ 100	10.15 d	
29	^{92}Nb	EC, $\beta^+ \approx 100$	3.47E+7 y	
30	^{91}Mo	EC, β^+ 100	15.49 m	
31	^{100}Mo	$2\beta^-$ 100	1.02E+19 y	Insufficient information.
32	^{102}Mo	β^- 100	11.3 m	ICC*6 was calculated.
33	^{102}Tc	β^- 100	5.28 s	
34	^{95}Ru	EC, β^+ 100	1.643 h	IBE was recalculated.

*1 Data set number.

*2 α = α decay, EC = electron capture, β^+ = β^+ decay, β^- = β^- decay, IT = isomeric transition, $2\beta^-$ = double β^- decay, SF = spontaneous fission, β^+SF = β^+ delayed fission, β^-SF = β^- delayed fission.

*3 Assignment to the ground state or isomeric state is uncertain in NUBASE.

*4 IBE = Net feeding at each level from β^- or EC + β^+ decay.

*5 Phys. Rev. **C47**, 2598 (1993).

*6 ICC = Internal conversion coefficient.

Table 1. continued.

No.	Nuclide	Decay mode (%)	Half-life	Comment
35	^{97m}Rh	EC, β^+ 94.4	46.2 m	
36		IT 5.6		
37	^{97}Rh	EC, β^+ 100	30.7 m	
38	^{98}Rh	EC, β^+ 100	8.7 m	
39	^{98}Pd	EC, β^+ 100	17.7 m	
40	^{99}Pd	EC, β^+ 100	21.4 m	
41	^{111m}Pd	β^- 27	5.5 h	DCC was put in TI field of G record for 70.44keV γ ray. IBE was recalculated.
42		IT 73		
43	^{111}Pd	β^- 100	23.4 m	
44	^{112}Pd	β^- 100	21.03 h	Error of Q value was corrected (30→288keV).
45	^{101}Ag	EC, β^+ 100	11.1 m	
46	^{105m}Ag	EC, β^+ 0.34	7.23 m	
47		IT $\approx$ 100		No NR.
48	^{111m}Ag	β^- 0.7	64.8 s	NR and BR were corrected.
49		IT 99.3		
50	^{113}Ag	β^- 100	5.37 h	
51	^{105}Cd	EC, β^+ 100	55.5 m	
52	^{111m}Cd	IT 100	48.54 m	
53	^{116}Cd	$2\beta^-$ 100	34E+18 y	No data set.
54	^{118}Cd	β^- 100	50.3 m	
55	^{107}In	EC, β^+ 100	32.4 m	IBE was recalculated. NB was changed (1.05→1.0).
56	^{108m}In	EC, β^+ 100	39.6 m	
57	^{108}In	EC, β^+ 100	58.0 m	IBE was recalculated.
58	^{109m}In	IT 100	1.34 m	
59	^{112m}In	IT 100	20.56 m	
60	^{118}In	β^- 100	5.0 s	
61	^{108}Sn	EC, β^+ 100	10.30 m	
62	^{109}Sn	EC, β^+ 100	18.0 m	
63	^{113m}Sn	EC, β^+ 8.9	21.4 m	
64		IT 91.1		
65	^{118}Sb	EC, β^+ 100	3.6 m	
66	^{129m}Sb	β^- 85	17.7 m	Insufficient information.
67		IT 15		Insufficient information.
68	^{114}Te	EC, β^+ 100	15.2 m	
69	^{117}Te	EC, β^+ 100	62 m	
70	^{118}Te	EC 100	6.00 d	
71	^{119m}Te	EC, β^+ $\approx$ 100	4.70 d	
72	^{119}Te	EC, β^+ 100	16.03 h	
73	^{128}Te	$2\beta^-$ 100	2.2E+24 y	No data set.
74	^{130}Te	$2\beta^-$ 100	7.9E+23 y	No data set.
75	^{118}I	EC, β^+ 100	13.7 m	
76	^{119}I	EC, β^+ 100	19.1 m	

Table 1. continued.

No.	Nuclide	Decay mode (%)	Half-life	Comment
77	^{124}Cs	EC, β^+ 100	30.9 s	IBE was recalculated.
78	^{124}Ba	EC, β^+ 100	11.0 m	
79	^{127}Ba	EC, β^+ 100	12.7 m	
80	^{129m}Ba	EC, $\beta^+ \approx 100$	2.16 h	NB was assumed to be 0.41.
81	^{129}Ba	EC, β^+ 100	2.23 h	
82	^{129}La	EC, β^+ 100	11.6 m	
83	^{130}La	EC, β^+ 100	8.7 m	
84	^{132m}La	EC, β^+ 24	24.3 m	
85		IT 76		
86	^{133}La	EC, β^+ 100	3.912 h	IBE was recalculated. NR was changed (0.016→0.025).
87	^{130}Ce	EC, β^+ 100	22.9 m	Data set was prepared using a new reference.*7
88	^{131}Ce	EC, β^+ 100	10.2 m	NR was assumed to be 0.22. IBE was calculated.
89	^{132}Ce	EC, β^+ 100	3.51 h	
90	^{133m}Ce	EC, β^+ 100	4.9 h	
91	^{133}Ce	EC, β^+ 100	97 m	
92	^{146}Ce	β^- 100	13.52 m	
93	^{134}Pr	EC, β^+ 100	11 m *8	
94	^{134}Pr	EC, β^+ 100	17 m *8	IBE was recalculated.
95	^{135}Pr	EC, β^+ 100	24 m	IBE was recalculated. BR and NB were added.
96	^{140}Pr	EC, β^+ 100	3.39 m	
97	^{146}Pr	β^- 100	24.15 m	
98	^{135}Nd	EC, β^+ 100	12.4 m	IBE was recalculated. BR and NB were added.
99	^{137}Nd	EC, β^+ 100	38.5 m	
100	^{140}Nd	EC 100	3.37 d	
101	^{144}Nd	α 100	2.29E+15 y	
102	^{150}Nd	$2\beta^-$ 100	2.1E+19 y	No data set.
103	^{152}Nd	β^- 100	11.4 m	
104	^{140}Pm	EC, β^+ 100	9.2 s	NT (1.0) was removed.
105	^{152m}Pm	$\beta^- \approx 100$	13.8 m	Insufficient information.
106	^{152}Pm	β^- 100	4.12 m	
107	^{140}Sm	EC, β^+ 100	14.82 m	
108	^{148}Sm	α 100	7E+15 y	
109	^{152m}Eu	IT 100	96 m	
110	^{154m}Eu	IT 100	46.3 m	
111	^{159}Eu	β^- 100	18.1 m	
112	^{150}Gd	α 100	1.79E+6 y	
113	^{145}Tb	EC, β^+ ?	20 m	No data set.
114	^{148}Tb	EC, β^+ 100	60 m	IBE was recalculated.
115	^{152}Tb	EC, β^+ 100	17.5 h	

*7 Reference 28).

*8 Assignment to the ground state or isomeric state is uncertain in NUBASE.

Table 1. continued.

No.	Nuclide	Decay mode (%)	Half-life	Comment
116	^{154m}Tb	EC, β^+ 98.2	22.7 h	
117		IT 1.8		Insufficient information.
118	^{154m}Tb	EC, β^+ 78.2	9.4 h	IBE was recalculated.
119		IT 21.8		Insufficient information.
120	^{163}Tb	β^- 100	19.5 m	
121	^{151}Dy	α 5.6	17.9 m	
122		EC, β^+ 94.4		
123	^{152}Dy	α 0.1	2.38 h	
124		EC $\approx$ 100		
125	^{153}Dy	α 0.0094	6.4 h	
126		EC, $\beta^+ \approx$ 100		
127	^{154}Dy	α 100	3.0E+6 y	
128	^{154}Ho	α 0.019	11.76 m	
129		EC, $\beta^+ \approx$ 100		IBE was recalculated.
130	^{156}Ho	EC, β^+ 100	56 m	IBE was recalculated.
131	^{158m}Ho	EC, $\beta^+ \geq$ 93	21.3 m	No NR.
132		IT $\leq$ 7		No data set.
133	^{158m}Ho	EC, $\beta^+ \leq$ 19	28 m	Data set is mixed with that of ^{158}Ho (11.3min).
134		IT $\geq$ 81		
135	^{158}Ho	α ?	11.3 m	No data set.
136		EC, $\beta^+ \geq$ 93		Data set is mixed with that of ^{158m}Ho (28min).
137	^{160m}Ho	EC, β^+ 35	5.02 h	Data set is mixed with that of ^{160}Ho (25.6min).
138		IT 65		
139	^{160}Ho	EC, β^+ 100	25.6 m	
140	^{163}Ho	EC 100	4570 y	
141	^{156}Er	EC, β^+ 100	19.5 m	IBE was recalculated. NB was added.
142	^{157}Er	EC, β^+ 100	18.65 m	Insufficient information.
143	^{158}Er	EC 100	2.29 h	
144	^{159}Er	EC, β^+ 100	36 m	
145	^{160}Er	EC 100	28.58 h	
146	^{163}Er	EC, β^+ 100	75.0 m	
147	^{161}Tm	EC, β^+ 100	30.2 m	Insufficient information.
148	^{163}Tm	EC, β^+ 100	1.810 h	
149	^{164}Tm	EC, β^+ 100	2.0 m	
150	^{165}Tm	EC, β^+ 100	30.06 h	
151	^{168}Tm	EC, $\beta^+ \approx$ 100	93.1 d	
152		β^- 0.010		
153	^{163}Yb	EC, β^+ 100	11.05 m	
154	^{164}Yb	EC 100	75.8 m	
155	^{165}Yb	EC, β^+ 100	9.9 m	NR was changed (0.090→0.083). IBE was recalculated.
156	^{165m}Lu	EC, β^+ ?	12 m	No data set.
157	^{165}Lu	EC, β^+ 100	10.74 m	NR was assumed to be 0.15. IBE was calculated.

Table 1. continued.

No.	Nuclide	Decay mode (%)	Half-life	Comment
158	^{167}Lu	EC, β^+ 100	51.5 m	
159	^{168}Hf	EC, β^+ 100	25.95 m	No scheme.
160	^{171}Hf	EC, β^+ 100	12.1 h	Insufficient information.
161	^{174}Hf	α 100	2.0E+15 y	
162	^{171}Ta	EC, β^+ 100	23.3 m	IBE was calculated.
163	^{174}W	EC, β^+ 100	31 m	No scheme.
164	^{175}W	EC, β^+ 100	35.2 m	Insufficient information.
165	^{179m}W	EC, $\beta^+ \approx 0.28$	6.40 m	
166		IT $\approx$ 100		
167	^{189}W	β^- 100	11.5 m	Insufficient information.
168	^{190}W	β^- 100	30.0 m	
169	^{179}Re	EC, β^+ 100	19.5 m	
170	^{183}Re	EC 100	70.0 d	
171	^{190m}Re	β^- 54.4	3.2 h	Insufficient information.
172		IT 45.6		Insufficient information.
173	^{190}Re	β^- 100	3.1 m	
174	^{183m}Os	EC, β^+ 85	9.9 h	NB was changed (1.0→1.18). IBE was recalculated.
175		IT 15		
176	^{183}Os	EC, β^+ 100	13.0 h	
177	^{186}Os	α 100	2.0E+15 y	
178	^{196}Os	β^- 100	34.9 m	
179	^{183}Ir	EC, $\beta^+ \approx 100$	58 m	
180	^{193m}Ir	IT 100	10.53 d	
181	^{196m}Ir	$\beta^- \approx 100$	1.40 h	
182	^{196}Ir	β^- 100	52 s	
183	^{184}Pt	α 0.0017	17.3 m	
184		EC, $\beta^+ \approx 100$		
185	^{185m}Pt	EC, β^+ ?	33.0 m	No data set.
186		IT < 2		No data set.
187	^{185}Pt	α 0.0050	70.9 m	No scheme.
188		EC, $\beta^+ \approx 100$		Insufficient information.
189	^{187}Pt	EC, β^+ 100	2.35 h	
190	^{190}Pt	α 100	6.5E+11 y	
191	^{202}Pt	β^- 100	44 h	
192	^{186}Au	EC, β^+ 100	10.7 m	NR was assumed to be 0.62. IBE was recalculated.
193		α 0.0008		No data set.
194	^{189}Au	EC, β^+ 100	28.7 m	Insufficient information.
195	^{190}Au	EC, β^+ 100	42.8 m	IBE was recalculated.
196	^{191}Au	EC, β^+ 100	3.18 h	IBE was calculated.
197	^{192}Au	EC, β^+ 100	4.94 h	
198	^{196m}Au	IT 100	9.6 h	

Table 1. continued.

No.	Nuclide	Decay mode (%)	Half-life	Comment
199	^{196}Au	EC, β^+ 93.05	6.183 d	
200		β^- 6.95		
201	^{202}Au	β^- 100	28.8 s	
202	^{190}Hg	EC, β^+ 100	20.0 m	IBE was recalculated.
203	^{191m}Hg	EC, β^+ 100	50.8 m	
204	^{191}Hg	EC, β^+ 100	49 m	
205	^{192}Hg	EC 100	4.85 h	
206	^{208}Hg	β^- 100	49 m	No data set.
207	^{191}Tl	EC, β^+ ?	20 m	No data set.
208	^{192m}Tl	EC, β^+ 100	10.8 m	Data set is mixed with that of ^{192}Tl.
209	^{193}Tl	EC, β^+ 100	21.6 m	Insufficient information.
210	^{196m}Tl	EC, β^+ 95.5	1.41 h	Insufficient information.
211		IT 4.5		
212	^{196}Tl	EC, β^+ 100	1.84 h	
213	^{194}Pb	α 7.3E−6	12.0 m	
214		EC, β^+ 100		
215	^{195}Pb	EC, β^+ 100	15 m	Insufficient information.
216	^{196}Pb	EC, β^+ 100	37 m	
217	^{197m}Pb	EC, β^+ 81	43 m	
218		IT 19		
219	^{197}Pb	EC, β^+ 100	8 m	
220	^{199m}Pb	EC, β^+ 7	12.2 m	Insufficient information.
221		IT 93		
222	^{204m}Pb	IT 100	67.2 m	
223	^{213}Pb	β^- 100	10.2 m	No data set.
224	^{198m}Bi	EC, β^+ 100	11.6 m	Insufficient information.
225	^{198}Bi	EC, β^+ 100	10.3 m	No data set.
226	^{199m}Bi	$\alpha \approx 0.01$	24.70 m	
227		EC, β^+ ?		No data set.
228		IT < 2		No scheme.
229	^{199}Bi	EC, β^+ 100	27 m	Insufficient information.
230	^{200m}Bi	EC > 90	31 m	Insufficient information.
231		IT < 10		No data set.
232	^{201m}Bi	α ?	59.1 m	
233		EC 92.9		
234		IT < 6.8		No data set.
235	^{204}Bi	EC, β^+ 100	11.22 h	
236	^{208}Bi	EC, β^+ 100	3.68E+5 y	
237	^{212m}Bi	α 67	25.0 m	
238		β^- 33		Insufficient information.

Table 1. continued.

No.	Nuclide	Decay mode (%)	Half-life	Comment
239	^{200}Po	α 11.1	11.5 m	
240		EC, β^+ 88.9		IBE was recalculated.
241	^{201}Po	α 1.6	15.3 m	
242		EC, β^+ 98.4		Insufficient information.
243	^{202}Po	α 2	44.7 m	
244		EC, β^+ ?		No scheme.
245	^{204}Po	α 0.66	3.53 h	
246		EC, β^+ 99.34		
247	^{206}Po	α 5.45	8.8 d	
248		EC, β^+ 94.55		IBE was calculated.
249	^{208}Po	$\alpha \approx 100$	2.898 y	
250		EC, β^+ 0.00223		
251	^{209}Po	$\alpha \approx 100$	102 y	
252		EC, β^+ 0.48		
253	^{217}Po	$\alpha > 95$	1.47 s	
254		$\beta^- < 5$		No data set.
255	^{205}At	α 10	26.2 m	
256		EC, β^+ 90		
257	^{206}At	α 0.89	30.0 m	
258		EC, β^+ 99.11		
259	^{208}At	α 0.55	1.63 h	
260		EC, β^+ 99.45		IBE was calculated.
261	^{209}At	α 4.1	5.41 h	
262		EC, β^+ 95.9		
263	^{210}At	α 0.175	8.1 h	
264		EC, $\beta^+ \approx 100$		
265	^{208}Rn	α 62	24.35 m	
266		EC, β^+ 38		Insufficient information.
267	^{209}Rn	α 17	28.5 m	
268		EC, β^+ 83		
269	^{210}Rn	α 96	2.4 h	
270		EC, β^+ 4		
271	^{211}Rn	α 27.4	14.6 h	
272		EC, β^+ 72.6		
273	^{212}Rn	α 100	23.9 m	
274	^{216}Rn	α 100	4.5E−5 s	
275	^{221}Rn	α 22	25 m	
276		β^- 78		
277	^{223}Rn	β^- 100	23.2 m	No scheme.
278	^{224}Rn	β^- 100	107 m	No scheme.
279	^{212}Fr	α 43	20.0 m	
280		EC, β^+ 57		

Table 1. continued.

No.	Nuclide	Decay mode (%)	Half-life	Comment
281	^{220}Ra	α 100	1.78E−2 s	
282	^{230}Ra	β^- 100	93 m	
283	^{229}Ac	β^- 100	62.7 m	
284	^{230}Ac	β^- 100	122 s	
285	^{224}Th	α 100	1.05 s	
286	^{229m}Th	IT ?	70 h	No data set.
287	^{233}Th	β^- 100	22.3 m	
288	^{236}Th	β^- 100	37.5 m	
289	^{238}Th	β^- ?	20 m	No data set.
290	^{229}Pa	α 0.48	1.50 d	
291		EC $\approx$ 100		
292	^{235}Pa	β^- 100	24.5 m	Insufficient information.
293	^{236}Pa	β^-SF 6E−8	9.1 m	Data set was not prepared.
294		β^- 100		
295	^{239}Pa	β^- 100	106 m	No data set.
296	^{228}U	$\alpha > 95$	9.1 m	
297		EC < 5		No data set.
298	^{229}U	$\alpha \approx 20$	58 m	Insufficient information.
299		EC, $\beta^+ \approx 80$		Insufficient information.
300	^{235m}U	IT 100	25 m	New data set.
301	^{242}U	β^- 100	16.8 m	Insufficient information.
302	^{231}Np	α 2	48.8 m	
303		EC, β^+ 98		
304	^{241}Np	β^- 100	13.9 m	
305	^{232}Pu	α 11	34.1 m	BR (0.2) given in the data set was used.
306		EC ?		BR (0.8) given in the data set was used.
307	^{233}Pu	α 0.12	20.9 m	
308		EC, $\beta^+ \approx 100$		Insufficient information.
309	^{247}Pu	β^- 100	2.27 d	No data set.
310	^{235}Am	EC, $\beta^+ \approx 100$	15 m	No data set.
311	^{236}Am	α ?	30 m	No data set.
312		EC, β^+ ?		No data set.
313	^{247}Am	β^- 100	23.0 m	
314	^{248}Am	β^- 100	10 m	No data set.
315	^{236}Cm	α ?	10 m	No data set.
316		EC, β^+ ?		No data set.
317	^{237}Cm	α ?	20 m	No data set.
318		EC, β^+ ?		No data set.
319	^{239}Cm	$\alpha < 0.1$	2.9 h	No data set.
320		EC, $\beta^+ \approx 100$		
321	^{251}Cm	β^- 100	16.8 m	

Table 1. continued.

No.	Nuclide	Decay mode (%)	Half-life	Comment
322	^{252}Cm	β^- 100	< 2 d	No data set.
323	^{243}Bk	$\alpha \approx 0.15$	4.5 h	
324		EC, $\beta^+ \approx 100$		Insufficient information.
325	^{244}Bk	α 0.006	4.35 h	
326		EC, $\beta^+ \approx 100$		No scheme.
327	^{248m}Bk	α 0.001	23.7 h	No data set.
328		EC 30		
329		β^- 70		
330	^{248}Bk	$\alpha > 70$	> 9 y	No data set.
331	^{251}Bk	$\alpha \approx$ 1E−5	55.6 m	No data set.
332		β^- 100		
333	^{253}Bk	β^- ?	10 m	No data set.
334	^{243}Cf	$\alpha \approx 14$	10.7 m	
335		EC, $\beta^+ \approx 86$		No scheme.
336	^{245}Cf	α 36	45.0 m	Insufficient information.
337		EC, β^+ 64		No scheme.
338	^{247}Cf	$\alpha \approx 0.035$	3.11 h	
339		EC $\approx$ 100		
340	^{255}Cf	SF < 0.001	85 m	New data set.
341		α 1E−5		No data set.
342		β^- 100		
343	^{256}Cf	SF 100	12.3 m	New data set.
344		α 1E−6		No data set.
345		β^- < 1		No data set.
246	^{248m}Es	?	41 m	No data set.
347	^{248}Es	β^+SF 3E−5	27 m	
348		$\alpha \approx 0.25$		Spin & parity in the g.s.*9 of ^{244}Bk were corrected.
349		EC, $\beta^+ \approx 100$		No data set.
350	^{249}Es	α 0.57	102.2 m	
351		EC, $\beta^+ \approx 100$		
352	^{250}Es	α < 3	8.6 h	No data set.
353		EC, $\beta^+ > 97$		
354	^{252}Es	α 76	471.7 d	
355		EC 24		
356		$\beta^- \approx 0.01$		No data set.
357	^{255}Es	SF 0.0041	39.8 d	New data set.
358		α 8.0		
359		β^- 92.0		
360	^{256m}Es	β^-SF 0.002	7.6 h	
361		$\beta^- \approx 100$		Insufficient information.
362	^{256}Es	β^- 100	25.4 m	

*9 g.s. = Ground state.

Table 1. continued.

No.	Nuclide	Decay mode (%)	Half-life	Comment
363	^{257}Es	α ?	2 h	No data set.
364		β^- ?		No data set.
365	^{250}Fm	SF $\approx$ 0.0006	30 m	
366		$\alpha > 90$		
367		EC < 10		No data set.
368	^{251}Fm	α 1.80	5.30 h	
369		EC, β^+ 98.20		
370	^{256}Fm	SF 91.9	157.6 m	New data set.
371		α 8.1		
372	^{254m}Md	EC, $\beta^+ \approx 100$	28 m	No data set.
373	^{254}Md	EC, $\beta^+ \approx 100$	10 m	No data set.
374	^{255}Md	SF < 0.15	27 m	
375		α 8		
376		EC, β^+ 92		
377	^{256}Md	α 11	78.1 m	
378		EC, β^+ 89		
379	^{258m}Md	SF < 20	57.0 m	
380		$\alpha < 1.2$		No data set.
381		EC ?		
382		$\beta^- < 10$		No data set.
383	^{259}Md	SF ?	1.60 h	
384		$\alpha < 1.3$		No data set.
385	^{260}Md	SF ?	27.8 d	
386		$\alpha < 5$		No data set.
387		EC < 5		No data set.
388		$\beta^- < 3.5$		No data set.
389	^{259}No	SF < 10	58 m	
390		α 75		
391		EC 25		
392	^{261}Lr	SF ?	39 m	No data set.
393		α ?		No data set.
394	^{262}Lr	α ?	3.6 h	No data set.
395		EC, β^+ ?		No data set.
396	^{263}Db	SF ?	10 m	No data set.
397		α ?		No data set.

Table 2. List of radionuclides that are important in fusion reactor facilities.

No.	Nuclide	Decay mode (%)	Half-life	Comment
398	^{16}N	β^- 100	7.13 s	
399	^{37}S	β^- 100	5.05 m	
400	^{40}Cl	β^- 100	1.35 m	
401	^{52}V	β^- 100	3.743 m	
402	^{53}V	β^- 100	1.61 m	
403	^{55}Cr	β^- 100	3.497 m	
404	^{57}Mn	β^- 100	85.4 s	
405	^{62}Co	β^- 100	1.50 m	
406	^{94m}Nb	β^- 0.50	6.263 m	
407		IT 99.50		
408	^{125m}Xe	IT 100	57 s	
409	^{127m}Xe	IT 100	69.2 s	
410	^{137}Xe	β^- 100	3.818 m	
411	^{183m}W	IT 100	5.20 s	
412	^{185m}W	IT 100	1.597 m	

Table 3. Decay data set of ^{130}Ce.

```
130LA    130CE EC DECAY                96XU04                                980614
130CE  P 0.0         0+                22.9 M    3              2.21E+3   29
130LA  N 0.0358    20          1.0       1.0
130LA  L 0.0         3(+)              8.7 M     1
130LA  L     110.45 90,1
130LA  E                0.05  8    0.5  6    6.7   6             0.6       7
130LAS E EAV=4.9E2 13$CK=0.78 8$CL=0.108 11$CM+=0.030 3
130LA  G 110.4     2 77      6 [E2]                      1.41
130LAS G KC=0.91$LC=0.394$MC=0.086$NC+=0.0227
130LA  L     131.01 71+
130LA  G 131.1     2 1000      [E2]                     0.771
130LA  E                 3   3    37   4   4.90  16             40.0      24
130LAS E EAV=4.8E2 13$CK=0.78 7$CL=0.109 11$CM+=0.031 3
130LAS G KC=0.532$LC=0.187$MC=0.0407$NC+=0.0107
130LA  L     219.72 91+
130LA  E                0.3  4    5.1  8   5.72  17             5.4       7
130LAS E EAV=4.4E2 13$CK=0.80 7$CL=0.111 10$CM+=0.031 3
130LA  G 88.9      2 24.0    12[M1]                      1.54
130LAS G K/T=0.517$L/T=0.0700$M/T=0.0145$N/T=0.00400
130LA  G 109.3     3 39      6 [M1]                      0.85
130LAS G KC=0.726$LC=0.098$MC=0.0203$NC+=0.00561
130LA  G 219.8     2 157.3   16[E2]                     0.130
130LAS G KC=0.102$LC=0.0227$MC=0.00485$NC+=0.00129
130LA  L     267.30 81+
130LA  E                0.3  4    5.9  7   5.64  17             6.2       6
130LAS E EAV=4.2E2 13$CK=0.81 6$CL=0.112 9$CM+=0.0315 25
130LA  G 47.5      2 1.0     5 [M1]                       9.5
130LAS G K/T=0.771$L/T=0.105$M/T=0.0218
130LA  G 136.4     2 136.8   27[M1]                     0.455
130LAS G KC=0.389$LC=0.0524$MC=0.0108$NC+=0.00299
130LA  G 267.3     2 129.1   30[E2]                     0.0683
130LAS G KC=0.0546$LC=0.0109$MC=0.00230$NC+=0.00062
130LA  L     304.10110,1
130LA  E                0.04  5   0.79  16  6.49  19            0.83      16
130LAS E EAV=4.0E2 13$CK=0.81 6$CL=0.113 8$CM+=0.0318 23
130LA  G 193.6     2 4.2     11[M1]                     0.173
130LAS G KC=0.148$LC=0.0197$MC=0.00408$NC+=0.00113
130LA  G 304.1     2 28.2    14[E2]                     0.0451
130LAS G KC=0.0365$LC=0.00680$MC=0.00144$NC+=0.00039
130LA  L     307.49 90,1
130LA  E                0.09  14   2.0  3   6.09  18            2.1       3
130LAS E EAV=4.0E2 13$CK=0.81 6$CL=0.113 8$CM+=0.0318 23
130LA  G 87.9      2 3.4     10[M1]                       1.59
130LAS G K/T=0.524$L/T=0.0709$M/T=0.0147$N/T=0.00405
130LA  G 196.9     2 24.5    15[M1]                     0.165
130LAS G KC=0.142$LC=0.0188$MC=0.00390$NC+=0.00108
130LA  G 307.5     2 143.5   10[E2]                     0.0436
130LAS G KC=0.0353$LC=0.00654$MC=0.00138$NC+=0.00037
130LA  L     340.64 81+
130LA  E                0.10  17   2.6  4   5.96  18            2.7       4
130LAS E EAV=3.9E2 13$CK=0.82 6$CL=0.114 8$CM+=0.0320 22
130LA  G 73.5      2 1.3     6 [M1]                       2.66
130LAS G K/T=0.620$L/T=0.084$M/T=0.0174$N/T=0.00482
```

```
130LA  G 209.6     2 118.5   20[M1]                    0.140
130LAS G KC=0.119$LC=0.0159$MC=0.00328$NC+=0.00091
130LA  G 230.5     2 8.2     20[M1]                    0.108
130LAS G KC=0.092$LC=0.0123$MC=0.00253$NC+=0.00070
130LA  G 340.6     2 42.8    10[E2]                    0.0317
130LAS G KC=0.0259$LC=0.00458$MC=0.00097$NC+=0.00026
130LA  L     350.72100,1
130LA  E               0.03  6   0.91  20  6.41  19            0.94      20
130LAS E EAV=3.8E2 13$CK=0.82 5$CL=0.114 8$CM+=0.0320 22
130LA  G 46.7      2 0.7     3 [M1]                     10.0
130LAS G K/T=0.775$L/T=0.105$M/T=0.0219
130LA  G 83.4      2 2.8     6 [M1]                     1.85
130LAS G K/T=0.554$L/T=0.0750$M/T=0.0155$N/T=0.00429
130LA  G 131.0     3 8.7     5 [M1]                    0.510
130LAS G KC=0.436$LC=0.0587$MC=0.0121$NC+=0.00335
130LA  G 240.1     2 7.1     10[M1]                    0.097
130LAS G KC=0.0827$LC=0.0110$MC=0.00227$NC+=0.00063
130LA  G 350.8     2 17.1    15
130LA  L     384.76 90,1
130LA  E               0.02  4    0.6  4    6.6   4            0.6       4
130LAS E EAV=3.7E2 13$CK=0.82 5$CL=0.115 7$CM+=0.0322 21
130LA  G 77.6      2 0.5     3 [M1]                     2.27
130LAS G K/T=0.593$L/T=0.0804$M/T=0.0167$N/T=0.00460
130LA  G 80.5      2 0.6     4 [M1]                     2.04
130LAS G K/T=0.573$L/T=0.0777$M/T=0.0161$N/T=0.00445
130LA  G 253.7     2 40.3    30[M1]                    0.0833
130LAS G KC=0.0714$LC=0.0095$MC=0.00196$NC+=0.00054
130LA  G 274.2     2 24.6    12[M1]                    0.0678
130LAS G KC=0.0581$LC=0.00769$MC=0.00159$NC+=0.00044
130LA  G 384.8     2 19      4
130LA  L     430.17170,1
130LA  E               0.03  7    1.3  4   6.23  22            1.3       4
130LAS E EAV=3.5E2 13$CK=0.83 5$CL=0.115 7$CM+=0.0325 19
130LA  G 163.0     3 21      5 [M1]                    0.277
130LAS G KC=0.237$LC=0.0318$MC=0.00657$NC+=0.00182
130LA  G 430.2     3 19      6
130LA  L     431.51150,1
130LA  E               0.02  4   0.69  18  6.49  20            0.71      18
130LAS E EAV=3.5E2 13$CK=0.83 5$CL=0.115 7$CM+=0.0325 19
130LA  G 127.5     3 0.6     4 [M1]                    0.550
130LAS G KC=0.470$LC=0.0634$MC=0.0131$NC+=0.00362
130LA  G 300.5     2 21.7    13[M1]                    0.0533
130LAS G KC=0.0457$LC=0.00602$MC=0.00124$NC+=0.00034
130LA  G 431.5     3 7       4
130LA  L     443.18120,1
130LA  E               0.007 16  0.29  22   6.9   4            0.30      23
130LAS E EAV=3.4E2 13$CK=0.83 5$CL=0.116 7$CM+=0.0325 19
130LA  G 139.0     3 0.6     4 [M1]                    0.432
130LAS G KC=0.369$LC=0.0497$MC=0.0103$NC+=0.00284
130LA  G 175.8     2 5.3     26[M1]                    0.225
130LAS G KC=0.193$LC=0.0257$MC=0.00533$NC+=0.00147
130LA  G 443.2     3 17      5
130LA  L     444.38 91+
130LA  E               0.07  14   2.8  4   5.87  18            2.9       4
130LAS E EAV=3.4E2 13$CK=0.83 5$CL=0.116 7$CM+=0.0325 18
130LA  G 59.6      2 4.1     7 [M1]                     4.89
130LAS G K/T=0.708$L/T=0.096$M/T=0.0200$N/T=0.00550
```

```
130LA  G 103.9     2 6.5     13[M1]                    0.98
130LAS G KC=0.84$LC=0.114$MC=0.0235$NC+=0.00648
130LA  G 136.6     3 9.6     3 [M1]                   0.453
130LAS G KC=0.387$LC=0.0522$MC=0.0108$NC+=0.00298
130LA  G 176.9     2 35.2    14[M1]                   0.221
130LAS G KC=0.189$LC=0.0253$MC=0.00523$NC+=0.00145
130LA  G 313.3     2 6.6     13[M1]                   0.0478
130LAS G KC=0.0409$LC=0.00539$MC=0.00111$NC+=0.00031
130LA  G 333.9     2 6.5     14[M1]                   0.0405
130LAS G KC=0.0347$LC=0.00456$MC=0.00094$NC+=0.00026
130LA  G 444.2     2 13      4
130LA  L     477.14180,1
130LA  E               0.01  3   0.71  12  6.46  19            0.72      12
130LAS E EAV=3.3E2 13$CK=0.83 4$CL=0.116 6$CM+=0.0327 17
130LA  G 209.9     2 8.5     8 [M1]                   0.139
130LAS G KC=0.119$LC=0.0158$MC=0.00327$NC+=0.00090
130LA  G 477.0     3 10.4    30
130LA  L     477.95131+
130LA  E               0.05  12   2.5  3   5.90  18            2.6       3
130LAS E EAV=3.3E2 13$CK=0.83 4$CL=0.116 6$CM+=0.0327 17
130LA  G 93.3      2 9.0     18[M1]                    1.34
130LAS G KC=1.14$LC=0.155$MC=0.0320$NC+=0.0088
130LA  G 170.5     3 6.8     12[M1]                   0.245
130LAS G KC=0.209$LC=0.0280$MC=0.00580$NC+=0.00160
130LA  G 346.8     2 30.2    30[M1]                   0.0367
130LAS G KC=0.0314$LC=0.00412$MC=0.00085$NC+=0.00023
130LA  G 478.0     3 10.4    30
130LA  L     481.90160,1
130LA  E               0.01  3   0.68  21  6.47  22            0.69      21
130LAS E EAV=3.2E2 13$CK=0.83 4$CL=0.116 6$CM+=0.0327 17
130LA  G 141.3     2 6       4 [M1]                   0.412
130LAS G KC=0.352$LC=0.0474$MC=0.0098$NC+=0.00271
130LA  G 214.7     3 3.6     7 [M1]                   0.131
130LAS G KC=0.112$LC=0.0149$MC=0.00307$NC+=0.00085
130LA  G 481.7     3 6.6     10
130LA  L     523.88111+
130LA  E               0.06  15   3.7  3   5.71  18            3.8       3
130LAS E EAV=3.1E2 13$CK=0.83 4$CL=0.117 6$CM+=0.0329 16
130LA  G 173.1     2 5.9     12[M1]                   0.235
130LAS G KC=0.201$LC=0.0269$MC=0.00556$NC+=0.00154
130LA  G 183.2     2 23.9    12[M1]                   0.201
130LAS G KC=0.172$LC=0.0230$MC=0.00475$NC+=0.00131
130LA  G 256.5     2 45.0    14[M1]                   0.0809
130LAS G KC=0.0693$LC=0.0092$MC=0.00190$NC+=0.00052
130LA  G 393.0     2 9.6     20
130LA  G 524.0     3 10.9    22
130LA  L     589.07160,1
130LA  E               0.01  3   0.76  12  6.37  20            0.77      12
130LAS E EAV=2.8E2 13$CK=0.84 3$CL=0.117 5$CM+=0.0331 14
130LA  G 248.4     2 5.8     20[M1]                   0.088
130LAS G KC=0.0755$LC=0.0100$MC=0.00207$NC+=0.00057
130LA  G 321.7     3 4.0     11[M1]                   0.0446
130LAS G KC=0.0382$LC=0.00503$MC=0.00104$NC+=0.00029
130LA  G 589.2     3 11.1    16
130LA  L     594.28180,1
130LA  E               0.008 25  0.73  9   6.38  19            0.74      9
130LAS E EAV=2.7E2 13$CK=0.84 3$CL=0.118 5$CM+=0.0331 14
```

```
130LA  G 463.3     2 18.6    18
130LA  G 594.2     3 2.1     10
130LA  L     606.74180,1
130LA  E                0.007 24  0.75  19  6.36  22            0.76      19
130LAS E EAV=2.7E2 13$CK=0.84 3$CL=0.118 5$CM+=0.0331 13
130LA  G 387.0     2 6.2     4
130LA  G 606.8     3 15      5
130LA  L     645.49140,1
130LA  E                0.006 22  0.75  18  6.34  22            0.76      18
130LAS E EAV=2.5E2 13$CK=0.841 24$CL=0.118 4$CM+=0.0332 12
130LA  G 294.8     2 6.7     20[M1]                      0.0560
130LAS G KC=0.0480$LC=0.00634$MC=0.00131$NC+=0.00036
130LA  G 535.1     2 8       4
130LA  G 645.3     3 6.1     15
130LA  L     672.93220,1
130LA  E                0.005 20  0.78  8   6.31  20            0.78      8
130LAS E EAV=2.4E2 13$CK=0.842 21$CL=0.118 4$CM+=0.0333 11
130LA  G 541.7     3 20.0    10
130LA  G 562.7     3 1.9     12
130LA  L     697.00140,1
130LA  E                0.005 23  0.97  14  6.20  21            0.97      14
130LAS E EAV=2.3E2 13$CK=0.843 19$CL=0.118 4$CM+=0.0334 11
130LA  G 266.9     2 8.2     10[M1]                      0.0728
130LAS G KC=0.0624$LC=0.00826$MC=0.00171$NC+=0.00047
130LA  G 389.2     3 3.3     17
130LA  G 566.2     2 13.4    27
130LA  G 696.7     3 1.7     10
130LA  L     810.46220,1
130LA  E                0.001 5   0.33  10  6.60  25            0.33      10
130LAS E EAV=1.8E2 14$CK=0.845 12$CL=0.119 3$CM+=0.0336 8
130LA  G 590.7     3 4.2     8
130LA  G 810.5     3 5.0     25
130LA  L      827.5 40,1
130LA  E                0.001 5   0.35  4   6.56  22            0.35      4
130LAS E EAV=1.7E2 14$CK=0.846 11$CL=0.1193 25$CM+=0.0336 8
130LA  G 520.0     3 9.7     10
130LA  L     913.60131+
130LA  E                        1.47  24  5.88  24            1.47      24
130LAS E CK=0.846 6$CL=0.1197 20$CM+=0.0338 6
130LA  G 470.5     2 5.5     14
130LA  G 528.8     2 12.3    24
130LA  G 605.8     3 15      5
130LA  G 694.2     3 3.8     20
130LA  G 782.5     3 4.5     6
130LA  L     985.90220,1
130LA  E                        0.27  6    6.6   3             0.27      6
130LAS E CK=0.846 3$CL=0.1201 18$CM+=0.0339 6
130LA  G 718.6     2 7.6     15
130LA  L    1032.45121+
130LA  E                        1.37  14   5.8   3             1.37      14
130LAS E CK=0.846 3$CL=0.1203 20$CM+=0.0340 7
130LA  G 724.9     2 9.1     15
130LA  G 765.2     3 6.2     12
130LA  G 901.3     2 13.7    15
130LA  G 922.0     3 3.8     13
130LA  G 1032.8    3 5.4     16
130LA  L    1168.73141+
```

```
130LA  E                          2.89  22   5.4   3             2.89      22
130LAS E CK=0.845 4$CL=0.121 3$CM+=0.0342 9
130LA  G 737.3     3 10.9    22
130LA  G 818.0     3 13.0    14
130LA  G 828.3     3 7.1     14
130LA  G 861.2     2 29.9    18
130LA  G 1037.5    3 19.7    20
130LA  L    1196.79101+
130LA  E                         10.6  7    4.8   3             10.6       7
130LAS E CK=0.844 4$CL=0.121 3$CM+=0.0343 10
130LA  G 752.2     2 31.6    25
130LA  G 812.0     3 17      4
130LA  G 856.3     2 38.3    20
130LA  G 889.4     2 32.8    20
130LA  G 977.2     2 105     8
130LA  G 1065.8    3 20.1    20
130LA  G 1196.6    2 51.7    26
130LA  L    1288.96121+
130LA  E                          4.2  3    5.1   4             4.2        3
130LAS E CK=0.844 5$CL=0.122 4$CM+=0.0345 12
130LA  G 845.6     2 10.4    16
130LA  G 948.3     3 16      3
130LA  G 1069.3    3 7.6     16
130LA  G 1158.0    3 27.5    21
130LA  G 1289.1    2 56.2    28
130LA  L    1431.19131+
130LA  E                         0.99  19   5.6   5             0.99       19
130LAS E CK=0.842 8$CL=0.123 6$CM+=0.0350 19
130LA  G 986.6     2 7       4
130LA  G 1123.8    3 3.7     5
130LA  G 1164.0    3 5.6     17
130LA  G 1300.3    3 5.7     16
130LA  G 1431.3    3 5.7     16
```

Table 4. Radiation type abbreviations used in the table (from ref. 1).

Radiation type abbreviation	Description of radiation type.
K_{α_1} X-ray K_{β_3} X-ray L_{α_2} X-ray etc.	The standard Siegbahn notation used to designate K- and L-series X rays. For low atomic numbers, the K- and L-series X rays are sometimes not broken down into separate components but are simply designated K or L X rays.
Auger-KLL Auger-KLX Auger-KXY Auger-LMM Auger-LMX Auger-LXY Auger-MXY	KLL, an Auger transition with an initial vacancy in the K shell and two resultant vacancies in the L shell. It is actually a composite of several Auger transitions of similar energy because there are three subshells in the L shell. Similar definitions apply to the other Auger transitions listed; X and Y refer to any shell higher than the L shell for K series Auger transitions and to any shell for L and M series Auger transitions.
Δ E	Residual low energy radiation (mostly Auger processes) for which theory cannot easily specify individual discrete transitions.
$\gamma\ i$	Gamma rays, where i is a sequential index ordered according to increasing gamma-ray energy.
$\gamma^{\pm}$	Annihilation photons from the annihilation of positrons and electrons. Each of the two annihilation photons is assumed to have an energy of 0.511 MeV; that is, annihilation at rest is assumed.
$\beta^{+}\ i$	Beta-plus particles, where i is a sequential index ordered according to increasing beta-plus end-point energy.
$\beta^{-}\ i$	Same as $\beta^{+}\ i$ except for beta-minus particles.
ce-K, $\gamma\ i$ ce-L_1, $\gamma\ i$ . . ce-N^{+}, $\gamma\ i$	Internal conversion electrons associated with the gamma ray having sequential index i. K and L_1 refer to internal conversion in the K and L_1 shells, respectively; N^{+} refers to internal conversion in the N and higher shells. Analogous designations apply to other shells or subshells.
$\alpha\ i$	Alpha particles, where i is a sequential index ordered according to increasing alpha-particle energy.
α recoil	Recoil atom associated with the immediately preceding alpha particle.
SF n SF f SF p γ SF d γ SF β	Spontaneous fission neutrons, fragments, prompt gamma rays, delayed gamma rays, and beta particles. In all cases, the energies associated with the SF radiations are averaged over a continuous spectrum of energies.

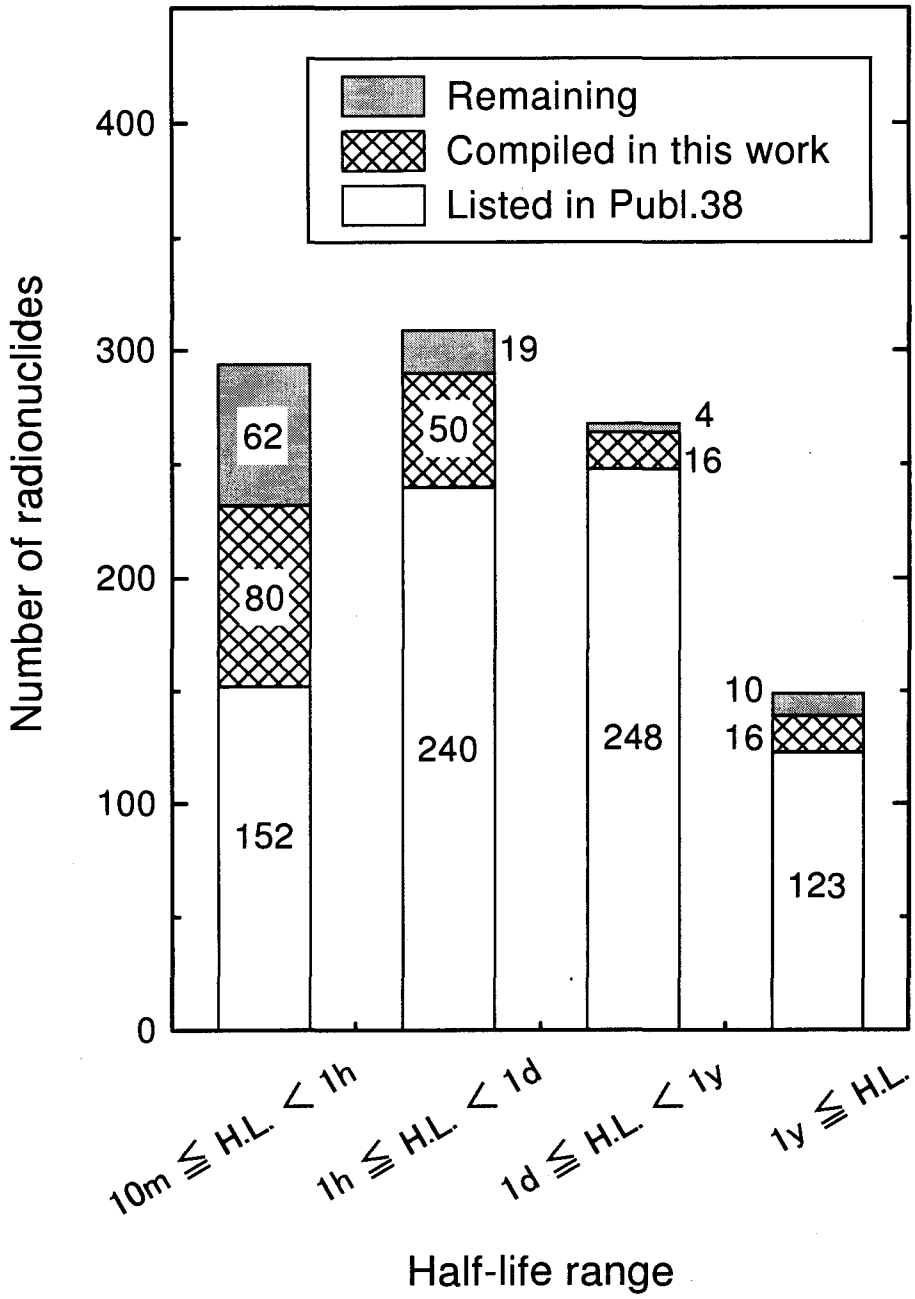


Figure 1. Distributions of the number of radionuclides whose decay data are compiled in Publ. 38 and the present study, classified by the half-life (H.L.) ranges. The values of half-life are based on the evaluated data of NUBASE.[20)]

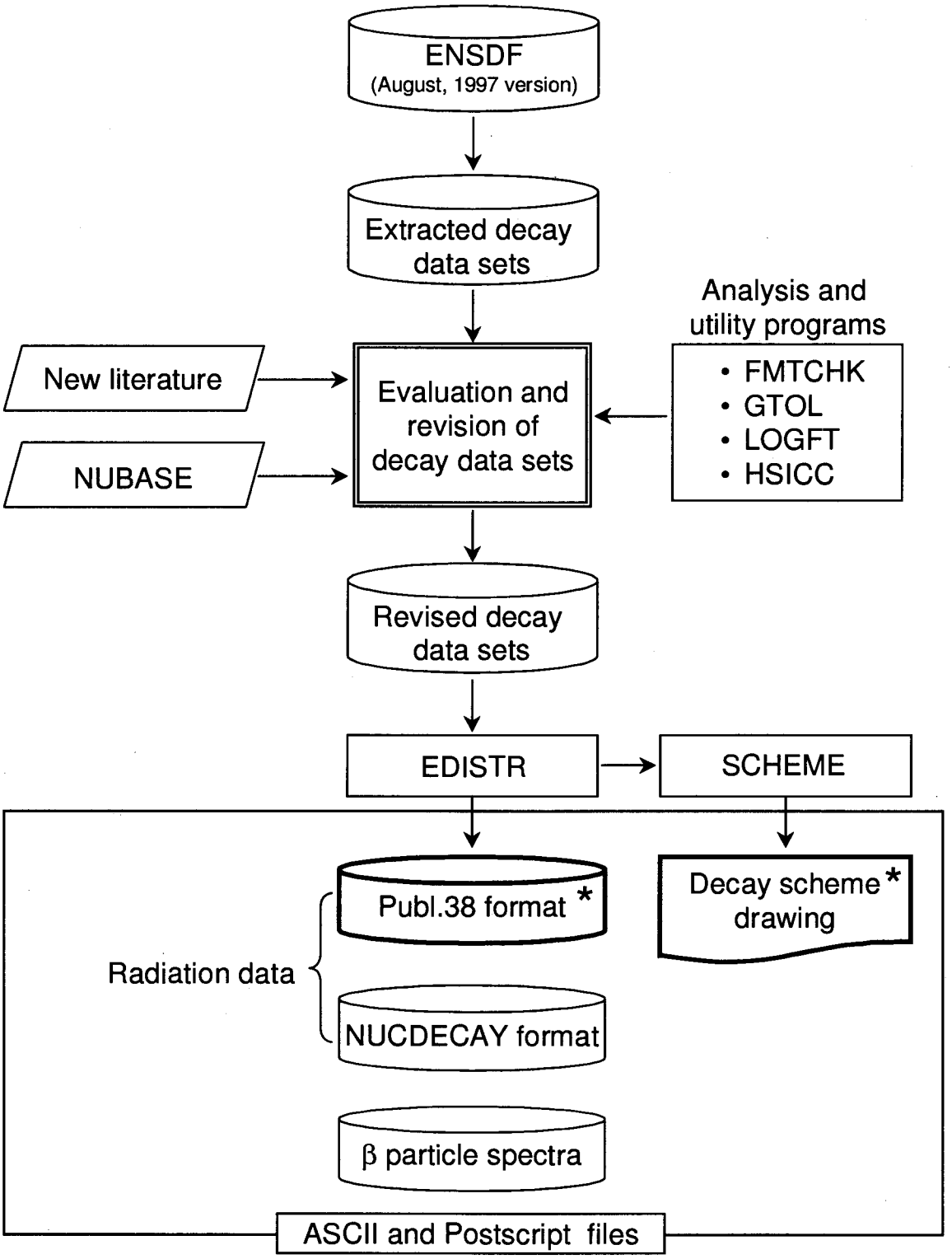


Figure 2. Flow of the compilation of nuclear decay data. The compiled data marked with asterisk (*) are presented in Appendix A of this report.

Appendix A

Lists of Nuclear Decay Data in the ICRP Publ. 38 Format

The compiled decay data in the Publ. 38 format are presented. The data are arranged in order of increasing atomic number. Within a given atomic number, the radionuclides appear in order of increasing mass number. A detailed description of the format of the data is given in Publ. 38. A brief overview is described below.

Table

Atomic number, element symbol and mass number are given at the beginning of a table. A date (day-month-year) that appears in the next line is that when the original data set was placed in the ENSDF. For radionuclides having multiple decay modes, the respective dates are given if these are different. For spontaneously fissioning nuclides, the date on which the data were prepared by the authors is given.

Half-life: Physical half-life of the nuclide. Units are abbreviated as follows: y = year, d = day, h = hour, m = minute, and s = second.

Decay mode(s): The decay modes are abbreviated as follows: α = alpha decay, EC = electron capture, $\beta^+ = \beta^+$ decay, $\beta^- = \beta^-$ decay, IT = isomeric transition, and SF = spontaneous fission.

There are four columns in the radiation table. These are:

Radiation: The type of radiation being considered. Radiation type abbreviations are listed in Table 4.

$y(i)$: The corresponding mean number of events per nuclear transformation. The unit, $(\mathrm{Bq\ s})^{-1}$, given for the second column is equivalent to transformation^{-1}.

$E(i)$: The corresponding transition energy in MeV. This value will be accompanied by an asterisk (*) if the value is a weighted average over several discrete transitions of similar energy or if it is an average over a continuous distribution of energies.

$y(i) \times E(i)$: The product of $y(i)$ and $E(i)$ values; it is the average energy emitted per transformation for the associated radiation type specified in the first column.

In the multiple decay mode cases, the data are sequenced according to the order of the decay modes.

Following the radiation table, the energy emitted per transformation by the listed and omitted radiations, along with the cutoff percentage used, are given. In Publ. 38, radiations that contribute below a specified percentage cutoff value of energy emitted per transformation are omitted in order to keep the tables within a reasonable size. In implementing the cutoff scheme, all radiations other than those associated with spontaneous fission are placed in one of three categories, and the cutoff is applied separately to each category. The three categories are (1) γ rays, X rays, and annihilation photons; (2) β particles, internal conversion electrons, and Auger electrons; and (3) α particles and recoil nuclei. If the number of radiations is $\leq$ 32, the cutoff percentage is set to 0.0. If the number of radiations is $>$ 32, then the cutoff percentage is initially set at 0.1 for each category. If necessary, the cutoff percentage is then increased in 0.1 increments until the number of radiations contributing more than the cutoff percentage to the equilibrium dose, summed over the three categories of radiations to which the

cutoff percentage is separately applied, is ≤ 175. The energies emitted per transformation by the listed and omitted radiations for each of the above three categories and for all categories are given.

At the end of the table, there is an indication of whether the daughter nuclide is stable or radioactive; when there is more than one daughter nuclide, the branching fractions are also given. If a radionuclide decays to an isomeric level in a daughter nucleus, the fraction of the transformations that feeds the isomeric level and the fraction that feeds the ground state are given separately. If the branching fraction is not given explicitly, a default value of 1.0 is implied.

Decay scheme drawing

The decay scheme drawings are simplified in that radiations that contribute less than the cutoff percentage to the energy emitted per transformation of the parent are generally not shown. However, there are several exceptions, as described below.

For a very low-yield transformation mode, the principal radiations associated with the mode are shown even if all radiations of the mode fall below the cutoff percentage. It may happen that transitions shown on the drawings do not have a corresponding entry appearing in the data table. This may occur, for example, when a γ transition yield is quite low but the associated internal conversion electrons are of significant intensity.

It also may happen that a γ transition from a particular nuclear level of the daughter is of sufficient yield to be included in the table of output data but there is no α or β or γ transition feeding this level that is of sufficient yield to be included in the table. In this circumstance, the α or β transition to such a level is included in the drawing; this happens because α particles, β particles, and γ rays are in different major categories of radiations to which the cutoff scheme is applied separately.

The converse of the situation described above may occur. For reasons analogous to those stated above, the most intense γ ray that depopulates the level involved has been included in the decay scheme drawing. At least one γ ray will always be shown depopulating an excited nuclear level unless the level is an isomer with half-lives ≥ 1 min or unless no γ rays depopulating the level have been observed.

Conversely, the transitions associated with entries appearing in the tables may be absent from the drawings. It may be, for example, that the placement of a γ ray in the level scheme of the daughter nuclide is unknown; if such a γ ray is sufficiently intense, it will appear as an entry in the data table but will be missing from the drawing. A similar remark applies to α and β transitions, although much less frequently.

16-S-38

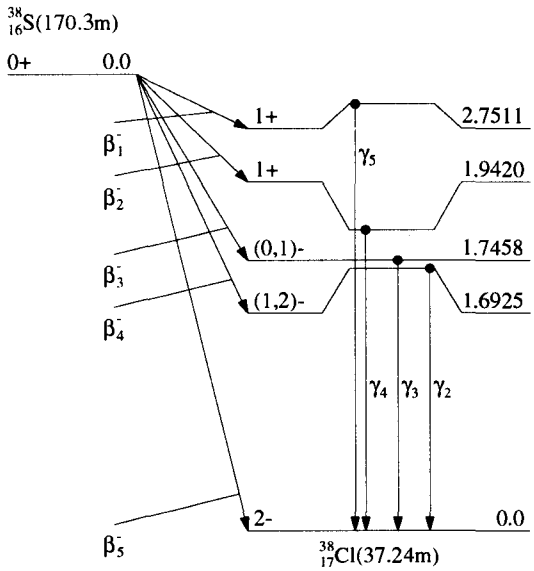
24-JUN-93

Half-life = 170.3 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.38E−02	5.453E−02*	7.53E−04
β^- 2	8.31E−01	3.720E−01*	3.09E−01
β^- 3	2.37E−02	4.578E−01*	1.09E−02
β^- 4	1.70E−03	4.815E−01*	8.19E−04
β^- 5	1.30E−01	1.291E+00*	1.68E−01
γ 2	1.66E−03	1.692E+00	2.81E−03
γ 3	2.44E−02	1.746E+00	4.26E−02
γ 4	8.30E−01	1.942E+00	1.61E+00
γ 5	1.38E−02	2.751E+00	3.79E−02
Listed X, γ and $\gamma^{\pm}$ radiations			1.70E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**			1.63E−04
Listed β, ce and Auger radiations			4.89E−01
Omitted β, ce and Auger radiations**			1.46E−05
Listed radiations			2.18E+00
Omitted radiations**			1.77E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cl-38 daughter is radioactive.



17-Cl-34m

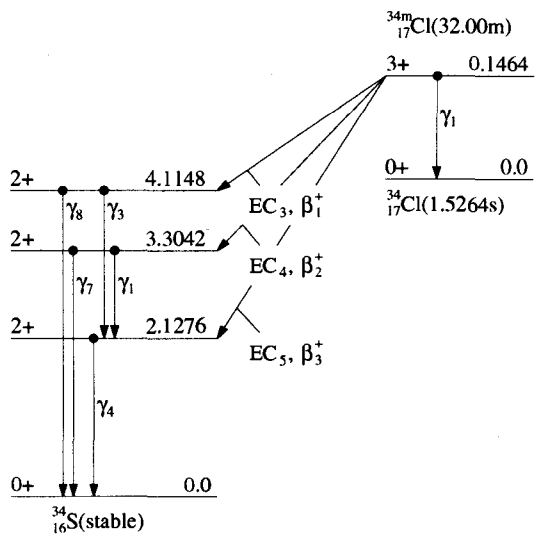
24-JUN-93

Half-life = 32.00 m
Decay mode(s): EC, β^+, IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	2.64E−03	2.031E−01*	5.35E−04
β^+ 2	2.56E−01	5.538E−01*	1.42E−01
β^+ 3	2.84E−01	1.099E+00*	3.12E−01
$\gamma^{\pm}$	1.08E+00	5.110E−01	5.54E−01
γ 1	1.41E−01	1.177E+00	1.66E−01
γ 3	1.85E−03	1.987E+00	3.68E−03
γ 4	4.28E−01	2.127E+00	9.11E−01
γ 7	1.23E−01	3.304E+00	4.06E−01
γ 8	2.73E−03	4.115E+00	1.12E−02
γ 1	4.05E−01	1.464E−01	5.93E−02
ce-K, γ 1	3.72E−02	1.435E−01	5.35E−03
Listed X, γ and $\gamma^{\pm}$ radiations			2.11E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**			1.73E−03
Listed β, ce and Auger radiations			4.59E−01
Omitted β, ce and Auger radiations**			5.99E−04
Listed radiations			2.57E+00
Omitted radiations**			2.33E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

S-34 daughter, yield 5.54E−01, is stable.
Cl-34 daughter, yield 4.46E−01, is radioactive.



17-Cl-34

24-JUN-93

Half-life = 1.5264 s
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	9.99E−01	2.052E+00*	2.05E+00
$\gamma^{\pm}$	2.00E+00	5.110E−01	1.02E+00
K_{α_1} X-ray	3.46E−05	2.307E−03	7.97E−08
K_{α_2} X-ray	1.73E−05	2.307E−03	3.99E−08
K_{α_3} X-ray	7.95E−13	2.243E−03	1.78E−15
K_{β_1} X-ray	2.14E−06	2.471E−03	5.28E−09
K_{β_3} X-ray	1.07E−06	2.471E−03	2.66E−09
L_α X-ray	3.20E−07	1.648E−04*	5.28E−11
L_β X-ray	1.14E−08	2.277E−04*	2.59E−12
Auger-KLL	6.07E−04	2.081E−03*	1.26E−06
Auger-KLX	5.90E−05	2.283E−03*	1.35E−07
Auger-KXY	3.23E−06	2.465E−03*	7.97E−09
Auger-MXY	6.90E−05	5.078E−06*	3.50E−10
Listed X, γ and $\gamma^{\pm}$ radiations			1.02E+00
Listed β, ce and Auger radiations			2.05E+00
Listed radiations			3.07E+00

* Average energy (MeV)

S-34 daughter is stable.

18-Ar-42

24-JUN-93

Half-life = 32.9 y
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.00E+00	2.325E−01*	2.33E−01
Listed β, ce and Auger radiations			2.33E−01
Listed radiations			2.33E−01

* Average energy (MeV)

K-42 daughter is radioactive.

18-Ar-44

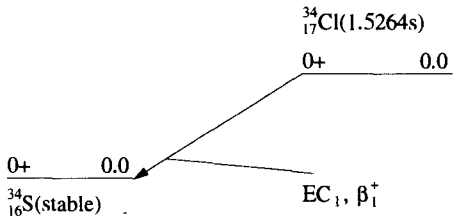
24-JUN-93

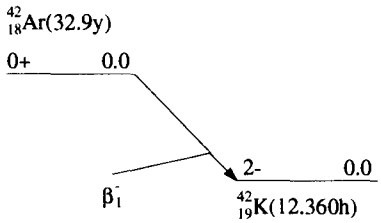
Half-life = 11.87 m
Decay mode(s): β^-

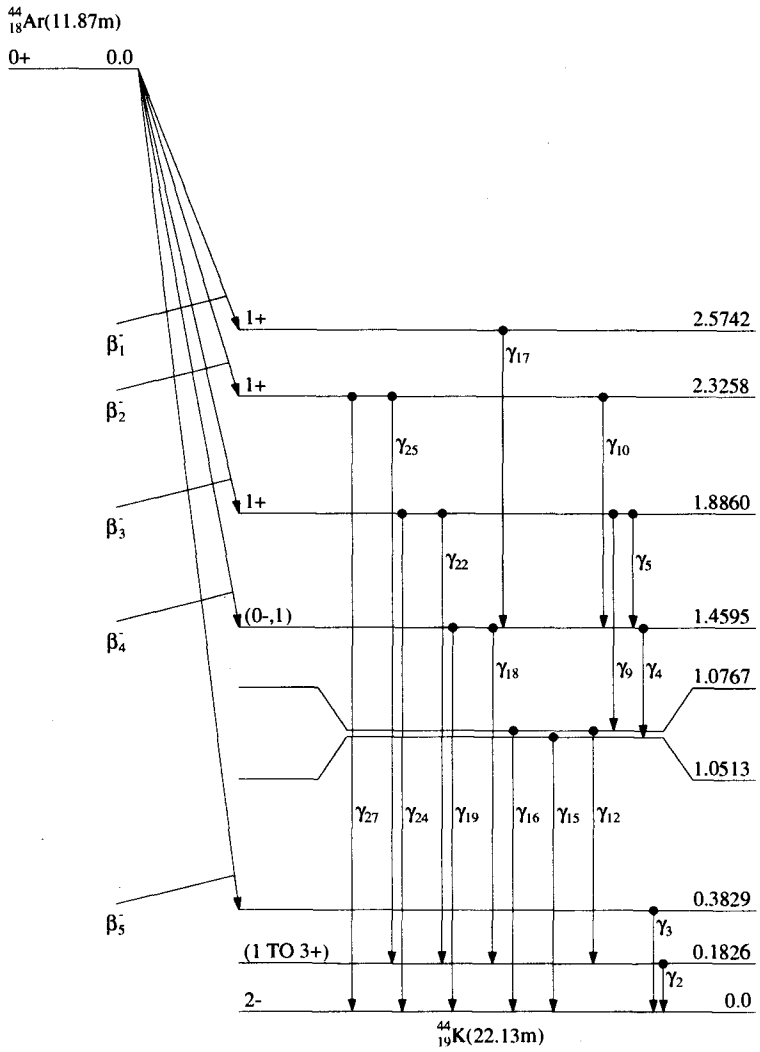
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	2.20E−02	3.622E−01*	7.97E−03
β^- 2	3.20E−02	4.705E−01*	1.51E−02
β^- 3	9.30E−01	6.693E−01*	6.22E−01
β^- 4	1.50E−02	8.674E−01*	1.30E−02
β^- 5	1.40E−03	1.380E+00*	1.93E−03
γ 2	6.60E−01	1.826E−01	1.21E−01
γ 3	5.15E−03	3.829E−01	1.97E−03
γ 4	4.12E−02	4.082E−01	1.68E−02
γ 5	2.63E−02	4.265E−01	1.12E−02
γ 9	1.95E−02	8.093E−01	1.58E−02
γ 10	1.63E−02	8.663E−01	1.41E−02
γ 12	6.67E−03	8.941E−01	5.96E−03
γ 14	2.18E−03	9.750E−01	2.12E−03
γ 15	3.95E−02	1.051E+00	4.15E−02
γ 16	9.70E−03	1.077E+00	1.04E−02
γ 17	2.18E−02	1.115E+00	2.43E−02
γ 18	1.54E−02	1.277E+00	1.96E−02
γ 19	2.18E−02	1.459E+00	3.18E−02
γ 20	5.15E−03	1.586E+00	8.16E−03
γ 21	6.73E−03	1.640E+00	1.10E−02
γ 22	5.65E−01	1.703E+00	9.63E−01
γ 23	1.12E−03	1.765E+00	1.98E−03
γ 24	3.14E−01	1.886E+00	5.93E−01
γ 25	7.79E−03	2.143E+00	1.67E−02
γ 26	1.72E−03	2.280E+00	3.91E−03
γ 27	8.12E−03	2.326E+00	1.89E−02
Listed X, γ and $\gamma^{\pm}$ radiations			1.93E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**			4.37E−03
Listed β, ce and Auger radiations			6.60E−01
Omitted β, ce and Auger radiations**			4.06E−04
Listed radiations			2.59E+00
Omitted radiations**			4.77E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

K-44 daughter is radioactive.


$^{34}_{17}$Cl(1.5264s)
0+ 0.0
0+ 0.0
$^{34}_{16}$S(stable)
EC$_1$, β^+_1


$^{42}_{18}$Ar(32.9y)
0+ 0.0
2- 0.0
β^-_1
$^{42}_{19}$K(12.360h)


$^{44}_{18}$Ar(11.87m)
0+ 0.0
β^-_1
β^-_2
β^-_3
β^-_4
β^-_5
1+ 2.5742
1+ 2.3258
1+ 1.8860
(0-,1) 1.4595
1.0767
1.0513
0.3829
(1 TO 3+) 0.1826
2- 0.0
γ_{17}
γ_{25}
γ_{10}
γ_{22}
γ_5
γ_{18}
γ_9
γ_4
γ_{27}
γ_{24}
γ_{19}
γ_{16}
γ_{15}
γ_{12}
γ_3
γ_2
$^{44}_{19}$K(22.13m)

23-V-50

05-SEP-95

Half-life = 1.5E+17 y
Decay mode(s): EC, β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	8.30E−01	1.554E+00	1.29E+00
ce-K, γ 1	3.45E−05	1.549E+00	5.35E−05
Auger-KLL	4.89E−01	3.962E−03*	1.94E−03
Auger-KLX	9.24E−02	4.441E−03*	4.10E−04
Auger-KXY	6.60E−03	4.895E−03*	3.23E−05
Auger-LMM	1.29E+00	4.316E−04*	5.55E−04
Auger-MXY	2.70E+00	1.422E−05*	3.84E−05
β^- 1	1.70E−01	7.514E−02*	1.28E−02
γ 1	1.70E−01	7.833E−01	1.33E−01
ce-K, γ 1	4.51E−05	7.773E−01	3.51E−05

Listed X, γ and $\gamma^{\pm}$ radiations	1.42E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	7.51E−04
Listed β, ce and Auger radiations	1.58E−02
Omitted β, ce and Auger radiations**	1.16E−05
Listed radiations	1.44E+00
Omitted radiations**	7.63E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ti-50 daughter, yield 8.30E−01, is stable.
Cr-50 daughter, yield 1.70E−01, is stable.

34-Se-72

26-JAN-95

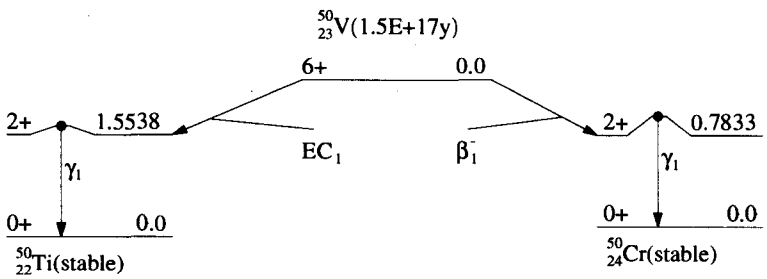
Half-life = 8.4 d
Decay mode(s): EC

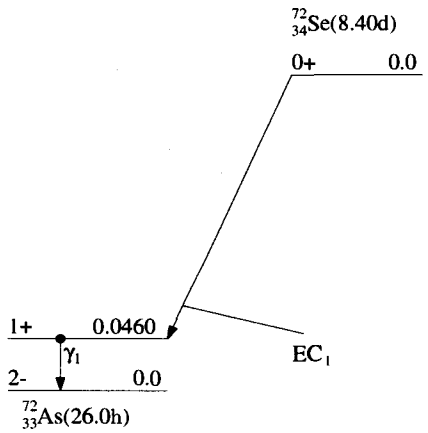
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	5.80E−01	4.600E−02	2.67E−02
ce-K, γ 1	3.83E−01	3.413E−02	1.31E−02
ce-L_1, γ 1	3.35E−02	4.447E−02	1.49E−03
ce-L_2, γ 1	2.76E−03	4.464E−02	1.23E−04
ce-L_3, γ 1	4.75E−03	4.468E−02	2.12E−04
ce-M, γ 1	6.28E−03	4.586E−02*	2.88E−04
K_{α_1} X-ray	4.08E−01	1.054E−02	4.30E−03
K_{α_2} X-ray	2.10E−01	1.051E−02	2.20E−03
K_{β_1} X-ray	6.00E−02	1.173E−02	7.03E−04
K_{β_2} X-ray	3.51E−03	1.186E−02	4.16E−05
K_{β_3} X-ray	3.06E−02	1.172E−02	3.59E−04
Auger-KLL	4.04E−01	9.040E−03*	3.65E−03
Auger-KLX	1.27E−01	1.032E−02*	1.31E−03
Auger-KXY	1.34E−02	1.157E−02*	1.55E−04
Auger-LMM	1.45E+00	1.165E−03*	1.69E−03
Auger-LMX	2.29E−01	1.302E−03*	2.98E−04
Auger-MXY	3.41E+00	9.076E−05*	3.09E−04

Listed X, γ and $\gamma^{\pm}$ radiations	3.43E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.92E−05
Listed β, ce and Auger radiations	2.26E−02
Omitted β, ce and Auger radiations**	1.10E−05
Listed radiations	5.69E−02
Omitted radiations**	3.02E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

As-72 daughter is radioactive.





37-Rb-78

07-AUG-91

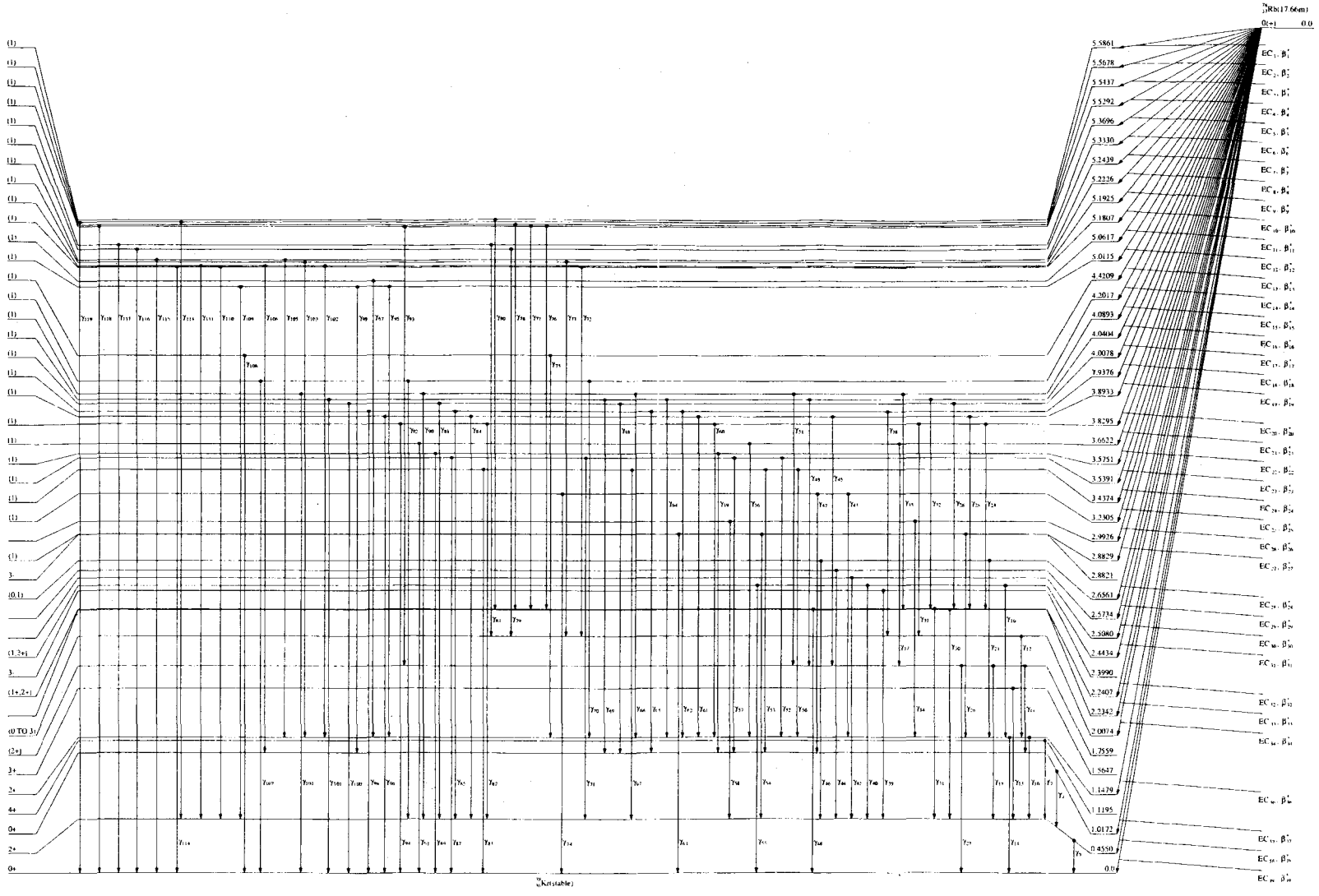
Half-life = 17.66 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 9	4.31E−03	4.401E−01*	1.90E−03
β^+ 10	3.49E−03	4.453E−01*	1.55E−03
β^+ 12	4.00E−03	5.202E−01*	2.08E−03
β^+ 13	6.05E−03	7.867E−01*	4.76E−03
β^+ 14	5.33E−03	8.873E−01*	4.73E−03
β^+ 15	2.67E−02	9.392E−01*	2.50E−02
β^+ 16	3.39E−02	9.618E−01*	3.26E−02
β^+ 17	2.05E−02	9.769E−01*	2.00E−02
β^+ 18	3.08E−02	1.009E+00*	3.11E−02
β^+ 19	1.63E−01	1.030E+00*	1.68E−01
β^+ 20	2.76E−02	1.060E+00*	2.92E−02
β^+ 21	3.68E−02	1.138E+00*	4.19E−02
β^+ 22	2.61E−02	1.179E+00*	3.07E−02
β^+ 23	6.67E−02	1.196E+00*	7.97E−02
β^+ 24	1.53E−01	1.243E+00*	1.90E−01
β^+ 25	1.61E−02	1.341E+00*	2.16E−02
β^+ 26	4.72E−03	1.454E+00*	6.86E−03
β^+ 27	9.44E−03	1.506E+00*	1.42E−02
β^+ 28	1.03E−02	1.614E+00*	1.66E−02
β^+ 29	9.23E−03	1.653E+00*	1.53E−02
β^+ 30	5.54E−03	1.684E+00*	9.33E−03
β^+ 31	2.43E−02	1.715E+00*	4.17E−02
β^+ 32	1.40E−02	1.813E+00*	2.53E−02
β^+ 33	7.18E−03	1.816E+00*	1.30E−02
β^+ 34	5.03E−03	1.925E+00*	9.67E−03
β^+ 35	2.67E−03	2.038E+00*	5.43E−03
β^+ 36	3.28E−02	2.342E+00*	7.69E−02
β^+ 37	2.05E−02	2.403E+00*	4.93E−02
β^+ 38	2.46E−02	2.674E+00*	6.58E−02
β^+ 39	8.21E−02	2.898E+00*	2.38E−01
$\gamma^{\pm}$	1.77E+00	5.110E−01	9.07E−01
γ 3	6.27E−01	4.550E−01	2.85E−01
γ 4	1.14E−01	5.622E−01	6.41E−02
γ 7	1.17E−02	6.644E−01	7.75E−03
γ 10	1.26E−01	6.929E−01	8.70E−02
γ 11	1.66E−02	7.387E−01	1.22E−02
γ 12	2.84E−02	8.596E−01	2.44E−02
γ 13	1.20E−02	1.110E+00	1.33E−02
γ 14	7.91E−02	1.148E+00	9.08E−02
γ 16	4.70E−03	1.295E+00	6.09E−03
γ 17	3.20E−02	1.301E+00	4.17E−02
γ 23	3.45E−03	1.508E+00	5.20E−03
γ 24	4.20E−03	1.595E+00	6.70E−03
γ 25	5.77E−03	1.653E+00	9.53E−03
γ 26	6.58E−03	1.735E+00	1.14E−02
γ 27	8.15E−03	1.756E+00	1.43E−02
γ 28	4.33E−03	1.767E+00	7.64E−03
γ 30	2.96E−02	1.779E+00	5.27E−02
γ 31	8.53E−03	1.786E+00	1.52E−02
γ 32	3.82E−03	1.806E+00	6.91E−03
γ 33	9.53E−03	1.822E+00	1.74E−02
γ 34	2.88E−03	1.845E+00	5.32E−03
γ 35	6.02E−03	1.855E+00	1.12E−02
γ 37	2.45E−03	1.906E+00	4.66E−03
γ 38	2.38E−03	1.930E+00	4.60E−03
γ 39	3.70E−03	1.944E+00	7.19E−03
γ 40	7.65E−03	1.988E+00	1.52E−02
γ 42	5.58E−03	2.053E+00	1.15E−02
γ 43	5.52E−03	2.083E+00	1.15E−02
γ 44	7.34E−03	2.118E+00	1.55E−02
γ 45	1.74E−02	2.137E+00	3.73E−02
γ 46	6.83E−03	2.201E+00	1.50E−02
γ 47	3.20E−03	2.213E+00	7.08E−03
γ 48	1.36E−02	2.241E+00	3.05E−02
γ 49	2.63E−03	2.285E+00	6.02E−03
γ 50	1.52E−02	2.290E+00	3.47E−02
γ 51	9.15E−03	2.333E+00	2.14E−02
γ 52	3.13E−03	2.391E+00	7.50E−03
γ 53	4.60E−02	2.420E+00	1.11E−01
γ 54	6.14E−03	2.427E+00	1.49E−02
γ 55	6.58E−03	2.443E+00	1.61E−02
γ 56	3.31E−02	2.514E+00	8.32E−02
γ 57	1.88E−03	2.522E+00	4.74E−03
γ 58	1.88E−03	2.537E+00	4.77E−03
γ 59	2.95E−03	2.558E+00	7.54E−03
γ 60	7.46E−03	2.681E+00	2.00E−02
γ 61	5.83E−03	2.745E+00	1.60E−02
γ 62	3.70E−03	2.790E+00	1.03E−02
γ 63	3.01E−03	2.883E+00	8.68E−03
γ 64	2.14E−02	2.892E+00	6.18E−02
γ 65	6.65E−03	2.920E+00	1.94E−02
γ 66	1.17E−02	2.941E+00	3.43E−02
γ 67	5.19E−02	2.982E+00	1.55E−01
γ 68	7.34E−03	2.990E+00	2.19E−02
γ 69	5.77E−03	3.023E+00	1.74E−02
γ 70	1.63E−03	3.054E+00	4.98E−03
γ 71	4.67E−02	3.084E+00	1.44E−01
γ 72	2.32E−03	3.173E+00	7.36E−03
γ 73	1.57E−03	3.215E+00	5.04E−03
γ 74	7.77E−03	3.230E+00	2.51E−02
γ 75	1.88E−03	3.273E+00	6.16E−03
γ 76	1.69E−03	3.288E+00	5.57E−03
γ 77	1.94E−03	3.295E+00	6.40E−03
γ 78	2.19E−03	3.309E+00	7.26E−03
γ 79	1.94E−03	3.326E+00	6.46E−03
γ 80	2.07E−03	3.352E+00	6.94E−03
γ 81	2.07E−03	3.362E+00	6.96E−03
γ 82	8.65E−03	3.374E+00	2.92E−02
γ 83	4.51E−02	3.437E+00	1.55E−01
γ 84	1.08E−01	3.438E+00	3.71E−01
γ 85	9.59E−03	3.483E+00	3.34E−02
γ 87	1.82E−02	3.539E+00	6.43E−02
γ 88	5.89E−03	3.553E+00	2.09E−02
γ 89	2.43E−02	3.575E+00	8.70E−02
γ 90	1.38E−03	3.634E+00	5.01E−03
γ 91	1.82E−03	3.662E+00	6.66E−03
γ 92	2.76E−03	3.747E+00	1.03E−02
γ 93	2.19E−03	3.773E+00	8.28E−03
γ 94	1.44E−03	3.829E+00	5.52E−03
γ 95	3.32E−03	3.864E+00	1.28E−02
γ 96	3.81E−02	3.893E+00	1.48E−01
γ 97	4.77E−03	3.914E+00	1.86E−02
γ 98	1.12E−02	3.938E+00	4.39E−02
γ 99	2.70E−03	3.994E+00	1.08E−02
γ 100	3.76E−03	4.008E+00	1.51E−02
γ 101	3.70E−03	4.040E+00	1.49E−02
γ 102	7.21E−03	4.044E+00	2.92E−02
γ 103	2.63E−03	4.074E+00	1.07E−02
γ 104	1.88E−03	4.089E+00	7.69E−03
γ 105	1.25E−03	4.096E+00	5.14E−03
γ 106	1.76E−03	4.175E+00	7.33E−03
γ 107	1.69E−03	4.201E+00	7.11E−03
γ 108	5.52E−03	4.421E+00	2.44E−02
γ 109	1.44E−03	4.556E+00	6.57E−03
γ 110	2.76E−03	4.726E+00	1.30E−02
γ 111	2.07E−03	4.737E+00	9.80E−03
γ 113	1.44E−03	5.113E+00	7.37E−03
γ 114	3.57E−03	5.180E+00	1.85E−02
γ 115	4.83E−03	5.244E+00	2.53E−02
γ 116	3.13E−03	5.333E+00	1.67E−02
γ 117	1.07E−03	5.369E+00	5.72E−03
γ 118	1.82E−03	5.529E+00	1.01E−02
γ 119	2.57E−03	5.568E+00	1.43E−02

Listed X, γ and $\gamma^{\pm}$ radiations	4.05E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	3.70E−02
Listed β, ce and Auger radiations	1.27E+00
Omitted β, ce and Auger radiations**	6.55E−03
Listed radiations	5.32E+00
Omitted radiations**	4.36E−02

* Average energy (MeV)
** Each omitted transition contributes
<0.100 % to $\sum y(i) \times E(i)$ in its category.

Kr-78 daughter is stable.


$^{79}_{37}$Rb(17.66m)
0(+) 0.0
5.5861
5.5678
5.5437
5.5292
5.3696
5.3330
5.2439
5.2226
5.1925
5.1807
5.0617
5.0115
4.4209
4.2017
4.0893
4.0404
4.0078
3.9376
3.8933
3.8295
3.6622
3.5751
3.5391
3.4374
3.2305
2.9926
2.8829
2.8821
2.6561
2.5734
2.5080
2.4434
2.3990
2.2407
2.2342
2.0074
1.7559
1.5647
1.1479
1.1195
1.0172
0.4550
0.0
(1)
(1)
(1)

37-Rb-84m

18-JUN-97

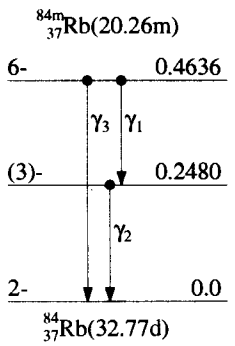
Half-life = 20.26 m
Decay mode(s): IT

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	2.95E−01	2.156E−01	6.36E−02
ce-K, γ 1	2.63E−01	2.004E−01	5.26E−02
ce-L_1, γ 1	2.57E−02	2.135E−01	5.49E−03
ce-L_2, γ 1	1.85E−02	2.137E−01	3.95E−03
ce-L_3, γ 1	1.65E−02	2.138E−01	3.52E−03
ce-M, γ 1	1.02E−02	2.154E−01*	2.19E−03
ce-N^+, γ 1	1.29E−03	2.156E−01*	2.79E−04
γ 2	6.02E−01	2.480E−01	1.49E−01
ce-K, γ 2	1.75E−02	2.328E−01	4.06E−03
ce-L_1, γ 2	1.71E−03	2.460E−01	4.22E−04
ce-M, γ 2	3.41E−04	2.478E−01*	8.45E−05
γ 3	3.61E−01	4.636E−01	1.67E−01
ce-K, γ 3	1.20E−02	4.484E−01	5.40E−03
ce-L_1, γ 3	1.21E−03	4.616E−01	5.59E−04
ce-L_2, γ 3	3.55E−04	4.618E−01	1.64E−04
ce-L_3, γ 3	2.07E−04	4.618E−01	9.56E−05
ce-M, γ 3	2.61E−04	4.634E−01*	1.21E−04
K_{α_1} X-ray	1.10E−01	1.340E−02	1.47E−03
K_{α_2} X-ray	5.70E−02	1.334E−02	7.60E−04
Auger-KLL	6.96E−02	1.136E−02*	7.91E−04
Auger-KLX	2.44E−02	1.304E−02*	3.18E−04
Auger-LMM	2.79E−01	1.485E−03*	4.15E−04
Auger-LMX	9.86E−02	1.723E−03*	1.70E−04
Auger-MXY	7.31E−01	1.726E−04*	1.26E−04

Listed X, γ and $\gamma^{\pm}$ radiations	3.83E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.42E−04
Listed β, ce and Auger radiations	8.08E−02
Omitted β, ce and Auger radiations**	1.81E−04
Listed radiations	4.63E−01
Omitted radiations**	6.22E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Rb-84 daughter is radioactive.



39-Y-84

18-JUN-97

Half-life = 40 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	5.01E−03	4.975E−01*	2.49E−03
β^+ 2	8.42E−02	5.818E−01*	4.90E−02
β^+ 3	2.41E−02	6.471E−01*	1.56E−02
β^+ 4	3.01E−02	6.917E−01*	2.08E−02
β^+ 5	1.03E−01	8.315E−01*	8.58E−02
β^+ 6	1.43E−01	9.429E−01*	1.35E−01
β^+ 7	1.90E−02	1.023E+00*	1.95E−02
β^+ 8	1.02E−02	1.162E+00*	1.19E−02
β^+ 9	2.61E−01	1.158E+00*	3.02E−01
β^+ 10	1.96E−02	1.176E+00*	2.31E−02
β^+ 11	4.81E−02	1.192E+00*	5.73E−02
β^+ 12	3.21E−02	1.257E+00*	4.03E−02
β^+ 13	4.11E−02	1.343E+00*	5.52E−02
β^+ 14	3.91E−02	1.526E+00*	5.96E−02
β^+ 15	1.00E−02	1.650E+00*	1.65E−02
β^+ 16	1.20E−02	1.825E+00*	2.20E−02
β^+ 17	3.01E−02	2.135E+00*	6.42E−02
$\gamma^\pm$	1.82E+00	5.110E−01	9.32E−01
γ 1	9.76E−02	4.627E−01	4.52E−02
γ 2	8.78E−02	6.022E−01	5.28E−02
γ 3	1.57E−01	6.605E−01	1.04E−01
γ 4	5.13E−02	6.804E−01	3.49E−02
γ 5	8.48E−02	7.045E−01	5.97E−02
γ 6	9.86E−01	7.930E−01	7.82E−01
γ 7	5.92E−03	9.320E−01	5.51E−03
γ 8	7.49E−01	9.741E−01	7.30E−01
γ 9	3.85E−02	9.946E−01	3.82E−02
γ 10	2.07E−02	1.001E+00	2.07E−02
γ 11	5.62E−01	1.040E+00	5.84E−01
γ 12	2.86E−02	1.110E+00	3.18E−02
γ 13	1.68E−02	1.120E+00	1.88E−02
γ 14	3.25E−02	1.144E+00	3.72E−02
γ 15	6.90E−03	1.155E+00	7.97E−03
γ 16	6.61E−02	1.255E+00	8.29E−02
γ 17	3.45E−02	1.263E+00	4.36E−02
γ 18	2.66E−02	1.330E+00	3.54E−02
γ 19	1.38E−02	1.453E+00	2.01E−02
γ 20	5.82E−02	1.503E+00	8.74E−02
γ 21	1.48E−02	1.617E+00	2.39E−02
γ 22	1.97E−02	1.657E+00	3.27E−02
γ 23	3.16E−02	1.746E+00	5.51E−02
γ 24	2.96E−02	1.764E+00	5.22E−02
γ 25	2.46E−02	2.294E+00	5.65E−02

Listed X, γ and $\gamma^\pm$ radiations	3.97E+00
Omitted X, γ and $\gamma^\pm$ radiations**	7.97E−04
Listed β, ce and Auger radiations	9.80E−01
Omitted β, ce and Auger radiations**	2.77E−03
Listed radiations	4.95E+00
Omitted radiations**	3.56E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sr-84 daughter is stable.

39-Y-84

18-JUN-97

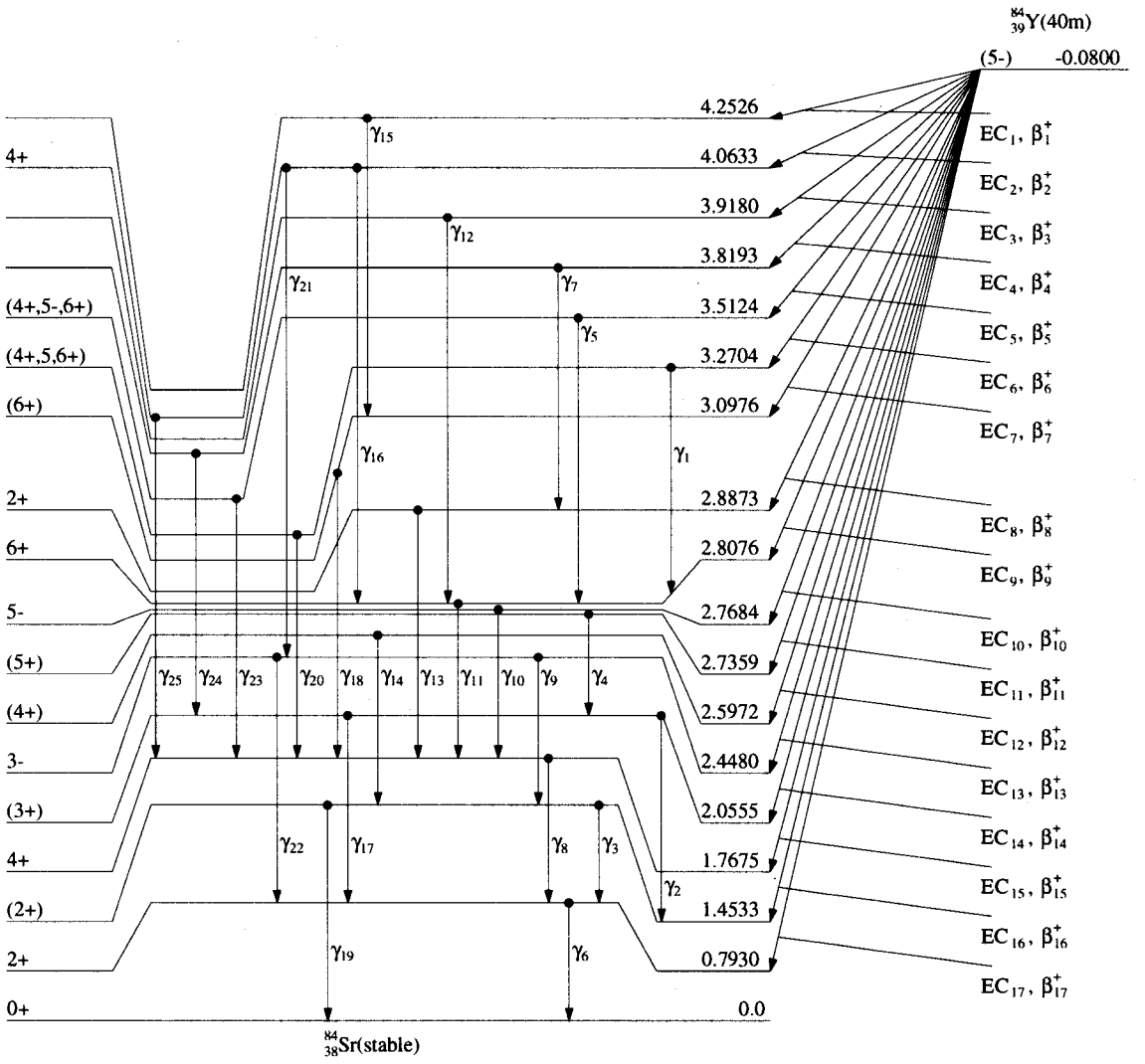
Half-life = 4.6 s
Decay mode(s): EC, β^+

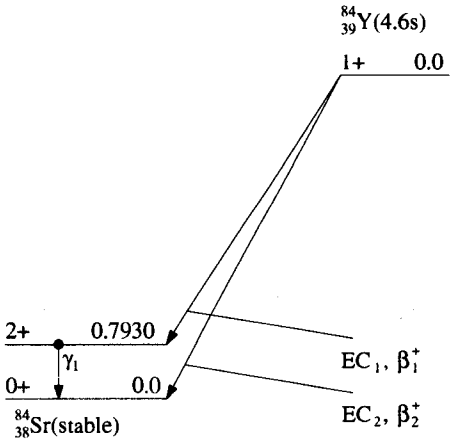
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	3.42E−01	2.151E+00*	7.36E−01
β^+ 2	6.44E−01	2.535E+00*	1.63E+00
$\gamma^\pm$	1.97E+00	5.110E−01	1.01E+00
γ 1	3.50E−01	7.930E−01	2.78E−01

Listed X, γ and $\gamma^\pm$ radiations	1.29E+00
Omitted X, γ and $\gamma^\pm$ radiations**	1.19E−04
Listed β, ce and Auger radiations	2.37E+00
Omitted β, ce and Auger radiations**	3.53E−04
Listed radiations	3.66E+00
Omitted radiations**	4.72E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sr-84 daughter is stable.


$^{84}_{39}$Y(40m)
(5-) -0.0800
4.2526
4.0633
3.9180
3.8193
3.5124
3.2704
3.0976
2.8873
2.8076
2.7684
2.7359
2.5972
2.4480
2.0555
1.7675
1.4533
0.7930
0.0
4+
(4+,5-,6+)
(4+,5,6+)
(6+)
2+
6+
5-
(5+)
(4+)
3-
(3+)
4+
(2+)
2+
0+
γ_{15} γ_{12} γ_{21} γ_7 γ_5 γ_{16} γ_1
γ_{25} γ_{24} γ_{23} γ_{20} γ_{18} γ_{14} γ_{13} γ_{11} γ_{10} γ_9 γ_4
γ_{22} γ_{17} γ_8 γ_3 γ_2
γ_{19} γ_6
EC_1, β^+_1
EC_2, β^+_2
EC_3, β^+_3
EC_4, β^+_4
EC_5, β^+_5
EC_6, β^+_6
EC_7, β^+_7
EC_8, β^+_8
EC_9, β^+_9
EC_{10}, β^+_{10}
EC_{11}, β^+_{11}
EC_{12}, β^+_{12}
EC_{13}, β^+_{13}
EC_{14}, β^+_{14}
EC_{15}, β^+_{15}
EC_{16}, β^+_{16}
EC_{17}, β^+_{17}
$^{84}_{38}$Sr(stable)


$^{84}_{39}$Y(4.6s)
1+ 0.0
2+ 0.7930
0+ 0.0
γ_1
$^{84}_{38}$Sr(stable)
EC_1, β^+_1
EC_2, β^+_2

39-Y-85m

26-APR-91

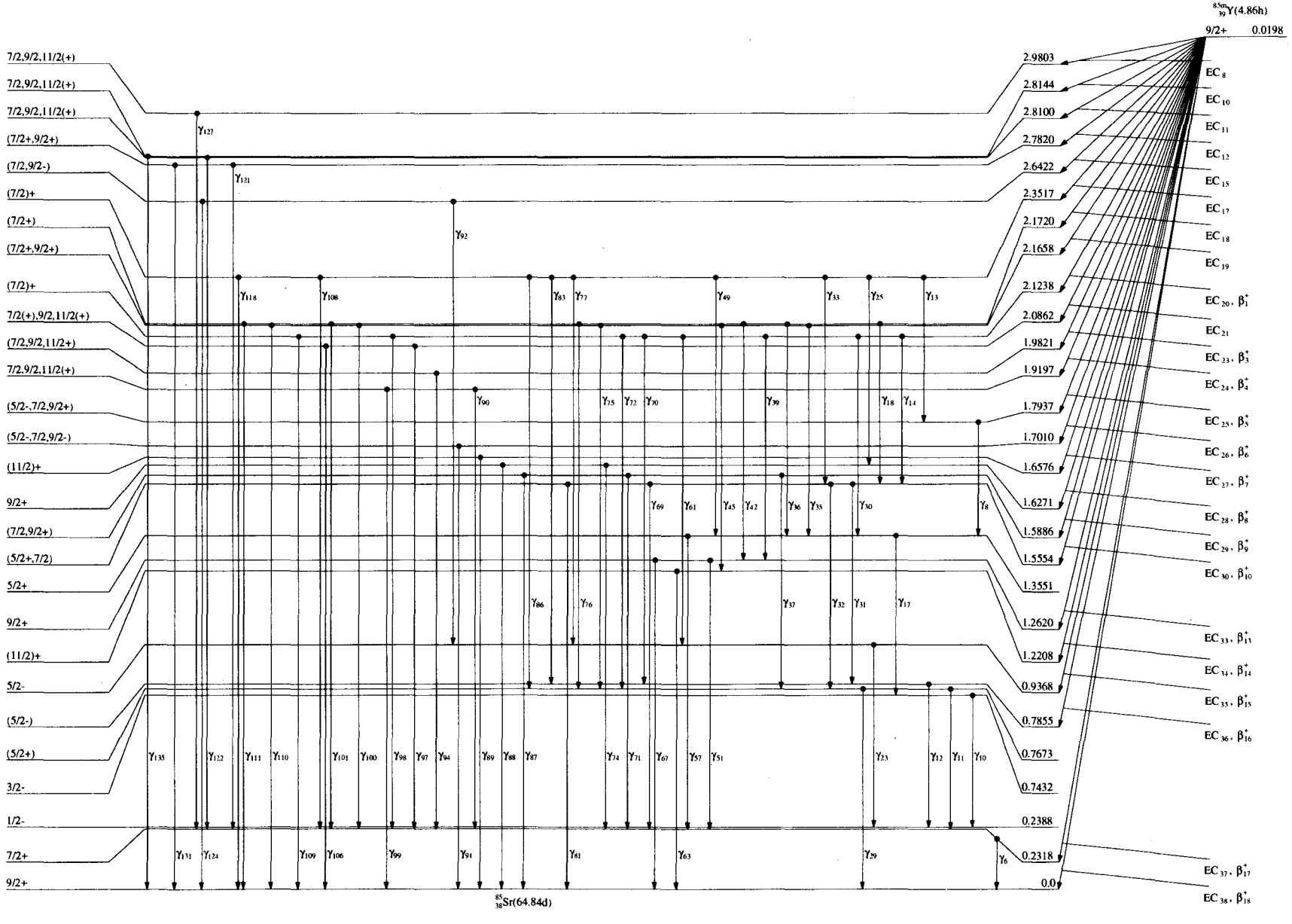
Half-life = 4.86 h
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 13	4.09E−03	4.337E−01*	1.77E−03
β^+ 14	5.88E−03	4.519E−01*	2.66E−03
β^+ 17	4.79E−02	8.983E−01*	4.30E−02
β^+ 18	5.18E−01	1.005E+00*	5.21E−01
$\gamma^\pm$	1.16E+00	5.110E−01	5.91E−01
γ 6	2.28E−01	2.317E−01	5.28E−02
ce-K, γ 6	4.50E−03	2.156E−01	9.70E−04
γ 10	1.51E−02	5.044E−01	7.60E−03
γ 11	3.46E−02	5.356E−01	1.85E−02
γ 12	1.19E−02	5.467E−01	6.49E−03
γ 13	2.65E−03	5.582E−01	1.48E−03
γ 14	1.67E−02	5.684E−01	9.52E−03
γ 17	1.08E−02	6.119E−01	6.61E−03
γ 18	8.64E−03	6.165E−01	5.33E−03
γ 23	1.30E−02	6.980E−01	9.05E−03
γ 25	4.43E−03	7.245E−01	3.21E−03
γ 29	3.62E−02	7.673E−01	2.78E−02
γ 30	1.30E−02	7.686E−01	9.96E−03
γ 31	2.97E−03	7.697E−01	2.29E−03
γ 32	1.57E−02	7.879E−01	1.23E−02
γ 33	2.38E−03	7.964E−01	1.89E−03
γ 35	1.89E−03	8.108E−01	1.53E−03
γ 36	7.78E−03	8.168E−01	6.35E−03
γ 37	2.16E−03	8.216E−01	1.77E−03
γ 39	9.72E−03	8.616E−01	8.37E−03
γ 42	2.00E−03	9.100E−01	1.82E−03
γ 45	1.67E−03	9.445E−01	1.58E−03
γ 49	5.40E−03	9.965E−01	5.38E−03
γ 51	2.02E−02	1.030E+00	2.08E−02
γ 57	1.78E−02	1.123E+00	2.00E−02
γ 61	2.75E−03	1.187E+00	3.27E−03
γ 63	1.98E−02	1.220E+00	2.41E−02
γ 67	6.48E−03	1.262E+00	8.18E−03
γ 69	6.86E−03	1.323E+00	9.08E−03
γ 70	1.67E−03	1.338E+00	2.24E−03
γ 71	1.30E−03	1.356E+00	1.76E−03
γ 72	5.35E−03	1.356E+00	7.25E−03
γ 74	4.43E−03	1.395E+00	6.18E−03
γ 75	9.72E−04	1.398E+00	1.36E−03
γ 76	3.08E−02	1.405E+00	4.32E−02
γ 77	4.05E−03	1.415E+00	5.73E−03
γ 81	2.16E−03	1.555E+00	3.36E−03
γ 83	2.27E−03	1.566E+00	3.55E−03
γ 86	1.19E−02	1.584E+00	1.88E−02
γ 87	3.35E−03	1.589E+00	5.32E−03
γ 88	2.70E−03	1.627E+00	4.39E−03
γ 89	1.30E−03	1.658E+00	2.15E−03
γ 90	1.46E−03	1.688E+00	2.46E−03
γ 91	8.10E−04	1.701E+00	1.38E−03
γ 92	5.94E−03	1.705E+00	1.01E−02
γ 94	8.10E−04	1.750E+00	1.42E−03
γ 97	4.05E−03	1.854E+00	7.51E−03
γ 98	1.78E−02	1.892E+00	3.37E−02
γ 99	1.40E−03	1.920E+00	2.70E−03
γ 100	2.16E−03	1.934E+00	4.18E−03
γ 101	5.72E−03	1.940E+00	1.11E−02
γ 106	1.46E−03	2.086E+00	3.04E−03
γ 108	7.88E−03	2.120E+00	1.67E−02
γ 109	4.97E−02	2.124E+00	1.06E−01
γ 110	4.37E−03	2.166E+00	9.47E−03
γ 111	2.27E−02	2.172E+00	4.93E−02
γ 118	5.62E−03	2.352E+00	1.32E−02
γ 121	2.27E−03	2.550E+00	5.78E−03
γ 122	7.56E−04	2.579E+00	1.95E−03
γ 124	1.30E−03	2.642E+00	3.42E−03
γ 127	1.08E−03	2.748E+00	2.97E−03
γ 131	3.35E−03	2.782E+00	9.31E−03
γ 135	1.19E−03	2.815E+00	3.34E−03
K_{α_1} X-ray	1.44E−01	1.417E−02	2.04E−03
Auger-KLL	8.23E−02	1.198E−02*	9.86E−04

Listed X, γ and $\gamma^\pm$ radiations	1.28E+00
Omitted X, γ and $\gamma^\pm$ radiations**	4.71E−02
Listed β, ce and Auger radiations	5.71E−01
Omitted β, ce and Auger radiations**	2.86E−03
Listed radiations	1.86E+00
Omitted radiations**	5.00E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sr-85m daughter, yield 4.0E−02, is radioactive.
Sr-85 daughter, yield 9.60E−01, is radioactive.


$^{85m}_{39}$Y(4.86h)
9/2+ 0.0198
7/2,9/2,11/2(+)
7/2,9/2,11/2(+)
7/2,9/2,11/2(+)
(7/2+,9/2+)
(7/2,9/2-)
(7/2)+
(7/2+)
(7/2+,9/2+)
(7/2)+
7/2(+),9/2,11/2(+)
(7/2,9/2,11/2+)
7/2,9/2,11/2(+)
(5/2-,7/2,9/2+)
(5/2-,7/2,9/2-)
(11/2)+
9/2+
(7/2,9/2+)
(5/2+,7/2)
5/2+
9/2+
(11/2)+
5/2-
(5/2-)
(5/2+)
3/2-
1/2-
7/2+
9/2+
2.9803
2.8144
2.8100
2.7820
2.6422
2.3517
2.1720
2.1658
2.1238
2.0862
1.9821
1.9197
1.7937
1.7010
1.6576
1.6271
1.5886
1.5554
1.3551
1.2620
1.2208
0.9368
0.7855
0.7673
0.7432
0.2388
0.2318
0.0
EC8
EC10
EC11
EC12
EC15
EC17
EC18
EC19
EC20, β1+
EC21
EC23, β3+
EC24, β4+
EC25, β5+
EC26, β6+
EC27, β7+
EC28, β8+
EC29, β9+
EC30, β10+
EC33, β13+
EC34, β14+
EC35, β15+
EC36, β16+
EC37, β17+
EC38, β18+
γ127
γ121
γ92
γ118
γ108
γ83
γ77
γ49
γ33
γ25
γ13
γ90
γ75
γ72
γ70
γ39
γ18
γ14
γ69
γ61
γ45
γ42
γ36
γ35
γ30
γ8
γ86
γ76
γ37
γ32
γ31
γ17
γ135
γ122
γ111
γ110
γ101
γ100
γ98
γ97
γ94
γ89
γ88
γ87
γ74
γ71
γ67
γ57
γ51
γ23
γ12
γ11
γ10
γ131
γ124
γ109
γ106
γ99
γ91
γ81
γ63
γ29
γ6
$^{85}_{38}$Sr(64.84d)

39-Y-85

26-APR-91

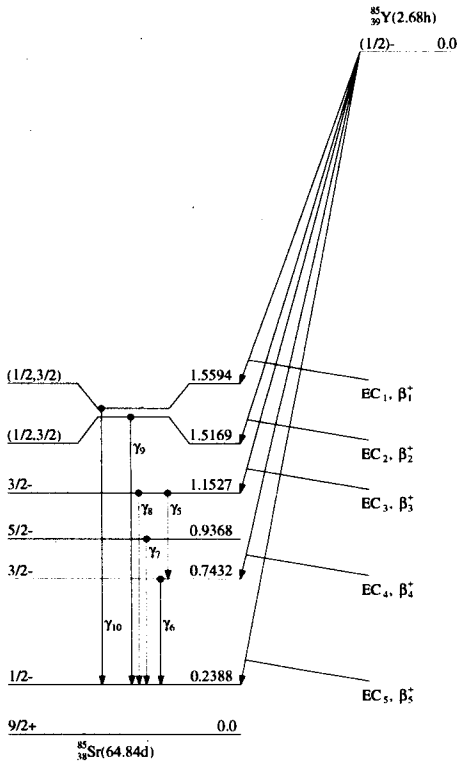
Half-life = 2.68 h
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 3	3.83E−02	4.732E−01*	1.81E−02
β^+ 4	3.73E−01	6.560E−01*	2.45E−01
β^+ 5	2.42E−01	8.860E−01*	2.14E−01
$\gamma^{\pm}$	1.31E+00	5.110E−01	6.68E−01
γ 5	8.43E−03	4.095E−01	3.45E−03
γ 6	6.02E−01	5.044E−01	3.04E−01
ce-K, γ 6	1.37E−03	4.883E−01	6.69E−04
γ 7	1.81E−03	6.980E−01	1.26E−03
γ 8	9.03E−02	9.139E−01	8.25E−02
γ 9	2.41E−03	1.278E+00	3.08E−03
γ 10	3.67E−03	1.321E+00	4.85E−03
K_{α_1} X-ray	1.17E−01	1.417E−02	1.66E−03
Auger-KLL	6.72E−02	1.198E−02*	8.05E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.07E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.79E−03
Listed β, ce and Auger radiations	4.79E−01
Omitted β, ce and Auger radiations**	1.51E−03
Listed radiations	1.55E+00
Omitted radiations**	3.30E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sr-85m daughter is radioactive.



39-Y-87m

26-APR-91

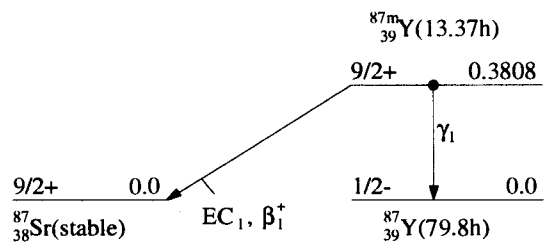
Half-life = 13.37 h
Decay mode(s): EC, β^+, IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	7.50E−03	5.350E−01*	4.01E−03
$\gamma^{\pm}$	1.50E−02	5.110E−01	7.66E−03
γ 1	7.82E−01	3.808E−01	2.98E−01
ce-K, γ 1	1.71E−01	3.638E−01	6.21E−02
ce-L_1, γ 1	2.06E−02	3.784E−01	7.80E−03
ce-L_2, γ 1	2.41E−03	3.786E−01	9.14E−04
ce-L_3, γ 1	2.82E−03	3.787E−01	1.07E−03
ce-M, γ 1	4.52E−03	3.805E−01*	1.72E−03
ce-N^+, γ 1	7.70E−04	3.808E−01*	2.93E−04
K_{α_1} X-ray	6.74E−02	1.496E−02	1.01E−03
K_{α_2} X-ray	3.51E−02	1.488E−02	5.23E−04
Auger-KLL	3.50E−02	1.262E−02*	4.41E−04
Auger-KLX	1.29E−02	1.453E−02*	1.87E−04
Auger-LMM	1.43E−01	1.664E−03*	2.38E−04
Auger-LMX	5.69E−02	1.960E−03*	1.11E−04
Auger-MXY	3.85E−01	2.249E−04*	8.66E−05

Listed X, γ and $\gamma^{\pm}$ radiations	3.07E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	3.97E−04
Listed β, ce and Auger radiations	7.90E−02
Omitted β, ce and Auger radiations**	8.31E−05
Listed radiations	3.86E−01
Omitted radiations**	4.80E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sr-87 daughter, yield 1.57E−02, is stable.
Y-87 daughter, yield 9.843E−01, is radioactive.



40-Zr-87

26-APR-91

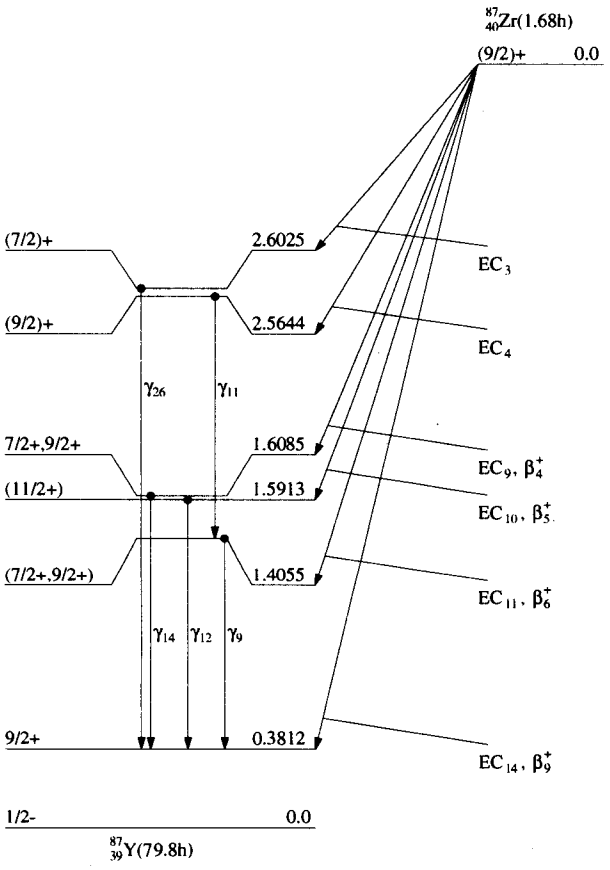
Half-life = 1.68 h
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 4	3.20E−03	4.556E−01*	1.46E−03
β^+ 9	8.34E−01	1.012E+00*	8.44E−01
$\gamma^\pm$	1.68E+00	5.110E−01	8.58E−01
γ 9	2.80E−03	1.024E+00	2.87E−03
γ 11	8.00E−04	1.159E+00	9.27E−04
γ 12	3.30E−03	1.210E+00	3.99E−03
γ 14	1.00E−02	1.227E+00	1.23E−02
γ 26	9.00E−04	2.222E+00	2.00E−03

Listed X, γ and $\gamma^\pm$ radiations	8.80E−01
Omitted X, γ and $\gamma^\pm$ radiations**	1.08E−02
Listed β, ce and Auger radiations	8.46E−01
Omitted β, ce and Auger radiations**	2.04E−03
Listed radiations	1.73E+00
Omitted radiations**	1.28E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Y-87m daughter, yield 9.985E−01, is radioactive.
Y-87 daughter, yield 1.5E−03, is radioactive.



41-Nb-91m

13-DEC-90

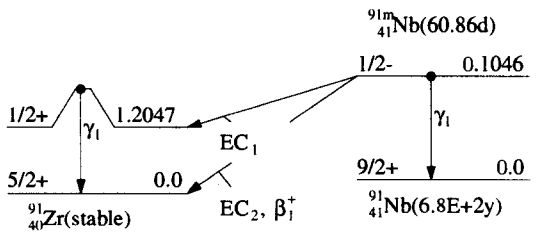
Half-life = 60.86 d
Decay mode(s): EC, β^+, IT

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	1.91E−02	1.205E+00	2.30E−02
K_{α_1} X-ray	1.10E−02	1.578E−02	1.74E−04
K_{α_2} X-ray	5.76E−03	1.569E−02	9.04E−05
γ 1	5.80E−03	1.046E−01	6.07E−04
ce-K, γ 1	6.75E−01	8.563E−02	5.78E−02
ce-L_1, γ 1	1.24E−01	1.019E−01	1.26E−02
ce-L_2, γ 1	2.66E−02	1.022E−01	2.71E−03
ce-L_3, γ 1	1.04E−01	1.022E−01	1.06E−02
ce-M, γ 1	4.86E−02	1.043E−01*	5.07E−03
ce-N^+, γ 1	8.89E−03	1.046E−01*	9.30E−04
K_{α_1} X-ray	2.77E−01	1.662E−02	4.61E−03
K_{α_2} X-ray	1.45E−01	1.652E−02	2.40E−03
K_{β_1} X-ray	4.63E−02	1.862E−02	8.63E−04
K_{β_2} X-ray	1.08E−02	1.895E−02	2.05E−04
K_{β_3} X-ray	2.47E−02	1.861E−02	4.60E−04
Auger-KLL	1.19E−01	1.395E−02*	1.66E−03
Auger-KLX	4.56E−02	1.610E−02*	7.34E−04
Auger-KXY	5.42E−03	1.824E−02*	9.88E−05
Auger-LMM	6.35E−01	1.852E−03*	1.18E−03
Auger-LMX	2.68E−01	2.204E−03*	5.91E−04
Auger-MXY	1.74E+00	2.776E−04*	4.83E−04

Listed X, γ and $\gamma^\pm$ radiations	3.24E−02
Omitted X, γ and $\gamma^\pm$ radiations**	1.31E−04
Listed β, ce and Auger radiations	9.45E−02
Omitted β, ce and Auger radiations**	2.66E−04
Listed radiations	1.27E−01
Omitted radiations**	3.97E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Zr-91 daughter, yield 3.2E−02, is stable.
Nb-91 daughter, yield 9.68E−01, is radioactive.



41-Nb-91

13-DEC-90

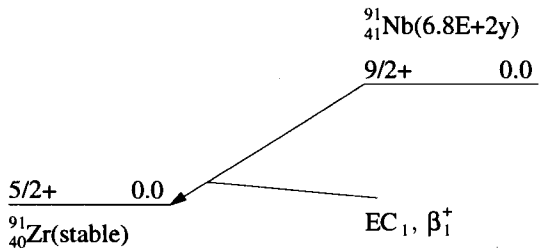
Half-life = 680 y
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.60E−03	1.191E−01*	1.91E−04
$\gamma^{\pm}$	3.20E−03	5.110E−01	1.64E−03
K_{α_1} X-ray	3.49E−01	1.578E−02	5.50E−03
K_{α_2} X-ray	1.82E−01	1.569E−02	2.86E−03
K_{β_1} X-ray	5.76E−02	1.767E−02	1.02E−03
K_{β_2} X-ray	1.29E−02	1.797E−02	2.32E−04
K_{β_3} X-ray	2.94E−02	1.765E−02	5.20E−04
L_α X-ray	1.40E−02	2.042E−03*	2.87E−05
L_β X-ray	9.95E−03	2.130E−03*	2.12E−05
Auger-KLL	1.65E−01	1.327E−02*	2.18E−03
Auger-KLX	6.17E−02	1.530E−02*	9.45E−04
Auger-KXY	7.24E−03	1.731E−02*	1.25E−04
Auger-LMM	6.85E−01	1.757E−03*	1.20E−03
Auger-LMX	2.87E−01	2.081E−03*	5.96E−04
Auger-LXY	3.34E−02	2.260E−03*	7.54E−05
Auger-MXY	1.87E+00	2.515E−04*	4.70E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.18E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	7.62E−06
Listed β, ce and Auger radiations	5.79E−03
Omitted β, ce and Auger radiations**	1.13E−06
Listed radiations	1.76E−02
Omitted radiations**	8.75E−06

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Zr-91 daughter is stable.



41-Nb-92m

05-APR-94

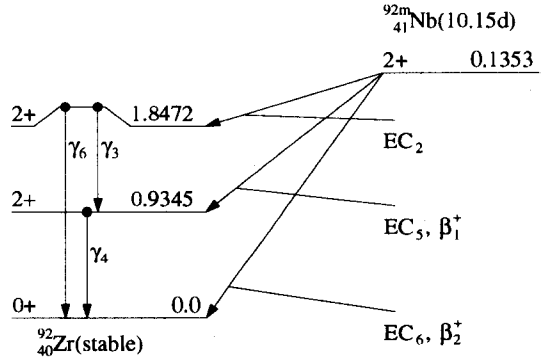
Half-life = 10.15 d
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	5.80E−04	8.734E−02*	5.06E−05
β^+ 2	1.20E−04	5.177E−01*	6.21E−05
γ 3	1.78E−02	9.126E−01	1.63E−02
ce-K, γ 3	1.29E−05	8.946E−01	1.16E−05
γ 4	9.91E−01	9.344E−01	9.26E−01
ce-K, γ 4	6.86E−04	9.164E−01	6.28E−04
ce-L_1, γ 4	7.18E−05	9.319E−01	6.69E−05
ce-M, γ 4	9.51E−06	9.341E−01*	8.88E−06
γ 6	8.52E−03	1.847E+00	1.57E−02
K_{α_1} X-ray	3.51E−01	1.578E−02	5.53E−03
K_{α_2} X-ray	1.83E−01	1.569E−02	2.88E−03
K_{β_1} X-ray	5.79E−02	1.767E−02	1.02E−03
Auger-KLL	1.66E−01	1.327E−02*	2.20E−03
Auger-KLX	6.21E−02	1.530E−02*	9.50E−04
Auger-KXY	7.28E−03	1.731E−02*	1.26E−04
Auger-LMM	6.87E−01	1.757E−03*	1.21E−03
Auger-LMX	2.87E−01	2.081E−03*	5.98E−04
Auger-LXY	3.35E−02	2.260E−03*	7.56E−05
Auger-MXY	1.87E+00	2.515E−04*	4.71E−04

Listed X, γ and $\gamma^{\pm}$ radiations	9.67E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.63E−03
Listed β, ce and Auger radiations	6.45E−03
Omitted β, ce and Auger radiations**	1.16E−05
Listed radiations	9.74E−01
Omitted radiations**	1.64E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Zr-92 daughter is stable.



41-Nb-92

26-AUG-92

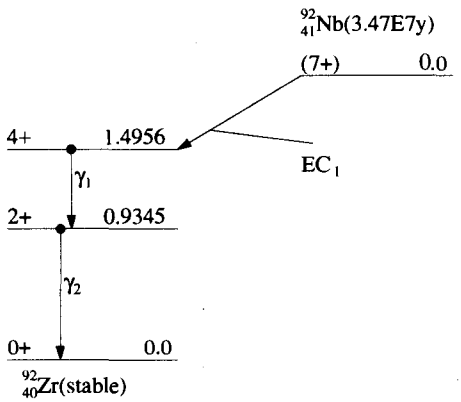
Half-life = 3.47E+7 y
Decay mode(s): EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	1.00E+00	5.611E−01	5.61E−01
ce-K, γ 1	2.62E−03	5.431E−01	1.42E−03
ce-L_1, γ 1	2.71E−04	5.586E−01	1.52E−04
ce-L_2, γ 1	1.55E−05	5.588E−01	8.68E−06
ce-M, γ 1	5.23E−05	5.608E−01*	2.93E−05
γ 2	1.00E+00	9.345E−01	9.34E−01
ce-K, γ 2	6.92E−04	9.165E−01	6.34E−04
ce-L_1, γ 2	7.24E−05	9.320E−01	6.75E−05
ce-M, γ 2	9.60E−06	9.342E−01*	8.97E−06
K_{α_1} X-ray	3.37E−01	1.578E−02	5.32E−03
K_{α_2} X-ray	1.76E−01	1.569E−02	2.76E−03
Auger-KLL	1.59E−01	1.327E−02*	2.11E−03
Auger-KLX	5.96E−02	1.530E−02*	9.12E−04
Auger-KXY	6.99E−03	1.731E−02*	1.21E−04
Auger-LMM	6.83E−01	1.758E−03*	1.20E−03
Auger-LMX	2.86E−01	2.081E−03*	5.94E−04
Auger-LXY	3.32E−02	2.260E−03*	7.52E−05
Auger-MXY	1.86E+00	2.515E−04*	4.68E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.50E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.77E−03
Listed β, ce and Auger radiations	7.80E−03
Omitted β, ce and Auger radiations**	2.00E−05
Listed radiations	1.51E+00
Omitted radiations**	1.79E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Zr-92 daughter is stable.



42-Mo-91

13-DEC-90

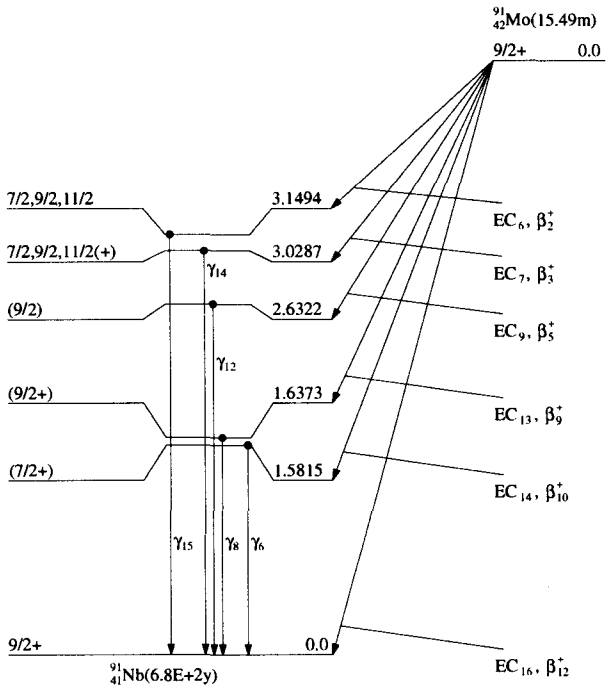
Half-life = 15.49 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 9	2.26E−03	7.877E−01*	1.78E−03
β^+ 12	9.33E−01	1.551E+00*	1.45E+00
$\gamma^{\pm}$	1.87E+00	5.110E−01	9.58E−01
γ 6	2.26E−03	1.582E+00	3.57E−03
γ 8	3.29E−03	1.637E+00	5.39E−03
γ 12	1.18E−03	2.632E+00	3.11E−03
γ 14	8.49E−04	3.029E+00	2.57E−03
γ 15	5.49E−04	3.149E+00	1.73E−03

Listed X, γ and $\gamma^{\pm}$ radiations	9.74E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	3.03E−03
Listed β, ce and Auger radiations	1.45E+00
Omitted β, ce and Auger radiations**	1.85E−03
Listed radiations	2.42E+00
Omitted radiations**	4.88E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Nb-91m daughter, yield 3.4E−04, is radioactive.
Nb-91 daughter, yield 9.9966E−01, is radioactive.



42-Mo-102

07-AUG-91

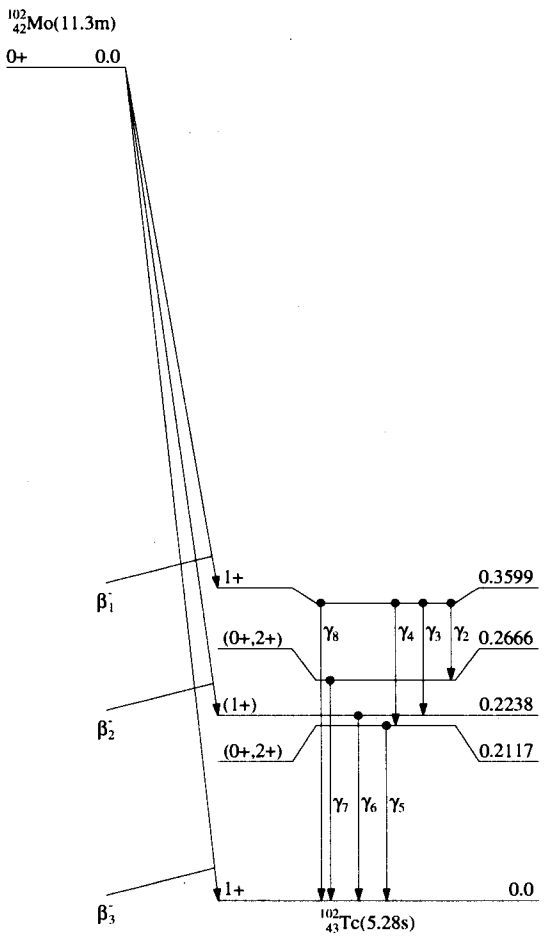
Half-life = 11.3 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	4.80E−02	2.118E−01*	1.02E−02
β^- 2	1.10E−02	2.649E−01*	2.91E−03
β^- 3	9.41E−01	3.562E−01*	3.35E−01
γ 2	1.03E−03	9.324E−02	9.57E−05
γ 3	2.32E−03	1.360E−01	3.15E−04
γ 4	3.76E−02	1.482E−01	5.57E−03
ce-K, γ 4	3.12E−03	1.271E−01	3.97E−04
γ 5	3.80E−02	2.117E−01	8.04E−03
γ 6	1.44E−02	2.238E−01	3.23E−03
γ 7	8.36E−04	2.666E−01	2.23E−04
γ 8	2.66E−03	3.599E−01	9.57E−04
K_{α_1} X-ray	2.55E−03	1.837E−02	4.69E−05
K_{α_2} X-ray	1.34E−03	1.825E−02	2.45E−05

Listed X, γ and $\gamma^{\pm}$ radiations	1.85E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.75E−05
Listed β, ce and Auger radiations	3.49E−01
Omitted β, ce and Auger radiations**	5.58E−04
Listed radiations	3.67E−01
Omitted radiations**	5.86E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Tc-102 daughter is radioactive.



43-Tc-102

07-AUG-91

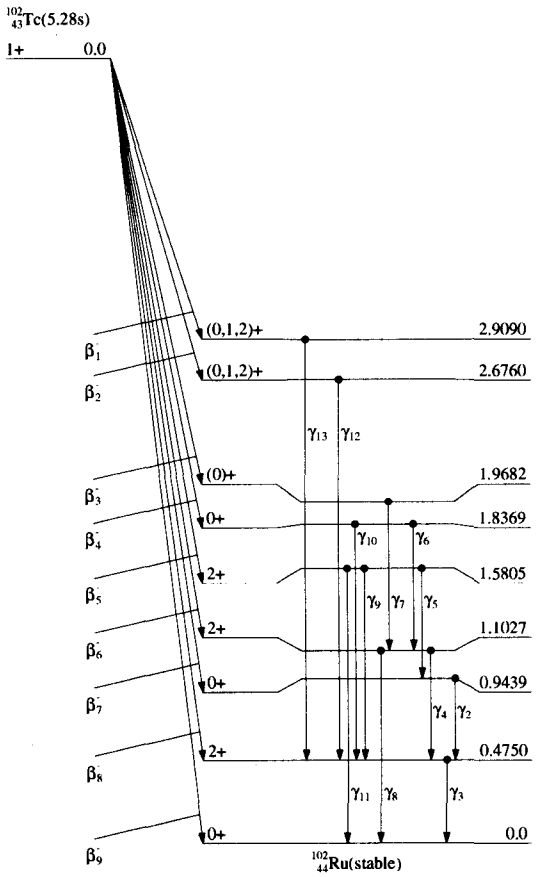
Half-life = 5.28 s
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 3	8.69E−03	1.052E+00*	9.14E−03
β^- 4	5.10E−03	1.113E+00*	5.67E−03
β^- 5	1.17E−02	1.233E+00*	1.44E−02
β^- 6	1.60E−03	1.459E+00*	2.33E−03
β^- 7	5.00E−03	1.534E+00*	7.67E−03
β^- 8	3.50E−02	1.757E+00*	6.15E−02
β^- 9	9.28E−01	1.984E+00*	1.84E+00
γ 2	8.84E−03	4.689E−01	4.15E−03
γ 3	6.70E−02	4.750E−01	3.18E−02
γ 4	7.84E−03	6.277E−01	4.92E−03
γ 5	3.89E−03	6.366E−01	2.47E−03
γ 6	1.27E−03	7.341E−01	9.35E−04
γ 7	8.71E−03	8.655E−01	7.54E−03
γ 8	3.75E−03	1.103E+00	4.14E−03
γ 9	7.37E−03	1.105E+00	8.15E−03
γ 10	3.62E−03	1.362E+00	4.93E−03
γ 11	6.03E−04	1.581E+00	9.53E−04
γ 12	2.34E−03	2.201E+00	5.16E−03
γ 13	2.28E−03	2.434E+00	5.54E−03

Listed X, γ and $\gamma^{\pm}$ radiations	8.07E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	5.90E−05
Listed β, ce and Auger radiations	1.94E+00
Omitted β, ce and Auger radiations**	3.36E−03
Listed radiations	2.02E+00
Omitted radiations**	3.42E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ru-102 daughter is stable.



44-Ru-95

05-APR-94

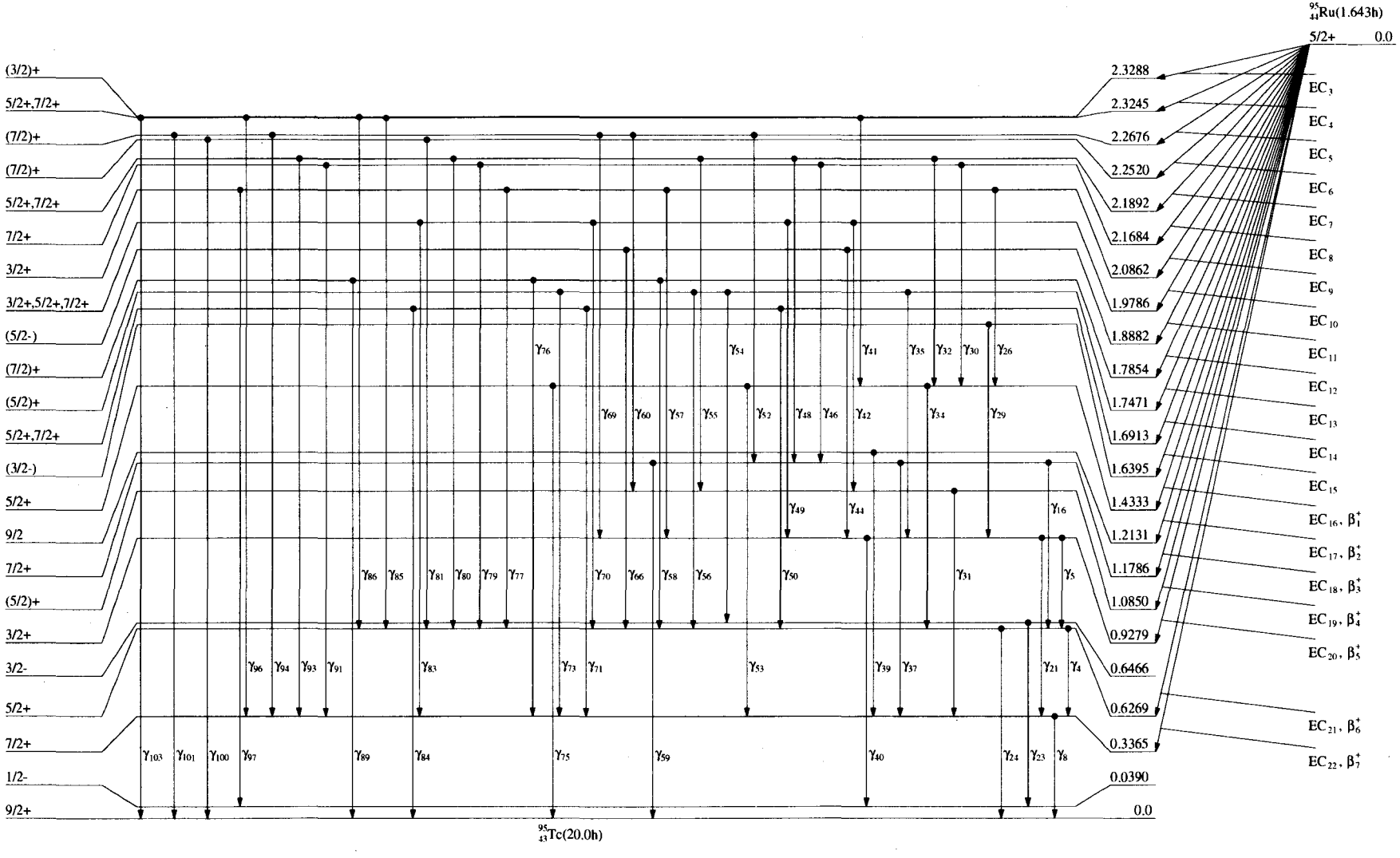
Half-life = 1.643 h
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 6	1.30E−02	4.061E−01*	5.27E−03
β^+ 7	1.26E−01	5.343E−01*	6.71E−02
$\gamma^\pm$	2.79E−01	5.110E−01	1.42E−01
γ 4	3.70E−02	2.904E−01	1.07E−02
ce-K, γ 4	5.35E−04	2.693E−01	1.44E−04
γ 5	2.11E−02	3.010E−01	6.36E−03
γ 8	7.02E−01	3.364E−01	2.36E−01
ce-K, γ 8	7.24E−03	3.154E−01	2.28E−03
ce-L_1, γ 8	7.90E−04	3.334E−01	2.63E−04
γ 16	1.71E−02	5.516E−01	9.41E−03
γ 21	1.19E−02	5.914E−01	7.04E−03
γ 24	1.78E−01	6.268E−01	1.12E−01
ce-K, γ 24	1.72E−03	6.058E−01	1.04E−03
ce-L_1, γ 24	1.82E−04	6.238E−01	1.13E−04
γ 26	1.02E−02	6.528E−01	6.67E−03
γ 29	1.78E−03	7.115E−01	1.27E−03
γ 30	4.66E−03	7.351E−01	3.43E−03
γ 31	1.62E−02	7.485E−01	1.21E−02
γ 32	2.18E−03	7.559E−01	1.65E−03
γ 34	4.05E−02	8.063E−01	3.27E−02
γ 35	6.44E−03	8.191E−01	5.28E−03
γ 37	1.27E−02	8.422E−01	1.07E−02
γ 39	2.18E−03	8.767E−01	1.91E−03
γ 40	1.91E−02	8.890E−01	1.70E−02
γ 41	1.78E−03	8.910E−01	1.59E−03
γ 42	1.59E−03	8.933E−01	1.42E−03
γ 44	2.18E−03	9.601E−01	2.09E−03
γ 46	7.04E−03	9.897E−01	6.97E−03
γ 48	7.24E−03	1.011E+00	7.31E−03
γ 49	2.61E−02	1.051E+00	2.74E−02
γ 50	7.44E−03	1.064E+00	7.91E−03
γ 52	2.18E−03	1.089E+00	2.37E−03
γ 53	2.10E−01	1.097E+00	2.31E−01
ce-K, γ 53	1.33E−04	1.076E+00	1.43E−04
γ 54	1.19E−03	1.100E+00	1.31E−03
γ 55	2.08E−03	1.104E+00	2.30E−03
γ 56	9.42E−03	1.120E+00	1.05E−02
γ 57	8.43E−03	1.158E+00	9.76E−03
γ 58	7.04E−03	1.158E+00	8.15E−03
γ 59	5.16E−02	1.179E+00	6.08E−02
γ 60	2.18E−03	1.183E+00	2.58E−03
γ 66	3.27E−03	1.261E+00	4.13E−03
γ 69	2.48E−03	1.340E+00	3.32E−03
γ 70	8.53E−03	1.352E+00	1.15E−02
γ 71	7.83E−03	1.355E+00	1.06E−02
γ 73	2.49E−02	1.411E+00	3.51E−02
γ 75	6.44E−03	1.433E+00	9.24E−03
γ 76	1.29E−03	1.449E+00	1.87E−03
γ 77	2.10E−02	1.459E+00	3.07E−02
γ 79	2.78E−03	1.541E+00	4.28E−03
γ 80	1.59E−03	1.562E+00	2.48E−03
γ 81	8.92E−04	1.625E+00	1.45E−03
γ 83	9.91E−04	1.642E+00	1.63E−03
γ 84	8.92E−04	1.691E+00	1.51E−03
γ 85	1.19E−03	1.698E+00	2.02E−03
γ 86	9.81E−04	1.702E+00	1.67E−03
γ 89	5.95E−03	1.785E+00	1.06E−02
γ 91	2.38E−03	1.832E+00	4.36E−03
γ 93	1.19E−03	1.853E+00	2.20E−03
γ 94	2.88E−03	1.931E+00	5.55E−03
γ 96	6.74E−03	1.988E+00	1.34E−02
γ 97	3.47E−03	2.047E+00	7.10E−03
γ 100	3.57E−03	2.252E+00	8.04E−03
γ 101	8.92E−04	2.268E+00	2.02E−03
γ 103	1.41E−02	2.325E+00	3.27E−02
K_{α_1} X-ray	3.20E−01	1.837E−02	5.89E−03
K_{α_2} X-ray	1.69E−01	1.825E−02	3.08E−03
Auger-KLL	1.15E−01	1.535E−02*	1.77E−03
Auger-KLX	4.58E−02	1.777E−02*	8.14E−04
Auger-KXY	5.58E−03	2.017E−02*	1.13E−04
Auger-LMM	5.61E−01	2.054E−03*	1.15E−03
Auger-LMX	2.41E−01	2.468E−03*	5.95E−04
Auger-MXY	1.55E+00	3.348E−04*	5.20E−04

Listed X, γ and $\gamma^\pm$ radiations	1.22E+00
Omitted X, γ and $\gamma^\pm$ radiations**	2.47E−02
Listed β, ce and Auger radiations	8.14E−02
Omitted β, ce and Auger radiations**	8.66E−04
Listed radiations	1.30E+00
Omitted radiations**	2.56E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Tc-95m daughter, yield 2.61E−02, is radioactive.
Tc-95 daughter, yield 9.739E−01, is radioactive.


$^{95}_{44}$Ru(1.643h)
5/2+ 0.0
(3/2)+
5/2+,7/2+
(7/2)+
(7/2)+
5/2+,7/2+
7/2+
3/2+
3/2+,5/2+,7/2+
(5/2-)
(7/2)+
(5/2)+
5/2+,7/2+
(3/2-)
5/2+
9/2
7/2+
(5/2)+
3/2+
3/2-
5/2+
7/2+
1/2-
9/2+
2.3288
2.3245
2.2676
2.2520
2.1892
2.1684
2.0862
1.9786
1.8882
1.7854
1.7471
1.6913
1.6395
1.4333
1.2131
1.1786
1.0850
0.9279
0.6466
0.6269
0.3365
0.0390
0.0
EC3
EC4
EC5
EC6
EC7
EC8
EC9
EC10
EC11
EC12
EC13
EC14
EC15
EC16, β+1
EC17, β+2
EC18, β+3
EC19, β+4
EC20, β+5
EC21, β+6
EC22, β+7
γ76 γ54 γ41 γ35 γ32 γ30 γ26
γ69 γ60 γ57 γ55 γ52 γ48 γ46 γ42 γ34 γ29
γ49 γ44 γ16
γ86 γ85 γ81 γ80 γ79 γ77 γ70 γ66 γ58 γ56 γ50 γ31 γ5
γ96 γ94 γ93 γ91 γ83 γ73 γ71 γ53 γ39 γ37 γ21 γ4
γ103 γ101 γ100 γ97 γ89 γ84 γ75 γ59 γ40 γ24 γ23 γ8
$^{95}_{43}$Tc(20.0h)

45-Rh-97m

05-NOV-93

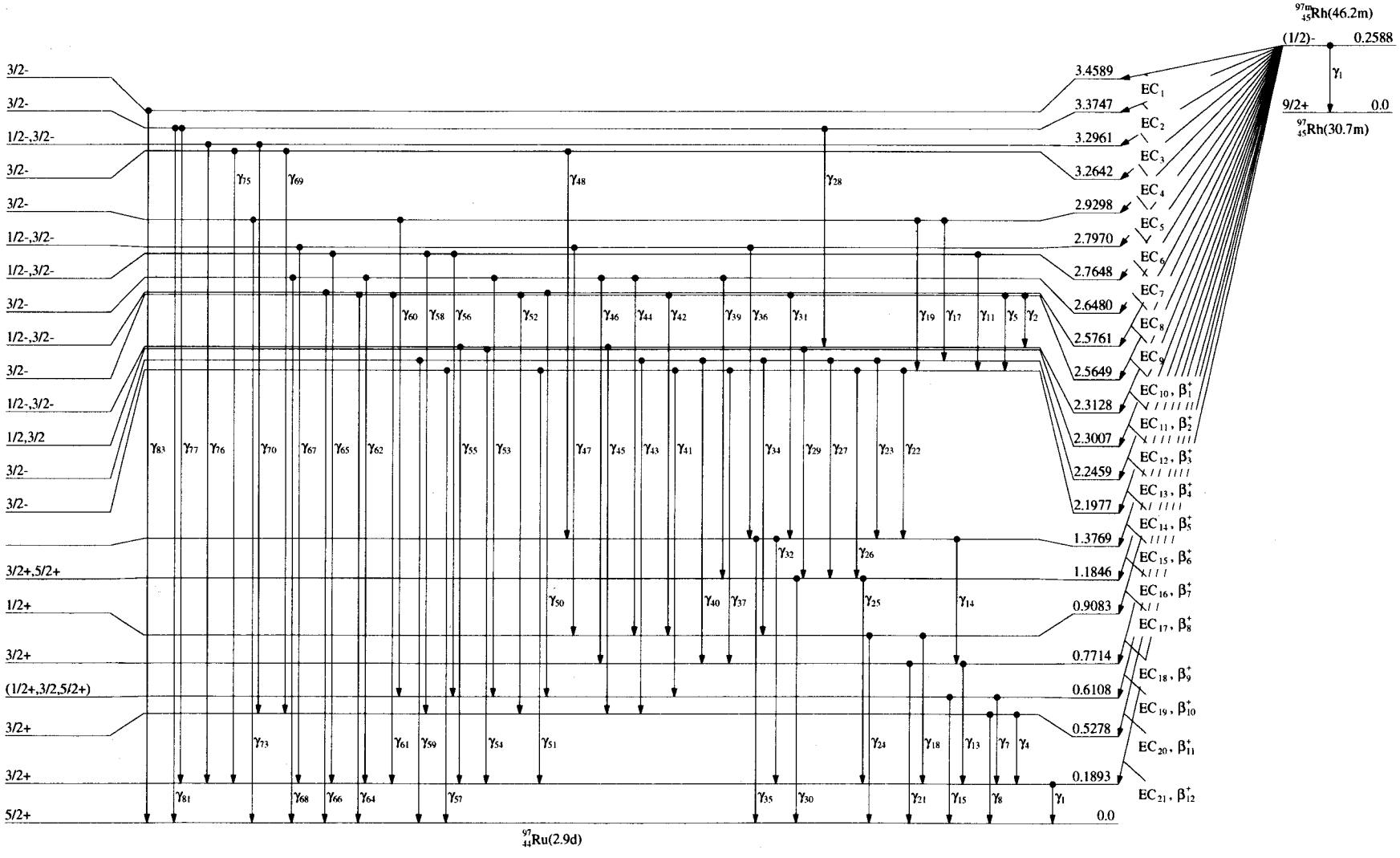
Half-life = 46.2 m
Decay mode(s): EC, β^+, IT

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 4	4.02E−03	2.316E−01*	9.30E−04
β^+ 5	6.39E−03	2.523E−01*	1.61E−03
β^+ 6	4.20E−03	6.130E−01*	2.57E−03
β^+ 7	5.30E−03	6.995E−01*	3.70E−03
β^+ 8	1.10E−02	8.249E−01*	9.04E−03
β^+ 9	2.10E−02	8.875E−01*	1.86E−02
β^+ 10	9.13E−03	9.612E−01*	8.78E−03
β^+ 11	1.83E−02	9.995E−01*	1.82E−02
β^+ 12	1.00E−01	1.156E+00*	1.16E−01
$\gamma^\pm$	3.60E−01	5.110E−01	1.84E−01
γ 1	4.87E−01	1.892E−01	9.21E−02
ce-K, γ 1	2.57E−02	1.671E−01	4.30E−03
ce-L_1, γ 1	2.81E−03	1.860E−01	5.23E−04
γ 2	1.06E−02	2.521E−01	2.68E−03
γ 4	1.22E−02	3.384E−01	4.12E−03
γ 5	6.41E−03	3.673E−01	2.36E−03
γ 7	1.27E−01	4.216E−01	5.36E−02
ce-K, γ 7	7.87E−04	3.994E−01	3.14E−04
γ 8	8.29E−02	5.278E−01	4.38E−02
γ 10	1.05E−02	5.621E−01	5.91E−03
γ 11	1.00E−02	5.672E−01	5.68E−03
γ 13	2.82E−02	5.822E−01	1.64E−02
γ 14	5.03E−03	6.055E−01	3.05E−03
γ 15	6.25E−03	6.106E−01	3.82E−03
γ 17	3.32E−03	6.838E−01	2.27E−03
γ 18	3.37E−02	7.190E−01	2.43E−02
γ 19	4.87E−03	7.318E−01	3.56E−03
γ 20	6.53E−03	7.483E−01	4.88E−03
γ 21	5.42E−02	7.714E−01	4.18E−02
γ 22	8.13E−03	8.209E−01	6.67E−03
γ 23	3.98E−03	8.692E−01	3.46E−03
γ 24	2.32E−02	9.083E−01	2.11E−02
γ 25	3.93E−02	9.954E−01	3.91E−02
γ 26	6.03E−02	1.013E+00	6.11E−02
γ 27	2.76E−03	1.060E+00	2.93E−03
γ 28	2.76E−03	1.061E+00	2.93E−03
γ 29	2.21E−03	1.117E+00	2.47E−03
γ 30	4.59E−02	1.184E+00	5.43E−02
γ 31	1.99E−02	1.187E+00	2.36E−02
γ 32	2.60E−02	1.187E+00	3.09E−02
γ 33	4.42E−03	1.287E+00	5.69E−03
γ 34	9.18E−03	1.337E+00	1.23E−02
γ 35	6.58E−03	1.377E+00	9.06E−03
γ 36	2.76E−03	1.421E+00	3.93E−03
γ 37	2.49E−02	1.426E+00	3.55E−02
γ 38	4.98E−03	1.451E+00	7.22E−03
γ 39	1.33E−02	1.463E+00	1.94E−02
γ 40	1.66E−02	1.475E+00	2.45E−02
γ 41	8.90E−02	1.587E+00	1.41E−01
γ 42	1.99E−02	1.657E+00	3.30E−02
γ 43	2.49E−02	1.719E+00	4.28E−02
γ 44	1.27E−02	1.740E+00	2.21E−02
γ 45	1.44E−02	1.785E+00	2.57E−02
γ 46	1.66E−03	1.877E+00	3.11E−03
γ 47	3.87E−03	1.888E+00	7.31E−03
γ 48	3.87E−03	1.888E+00	7.31E−03
γ 49	5.53E−03	1.907E+00	1.05E−02
γ 50	1.11E−02	1.965E+00	2.17E−02
γ 51	4.26E−02	2.008E+00	8.55E−02
γ 52	2.99E−02	2.037E+00	6.08E−02
γ 53	1.22E−02	2.037E+00	2.48E−02
γ 54	6.36E−03	2.111E+00	1.34E−02
γ 55	2.93E−02	2.123E+00	6.22E−02
γ 56	1.33E−02	2.152E+00	2.86E−02
γ 57	7.41E−03	2.197E+00	1.63E−02
γ 58	1.05E−02	2.237E+00	2.35E−02
γ 59	1.38E−01	2.246E+00	3.10E−01
γ 60	1.66E−03	2.319E+00	3.85E−03
γ 61	1.04E−02	2.376E+00	2.47E−02
γ 62	1.66E−03	2.459E+00	4.08E−03
γ 64	1.66E−03	2.564E+00	4.25E−03
γ 65	3.26E−03	2.577E+00	8.41E−03
γ 66	3.26E−03	2.577E+00	8.41E−03
γ 67	2.49E−02	2.608E+00	6.49E−02
γ 68	3.59E−02	2.648E+00	9.52E−02
γ 69	1.11E−03	2.738E+00	3.03E−03
γ 70	3.32E−03	2.767E+00	9.18E−03
γ 71	2.76E−03	2.853E+00	7.89E−03
γ 72	2.76E−03	2.899E+00	8.02E−03
γ 73	7.19E−03	2.931E+00	2.11E−02
γ 74	2.76E−03	3.034E+00	8.39E−03
γ 75	1.11E−03	3.076E+00	3.40E−03
γ 76	3.15E−03	3.108E+00	9.80E−03
γ 77	2.43E−03	3.185E+00	7.75E−03
γ 78	1.66E−03	3.227E+00	5.35E−03
γ 81	1.49E−02	3.374E+00	5.04E−02
γ 82	4.98E−03	3.400E+00	1.69E−02
γ 83	2.76E−03	3.458E+00	9.56E−03
K_{α_1} X-ray	2.97E−01	1.928E−02	5.72E−03
K_{α_2} X-ray	1.56E−01	1.915E−02	3.00E−03
Auger-KLL	9.80E−02	1.608E−02*	1.58E−03
Auger-KLX	3.96E−02	1.864E−02*	7.38E−04
Auger-LMM	5.01E−01	2.161E−03*	1.08E−03
Auger-LMX	2.17E−01	2.609E−03*	5.67E−04
Auger-MXY	1.39E+00	3.657E−04*	5.10E−04
γ 1	1.55E−02	2.588E−01	4.01E−03
ce-K, γ 1	3.18E−02	2.355E−01	7.49E−03
ce-L_1, γ 1	4.62E−03	2.553E−01	1.18E−03
ce-L_2, γ 1	8.11E−04	2.556E−01	2.07E−04
ce-L_3, γ 1	1.47E−03	2.558E−01	3.77E−04
ce-M, γ 1	1.34E−03	2.583E−01*	3.47E−04

Listed X, γ and $\gamma^\pm$ radiations	2.19E+00
Omitted X, γ and $\gamma^\pm$ radiations**	1.46E−02
Listed β, ce and Auger radiations	1.99E−01
Omitted β, ce and Auger radiations**	1.76E−03
Listed radiations	2.39E+00
Omitted radiations**	1.64E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ru-97 daughter, yield 9.44E−01, is radioactive.
Rh-97 daughter, yield 5.6E−02, is radioactive.


$^{97m}_{45}$Rh(46.2m)
(1/2)-
0.2588
γ_1
9/2+
0.0
$^{97}_{45}$Rh(30.7m)
3/2-
3/2-
1/2-,3/2-
3/2-
3/2-
1/2-,3/2-
1/2-,3/2-
3/2-
1/2-,3/2-
3/2-
1/2-,3/2-
1/2,3/2
3/2-
3/2-
3/2+,5/2+
1/2+
3/2+
(1/2+,3/2,5/2+)
3/2+
3/2+
5/2+
3.4589
3.3747
3.2961
3.2642
2.9298
2.7970
2.7648
2.6480
2.5761
2.5649
2.3128
2.3007
2.2459
2.1977
1.3769
1.1846
0.9083
0.7714
0.6108
0.5278
0.1893
0.0
EC_1
EC_2
EC_3
EC_4
EC_5
EC_6
EC_7
EC_8
EC_9
EC_{10}, β^+_1
EC_{11}, β^+_2
EC_{12}, β^+_3
EC_{13}, β^+_4
EC_{14}, β^+_5
EC_{15}, β^+_6
EC_{16}, β^+_7
EC_{17}, β^+_8
EC_{18}, β^+_9
EC_{19}, β^+_{10}
EC_{20}, β^+_{11}
EC_{21}, β^+_{12}
γ_{75} γ_{69} γ_{48} γ_{28}
γ_{60} γ_{58} γ_{56} γ_{52} γ_{46} γ_{44} γ_{42} γ_{39} γ_{36} γ_{31} γ_{19} γ_{17} γ_{11} γ_5 γ_2
γ_{83} γ_{77} γ_{76} γ_{70} γ_{67} γ_{65} γ_{62} γ_{55} γ_{53} γ_{47} γ_{45} γ_{43} γ_{41} γ_{34} γ_{29} γ_{27} γ_{23} γ_{22}
γ_{32} γ_{26}
γ_{50} γ_{40} γ_{37} γ_{25} γ_{14}
γ_{73} γ_{61} γ_{59} γ_{54} γ_{51} γ_{24} γ_{18} γ_{13} γ_7 γ_4
γ_{81} γ_{68} γ_{66} γ_{64} γ_{57} γ_{35} γ_{30} γ_{21} γ_{15} γ_8 γ_1
$^{97}_{44}$Ru(2.9d)

45-Rh-97

05-NOV-93

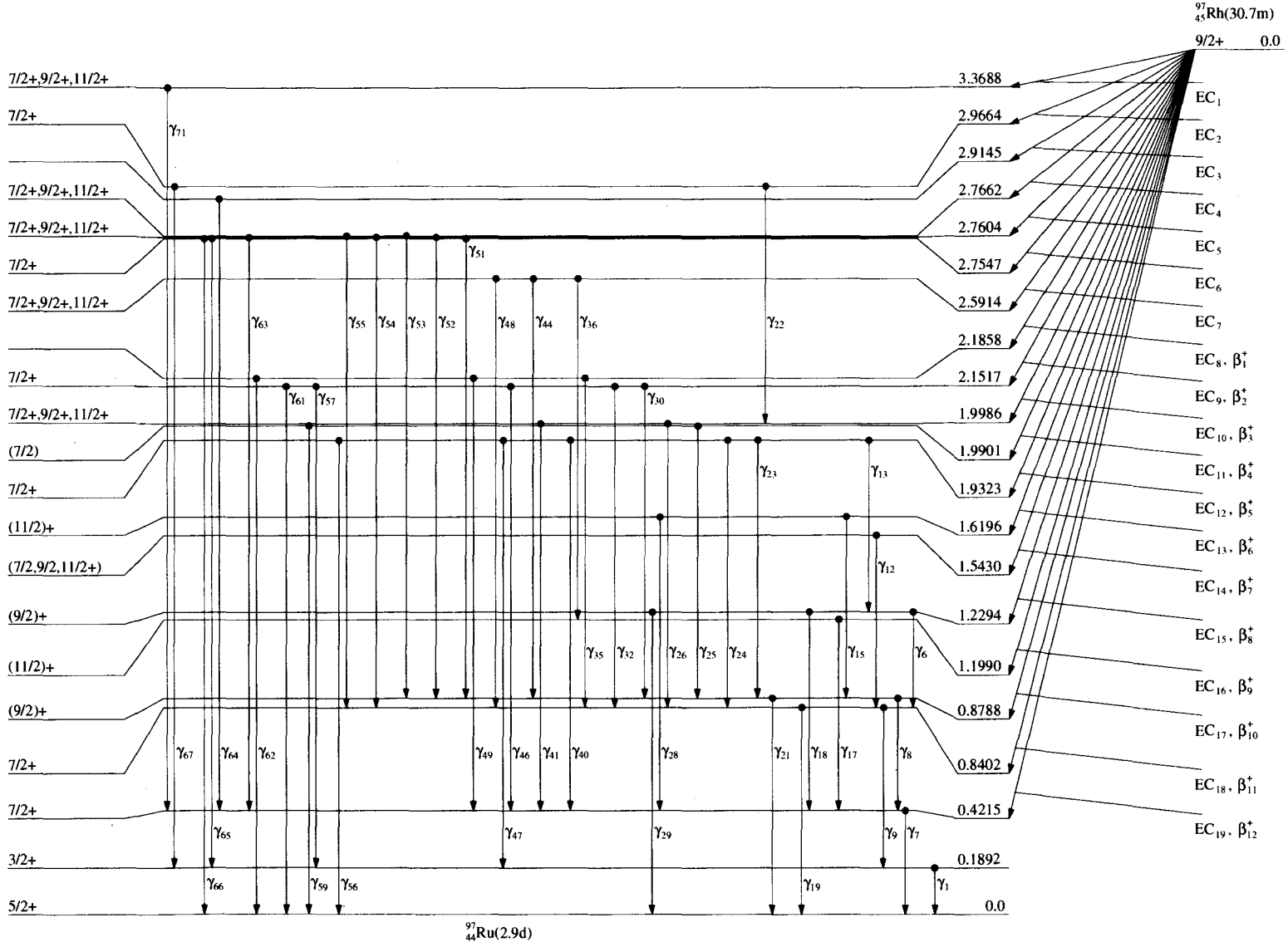
Half-life = 30.7 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 8	1.18E−02	5.632E−01*	6.67E−03
β^+ 9	5.57E−03	5.768E−01*	3.21E−03
β^+ 10	3.08E−02	7.207E−01*	2.22E−02
β^+ 11	4.58E−02	7.382E−01*	3.38E−02
β^+ 12	4.91E−01	9.292E−01*	4.57E−01
$\gamma^\pm$	1.18E+00	5.110E−01	6.02E−01
γ 1	1.04E−02	1.892E−01	1.98E−03
γ 6	8.73E−03	3.893E−01	3.40E−03
γ 7	7.46E−01	4.216E−01	3.15E−01
ce-K, γ 7	4.62E−03	3.994E−01	1.84E−03
γ 8	9.10E−03	4.573E−01	4.16E−03
γ 9	9.70E−03	6.510E−01	6.32E−03
γ 11	2.99E−03	6.838E−01	2.04E−03
γ 12	5.97E−03	7.028E−01	4.20E−03
γ 13	2.99E−03	7.028E−01	2.10E−03
γ 14	3.73E−03	7.076E−01	2.64E−03
γ 15	2.99E−03	7.409E−01	2.21E−03
γ 17	1.44E−02	7.774E−01	1.12E−02
γ 18	1.34E−02	8.077E−01	1.09E−02
γ 19	1.20E−01	8.401E−01	1.01E−01
γ 21	9.03E−02	8.788E−01	7.94E−02
γ 22	2.09E−03	9.679E−01	2.02E−03
γ 23	1.47E−02	1.054E+00	1.55E−02
γ 24	5.60E−03	1.092E+00	6.11E−03
γ 25	4.85E−03	1.111E+00	5.39E−03
γ 26	7.61E−03	1.158E+00	8.82E−03
γ 27	1.49E−03	1.162E+00	1.73E−03
γ 28	3.66E−03	1.198E+00	4.38E−03
γ 29	1.07E−02	1.229E+00	1.31E−02
γ 30	2.91E−03	1.273E+00	3.70E−03
γ 32	1.12E−02	1.310E+00	1.47E−02
γ 33	7.46E−03	1.312E+00	9.79E−03
γ 34	2.99E−03	1.322E+00	3.95E−03
γ 35	1.49E−03	1.345E+00	2.01E−03
γ 36	2.99E−03	1.392E+00	4.16E−03
γ 37	1.49E−03	1.415E+00	2.11E−03
γ 38	4.78E−03	1.435E+00	6.85E−03
γ 39	1.49E−03	1.469E+00	2.19E−03
γ 40	5.52E−03	1.511E+00	8.34E−03
γ 41	6.34E−03	1.577E+00	1.00E−02
γ 42	1.49E−03	1.615E+00	2.41E−03
γ 43	1.49E−03	1.708E+00	2.55E−03
γ 44	4.10E−03	1.713E+00	7.03E−03
γ 45	1.49E−03	1.723E+00	2.57E−03
γ 46	1.49E−03	1.730E+00	2.58E−03
γ 47	2.24E−03	1.742E+00	3.90E−03
γ 48	4.18E−03	1.751E+00	7.32E−03
γ 49	4.48E−03	1.764E+00	7.90E−03
γ 50	4.48E−03	1.813E+00	8.12E−03
γ 51	2.99E−03	1.877E+00	5.60E−03
γ 52	1.49E−03	1.881E+00	2.81E−03
γ 53	1.49E−03	1.888E+00	2.82E−03
γ 54	1.12E−03	1.920E+00	2.15E−03
γ 55	3.36E−03	1.925E+00	6.47E−03
γ 56	5.30E−03	1.932E+00	1.02E−02
γ 57	7.46E−04	1.962E+00	1.46E−03
γ 58	1.49E−03	1.978E+00	2.95E−03
γ 59	1.94E−03	1.989E+00	3.86E−03
γ 60	7.46E−04	2.050E+00	1.53E−03
γ 61	1.04E−02	2.152E+00	2.25E−02
γ 62	2.99E−03	2.186E+00	6.52E−03
γ 63	1.87E−03	2.339E+00	4.36E−03
γ 64	2.24E−03	2.493E+00	5.58E−03
γ 65	1.04E−03	2.564E+00	2.68E−03
γ 66	1.49E−03	2.754E+00	4.11E−03
γ 67	5.97E−04	2.777E+00	1.66E−03
γ 68	7.46E−04	2.789E+00	2.08E−03
γ 69	1.87E−03	2.801E+00	5.23E−03
γ 70	7.46E−04	2.844E+00	2.12E−03
γ 71	1.79E−03	2.947E+00	5.28E−03
γ 72	7.46E−04	3.000E+00	2.24E−03
γ 73	1.49E−03	3.102E+00	4.63E−03
γ 74	7.46E−04	3.304E+00	2.47E−03
γ 75	7.46E−04	3.401E+00	2.54E−03
γ 76	7.46E−04	3.441E+00	2.57E−03
γ 77	7.46E−04	3.494E+00	2.61E−03
K_{α_1} X-ray	1.56E−01	1.928E−02	3.00E−03
K_{α_2} X-ray	8.21E−02	1.915E−02	1.57E−03
Auger-KLL	5.15E−02	1.608E−02*	8.28E−04
Auger-LMM	2.63E−01	2.160E−03*	5.68E−04

Listed X, γ and $\gamma^\pm$ radiations	1.44E+00
Omitted X, γ and $\gamma^\pm$ radiations**	9.13E−03
Listed β, ce and Auger radiations	5.26E−01
Omitted β, ce and Auger radiations**	3.22E−03
Listed radiations	1.97E+00
Omitted radiations**	1.24E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ru-97 daughter is radioactive.


$^{97}_{45}$Rh(30.7m)
9/2+ 0.0
7/2+,9/2+,11/2+
7/2+
7/2+,9/2+,11/2+
7/2+,9/2+,11/2+
7/2+
7/2+,9/2+,11/2+
7/2+
7/2+,9/2+,11/2+
(7/2)
7/2+
(11/2)+
(7/2,9/2,11/2+)
(9/2)+
(11/2)+
(9/2)+
7/2+
7/2+
3/2+
5/2+
3.3688
2.9664
2.9145
2.7662
2.7604
2.7547
2.5914
2.1858
2.1517
1.9986
1.9901
1.9323
1.6196
1.5430
1.2294
1.1990
0.8788
0.8402
0.4215
0.1892
0.0
EC_1
EC_2
EC_3
EC_4
EC_5
EC_6
EC_7
EC_8, β^+_1
EC_9, β^+_2
EC_{10}, β^+_3
EC_{11}, β^+_4
EC_{12}, β^+_5
EC_{13}, β^+_6
EC_{14}, β^+_7
EC_{15}, β^+_8
EC_{16}, β^+_9
EC_{17}, β^+_{10}
EC_{18}, β^+_{11}
EC_{19}, β^+_{12}
γ_{71}
γ_{63} γ_{55} γ_{54} γ_{53} γ_{52} γ_{51} γ_{48} γ_{44} γ_{36} γ_{22}
γ_{61} γ_{57} γ_{30}
γ_{23} γ_{13}
γ_{12}
γ_{35} γ_{32} γ_{26} γ_{25} γ_{24} γ_{15} γ_{6}
γ_{67} γ_{64} γ_{62} γ_{49} γ_{46} γ_{41} γ_{40} γ_{28} γ_{21} γ_{18} γ_{17} γ_{8}
γ_{65} γ_{47} γ_{29} γ_{9} γ_{7}
γ_{66} γ_{59} γ_{56} γ_{19} γ_{1}
$^{97}_{44}$Ru(2.9d)

45-Rh-98

14-JAN-93

Half-life = 8.7 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	5.34E−03	9.030E−01*	4.82E−03
β^+ 2	7.05E−02	9.930E−01*	7.00E−02
β^+ 3	1.71E−02	1.180E+00*	2.02E−02
β^+ 4	4.53E−02	1.202E+00*	5.45E−02
β^+ 5	7.60E−01	1.538E+00*	1.17E+00
$\gamma^\pm$	1.80E+00	5.110E−01	9.18E−01
γ 1	7.54E−03	5.977E−01	4.50E−03
γ 2	9.42E−01	6.526E−01	6.15E−01
γ 3	5.28E−02	7.454E−01	3.93E−02
γ 4	1.70E−02	7.623E−01	1.29E−02
γ 5	6.78E−03	8.321E−01	5.64E−03
γ 6	4.14E−03	1.141E+00	4.73E−03
γ 7	4.52E−02	1.164E+00	5.26E−02
γ 8	1.13E−02	1.415E+00	1.60E−02
γ 10	1.06E−02	1.724E+00	1.83E−02
γ 11	4.71E−02	1.817E+00	8.56E−02
γ 12	1.70E−02	1.973E+00	3.35E−02
γ 14	1.04E−02	2.529E+00	2.62E−02
γ 16	2.26E−03	2.623E+00	5.93E−03
γ 17	2.83E−03	3.004E+00	8.49E−03

Listed X, γ and $\gamma^\pm$ radiations	1.85E+00
Omitted X, γ AND $\gamma^\pm$ radiations**	1.42E−03
Listed β, ce AND Auger radiations	1.32E+00
Omitted β, ce AND Auger radiations**	2.32E−03
Listed radiations	3.16E+00
Omitted radiations**	3.74E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ru-98 daughter is stable.

46-Pd-98

14-JAN-93

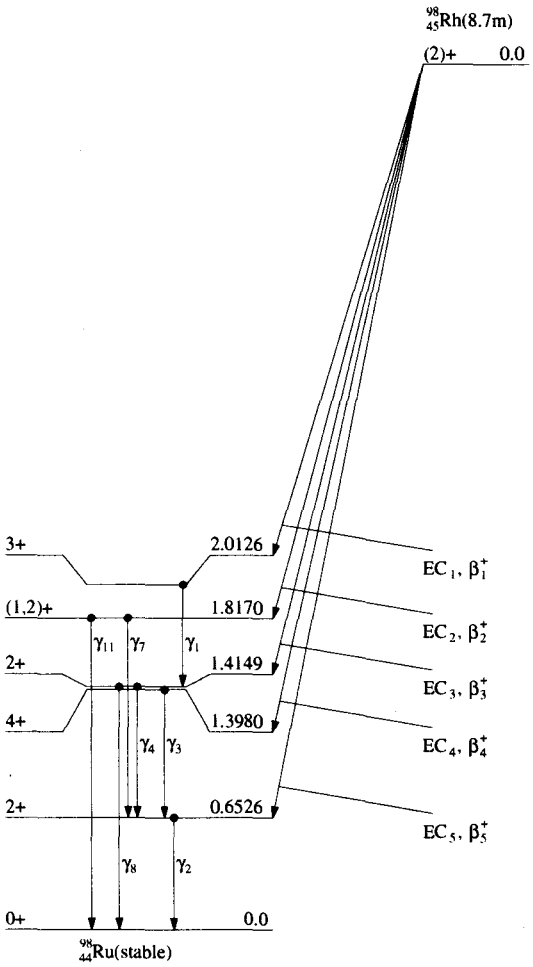
Half-life = 17.7 m
Decay mode(s): EC, β^+

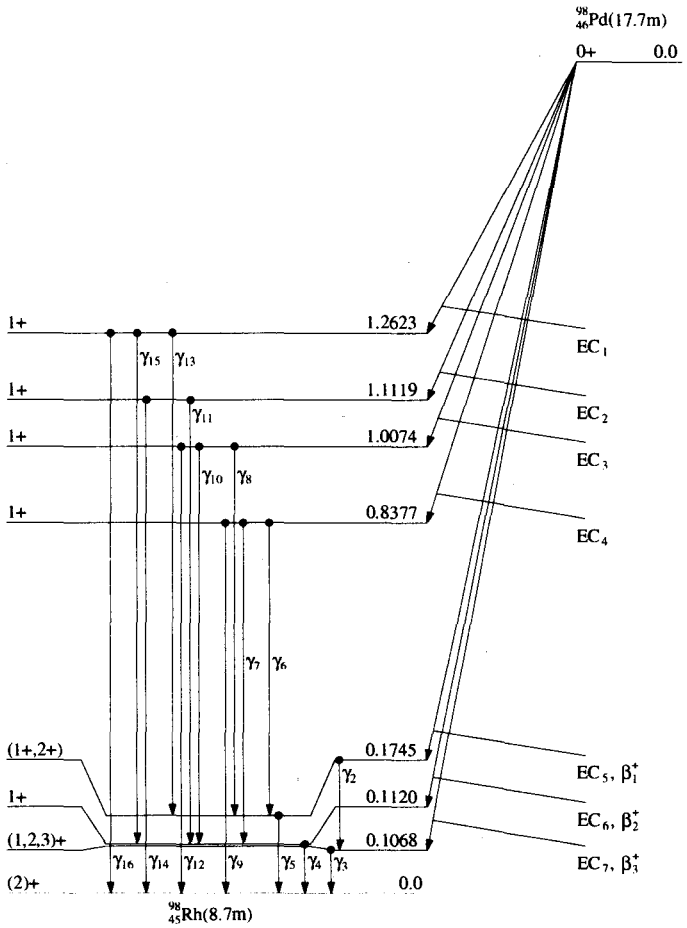
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.92E−03	2.999E−01*	5.75E−04
β^+ 2	4.51E−02	3.270E−01*	1.47E−02
β^+ 3	9.59E−04	3.293E−01*	3.16E−04
$\gamma^\pm$	9.59E−02	5.110E−01	4.90E−02
γ 2	8.70E−02	6.770E−02	5.89E−03
ce-K, γ 2	7.92E−02	4.448E−02	3.52E−03
ce-L_1, γ 2	8.96E−03	6.429E−02	5.76E−04
ce-M, γ 2	1.81E−03	6.720E−02*	1.21E−04
γ 3	1.39E−01	1.067E−01	1.49E−02
ce-K, γ 3	3.48E−02	8.353E−02	2.91E−03
ce-L_1, γ 3	3.93E−03	1.033E−01	4.06E−04
ce-M, γ 3	7.86E−04	1.063E−01*	8.35E−05
γ 4	5.80E−01	1.120E−01	6.50E−02
ce-K, γ 4	1.27E−01	8.878E−02	1.13E−02
ce-L_1, γ 4	1.43E−02	1.086E−01	1.55E−03
ce-L_2, γ 4	8.42E−04	1.089E−01	9.17E−05
ce-M, γ 4	2.86E−03	1.115E−01*	3.19E−04
ce-N^+, γ 4	5.61E−04	1.120E−01*	6.28E−05
γ 5	6.96E−02	1.744E−01	1.21E−02
ce-K, γ 5	4.54E−03	1.512E−01	6.86E−04
ce-L_1, γ 5	5.11E−04	1.710E−01	8.74E−05
γ 6	1.97E−01	6.622E−01	1.31E−01
ce-K, γ 6	4.56E−04	6.390E−01	2.92E−04
γ 7	3.89E−02	7.247E−01	2.82E−02
ce-K, γ 7	7.31E−05	7.015E−01	5.13E−05
γ 8	3.13E−02	8.328E−01	2.61E−02
γ 9	2.61E−03	8.368E−01	2.18E−03
γ 10	1.51E−02	8.954E−01	1.35E−02
γ 11	3.83E−03	9.999E−01	3.83E−03
γ 12	1.28E−02	1.008E+00	1.29E−02
γ 13	1.39E−02	1.088E+00	1.51E−02
γ 14	5.80E−03	1.112E+00	6.45E−03
γ 15	6.96E−03	1.150E+00	8.00E−03
γ 16	2.90E−03	1.263E+00	3.66E−03
K_{α_1} X-ray	4.67E−01	2.022E−02	9.45E−03
K_{α_2} X-ray	2.47E−01	2.007E−02	4.95E−03
K_{β_1} X-ray	8.23E−02	2.272E−02	1.87E−03
K_{β_2} X-ray	2.17E−02	2.317E−02	5.04E−04
K_{β_3} X-ray	4.34E−02	2.270E−02	9.86E−04
Auger-KLL	1.41E−01	1.683E−02*	2.37E−03
Auger-KLX	5.80E−02	1.953E−02*	1.13E−03
Auger-KXY	7.22E−03	2.220E−02*	1.60E−04
Auger-LMM	7.63E−01	2.269E−03*	1.73E−03
Auger-LMX	3.34E−01	2.753E−03*	9.19E−04
Auger-LXY	4.04E−02	3.059E−03*	1.24E−04
Auger-MXY	2.13E+00	3.970E−04*	8.47E−04

Listed X, γ and $\gamma^\pm$ radiations	4.15E−01
Omitted X, γ and $\gamma^\pm$ radiations**	1.61E−04
Listed β, ce and Auger radiations	4.50E−02
Omitted β, ce and Auger radiations**	3.37E−04
Listed radiations	4.60E−01
Omitted radiations**	4.98E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Rh-98 daughter is radioactive.


$^{98}_{45}$Rh(8.7m)
(2)+ 0.0
3+
2.0126
(1,2)+
1.8170
2+
1.4149
4+
1.3980
2+
0.6526
0+
0.0
$^{98}_{44}$Ru(stable)
γ_{11} γ_7 γ_1 γ_4 γ_3 γ_8 γ_2
EC_1, β_1^+
EC_2, β_2^+
EC_3, β_3^+
EC_4, β_4^+
EC_5, β_5^+


$^{98}_{46}$Pd(17.7m)
0+ 0.0
1+ 1.2623
1+ 1.1119
1+ 1.0074
1+ 0.8377
(1+,2+) 0.1745
1+ 0.1120
(1,2,3)+ 0.1068
(2)+ 0.0
$^{98}_{45}$Rh(8.7m)
γ_{15} γ_{13} γ_{11} γ_{10} γ_8 γ_7 γ_6 γ_2 γ_{16} γ_{14} γ_{12} γ_9 γ_5 γ_4 γ_3
EC_1
EC_2
EC_3
EC_4
EC_5, β_1^+
EC_6, β_2^+
EC_7, β_3^+

46-Pd-99

09-JAN-95

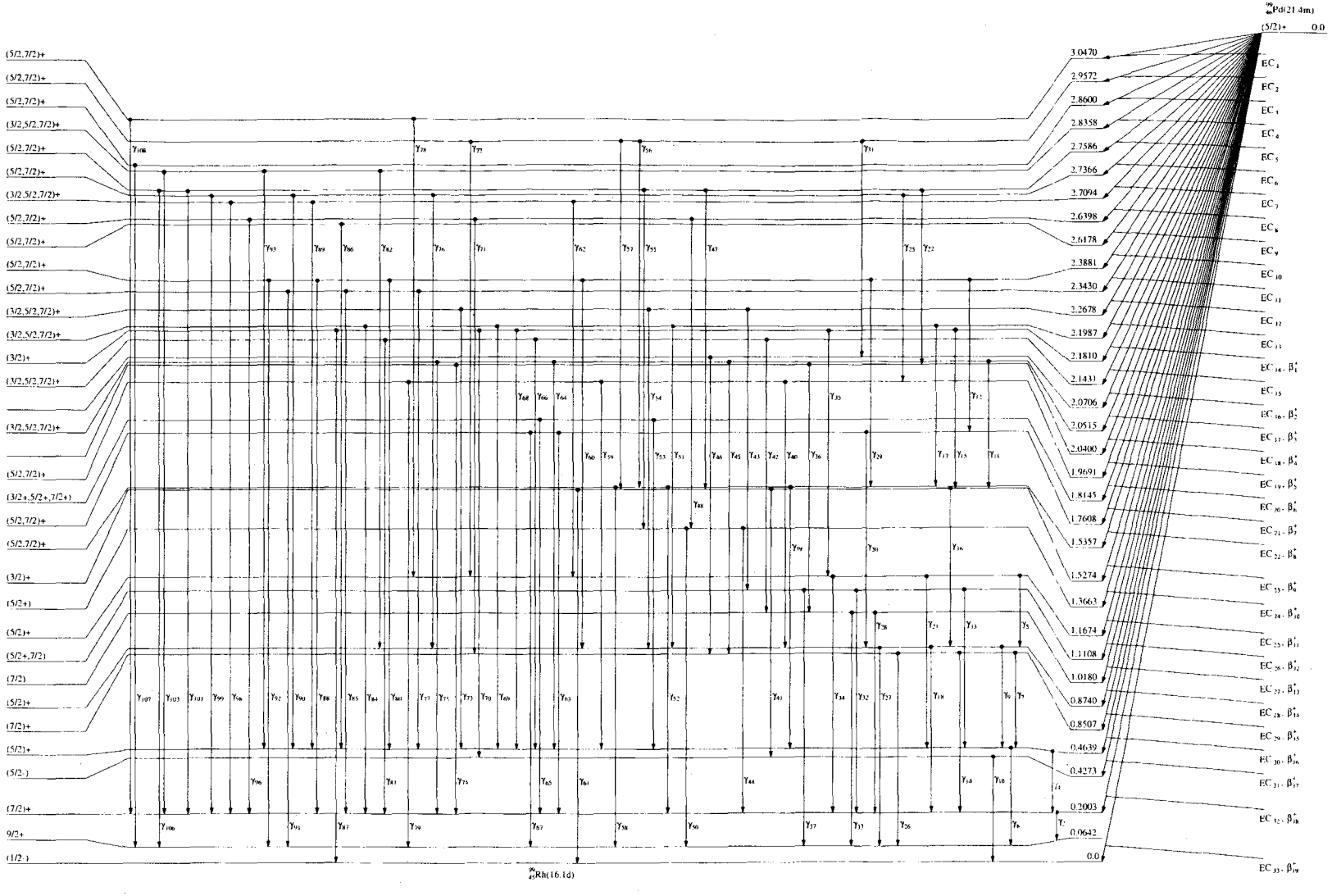
Half-life = 21.4 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 8	5.52E−03	3.690E−01*	2.04E−03
β^+ 9	1.30E−03	3.726E−01*	4.86E−04
β^+ 10	1.10E−03	4.432E−01*	4.89E−04
β^+ 11	1.00E−03	5.311E−01*	5.33E−04
β^+ 12	2.61E−03	5.563E−01*	1.45E−03
β^+ 13	2.81E−03	5.977E−01*	1.68E−03
β^+ 14	2.01E−02	6.622E−01*	1.33E−02
β^+ 15	3.21E−02	6.727E−01*	2.16E−02
β^+ 16	5.62E−02	8.481E−01*	4.76E−02
β^+ 17	4.41E−03	8.648E−01*	3.82E−03
β^+ 18	3.51E−01	9.690E−01*	3.40E−01
β^+ 19	4.11E−03	1.078E+00*	4.43E−03
$\gamma^{\pm}$	9.66E−01	5.110E−01	4.93E−01
γ 2	7.27E−01	1.360E−01	9.89E−02
ce-K, γ 2	9.96E−02	1.128E−01	1.12E−02
ce-L_1, γ 2	1.11E−02	1.326E−01	1.47E−03
γ 4	1.52E−01	2.636E−01	4.01E−02
ce-K, γ 4	3.67E−03	2.404E−01	8.81E−04
γ 5	1.31E−02	2.933E−01	3.84E−03
γ 7	2.84E−02	3.867E−01	1.10E−02
γ 8	3.56E−02	3.998E−01	1.42E−02
γ 9	1.31E−02	4.103E−01	5.37E−03
γ 10	1.96E−02	4.273E−01	8.39E−03
γ 11	3.34E−03	5.241E−01	1.75E−03
γ 12	2.84E−03	6.270E−01	1.78E−03
γ 13	5.89E−03	6.461E−01	3.80E−03
γ 14	1.31E−02	6.504E−01	8.51E−03
γ 15	1.45E−02	6.528E−01	9.49E−03
γ 16	2.54E−02	6.531E−01	1.66E−02
γ 17	3.85E−03	6.624E−01	2.55E−03
γ 18	6.91E−02	6.734E−01	4.65E−02
γ 21	2.40E−03	7.027E−01	1.69E−03
γ 22	4.29E−03	7.187E−01	3.08E−03
γ 25	2.18E−03	7.672E−01	1.67E−03
γ 26	3.34E−02	7.866E−01	2.63E−02
γ 27	2.04E−02	8.098E−01	1.65E−02
γ 28	1.09E−02	8.176E−01	8.92E−03
γ 29	3.05E−03	8.523E−01	2.60E−03
γ 30	3.34E−03	8.865E−01	2.96E−03
γ 31	3.34E−03	8.865E−01	2.96E−03
γ 32	2.84E−03	9.109E−01	2.58E−03
γ 33	1.74E−03	9.540E−01	1.66E−03
γ 34	9.45E−03	9.671E−01	9.14E−03
γ 35	1.45E−02	1.013E+00	1.47E−02
γ 36	2.76E−03	1.022E+00	2.82E−03
γ 37	4.36E−03	1.046E+00	4.56E−03
γ 39	8.87E−03	1.072E+00	9.51E−03
γ 40	2.40E−03	1.095E+00	2.63E−03
γ 41	1.02E−02	1.100E+00	1.12E−02
γ 42	2.25E−03	1.124E+00	2.53E−03
γ 43	6.62E−03	1.157E+00	7.66E−03
γ 44	7.49E−03	1.166E+00	8.73E−03
γ 45	1.09E−03	1.201E+00	1.31E−03
γ 46	2.98E−03	1.219E+00	3.63E−03
γ 47	7.27E−03	1.231E+00	8.95E−03
γ 48	1.38E−03	1.274E+00	1.76E−03
γ 50	2.33E−03	1.302E+00	3.03E−03
γ 51	8.36E−03	1.325E+00	1.11E−02
γ 52	4.65E−02	1.336E+00	6.21E−02
γ 53	1.74E−03	1.351E+00	2.36E−03
γ 54	1.31E−03	1.392E+00	1.82E−03
γ 55	1.31E−03	1.392E+00	1.82E−03
γ 56	1.60E−03	1.422E+00	2.27E−03
γ 57	1.96E−03	1.429E+00	2.81E−03
γ 58	2.25E−03	1.471E+00	3.32E−03
γ 59	5.38E−03	1.505E+00	8.10E−03
γ 60	1.96E−03	1.515E+00	2.97E−03
γ 61	2.84E−03	1.528E+00	4.33E−03
γ 62	1.53E−03	1.541E+00	2.35E−03
γ 63	1.60E−03	1.560E+00	2.49E−03
γ 64	1.24E−03	1.588E+00	1.96E−03
γ 65	4.80E−03	1.614E+00	7.74E−03
γ 66	6.18E−03	1.681E+00	1.04E−02
γ 67	5.53E−03	1.697E+00	9.38E−03
γ 68	6.40E−03	1.718E+00	1.10E−02
γ 69	9.45E−04	1.735E+00	1.64E−03
γ 70	1.31E−03	1.754E+00	2.30E−03
γ 71	2.11E−03	1.790E+00	3.77E−03
γ 72	2.11E−03	1.790E+00	3.77E−03
γ 73	1.74E−03	1.804E+00	3.15E−03
γ 74	1.89E−03	1.840E+00	3.48E−03
γ 75	4.51E−03	1.852E+00	8.35E−03
γ 76	1.82E−03	1.864E+00	3.39E−03
γ 77	1.67E−03	1.880E+00	3.14E−03
γ 78	1.67E−03	1.880E+00	3.14E−03
γ 79	6.54E−03	1.905E+00	1.25E−02
γ 80	4.73E−03	1.925E+00	9.10E−03
γ 81	2.69E−03	1.943E+00	5.23E−03
γ 82	8.00E−04	1.962E+00	1.57E−03
γ 84	7.71E−03	1.999E+00	1.54E−02
γ 85	4.14E−03	2.142E+00	8.88E−03
γ 86	1.67E−03	2.155E+00	3.60E−03
γ 87	2.98E−03	2.182E+00	6.50E−03
γ 88	2.04E−03	2.188E+00	4.45E−03
γ 89	8.29E−03	2.246E+00	1.86E−02
γ 90	3.49E−03	2.273E+00	7.93E−03
γ 91	1.89E−03	2.278E+00	4.31E−03
γ 92	5.45E−03	2.325E+00	1.27E−02
γ 93	8.00E−04	2.373E+00	1.90E−03
γ 96	8.72E−04	2.439E+00	2.13E−03
γ 98	1.16E−03	2.509E+00	2.92E−03
γ 99	5.82E−03	2.536E+00	1.48E−02
γ 101	1.89E−03	2.558E+00	4.83E−03
γ 103	9.45E−04	2.634E+00	2.49E−03
γ 106	1.38E−03	2.695E+00	3.72E−03
γ 107	8.72E−04	2.796E+00	2.44E−03
γ 108	1.53E−03	2.847E+00	4.35E−03
K_{α_1} X-ray	2.41E−01	2.022E−02	4.88E−03
K_{α_2} X-ray	1.27E−01	2.007E−02	2.56E−03
Auger-KLL	7.28E−02	1.683E−02*	1.23E−03
Auger-KLX	2.99E−02	1.953E−02*	5.85E−04
Auger-LMM	3.95E−01	2.269E−03*	8.96E−04
Auger-LMX	1.72E−01	2.753E−03*	4.75E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.27E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.55E−02
Listed β, ce and Auger radiations	4.54E−01
Omitted β, ce and Auger radiations**	2.51E−03
Listed radiations	1.73E+00
Omitted radiations**	1.80E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Rh-99m daughter, yield 9.652E−01, is radioactive.
Rh-99 daughter, yield 3.48E−02, is radioactive.


$^{99}_{46}$Pd(21.4m)
(5/2)+ 0.0
3.0470
2.9572
2.8600
2.8358
2.7586
2.7366
2.7094
2.6398
2.6178
2.3881
2.3430
2.2678
2.1987
2.1810
2.1433
2.0706
2.0515
2.0400
1.9691
1.8145
1.7608
1.5357
1.5274
1.3663
1.1674
1.1108
1.0180
0.8740
0.8507
0.4639
0.4273
0.2003
0.0642
0.0
$^{99}_{45}$Rh(16.1d)

46-Pd-111

08-APR-96

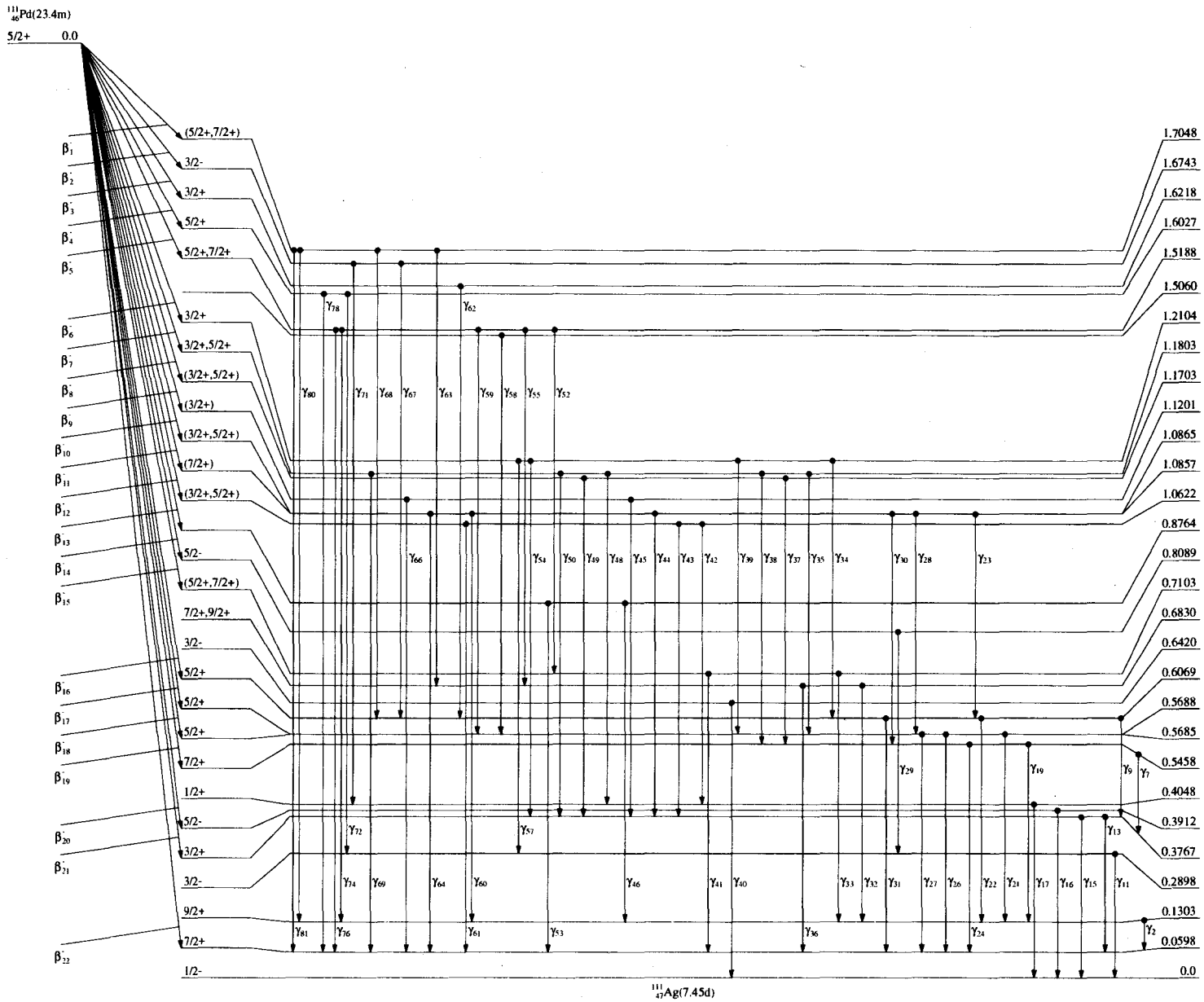
Half-life = 23.4 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 5	1.40E−02	2.182E−01*	3.06E−03
β^- 15	1.36E−02	5.545E−01*	7.55E−03
β^- 16	3.91E−03	6.002E−01*	2.34E−03
β^- 21	1.80E−03	7.032E−01*	1.27E−03
β^- 22	9.54E−01	8.472E−01*	8.09E−01
γ 2	7.78E−03	7.043E−02	5.48E−04
γ 7	3.48E−04	1.694E−01	5.90E−05
γ 9	2.44E−04	2.303E−01	5.61E−05
γ 11	1.06E−03	2.898E−01	3.08E−04
γ 13	2.09E−04	3.168E−01	6.61E−05
γ 15	4.61E−03	3.767E−01	1.74E−03
γ 16	2.70E−04	3.912E−01	1.06E−04
γ 17	8.70E−04	4.048E−01	3.52E−04
γ 18	2.61E−04	4.140E−01	1.08E−04
γ 19	7.66E−04	4.155E−01	3.18E−04
γ 21	5.05E−04	4.385E−01	2.21E−04
γ 22	6.00E−04	4.767E−01	2.86E−04
γ 23	2.00E−04	4.789E−01	9.58E−05
γ 24	2.70E−04	4.858E−01	1.31E−04
γ 26	2.18E−03	5.091E−01	1.11E−03
γ 27	2.18E−03	5.091E−01	1.11E−03
γ 28	2.70E−04	5.164E−01	1.39E−04
γ 29	1.04E−04	5.193E−01	5.42E−05
γ 30	2.70E−04	5.407E−01	1.46E−04
γ 31	3.83E−03	5.470E−01	2.09E−03
γ 32	1.65E−04	5.526E−01	9.13E−05
γ 33	8.70E−03	5.800E−01	5.05E−03
γ 34	2.35E−04	6.031E−01	1.42E−04
γ 35	1.83E−04	6.113E−01	1.12E−04
γ 36	2.87E−03	6.232E−01	1.79E−03
γ 37	1.74E−04	6.240E−01	1.09E−04
γ 38	2.17E−04	6.350E−01	1.38E−04
γ 39	4.35E−04	6.417E−01	2.79E−04
γ 40	1.74E−04	6.417E−01	1.12E−04
γ 41	5.74E−03	6.504E−01	3.73E−03
γ 42	2.44E−04	6.573E−01	1.60E−04
γ 43	5.22E−04	6.854E−01	3.58E−04
γ 44	1.31E−03	7.098E−01	9.26E−04
γ 45	1.74E−04	7.426E−01	1.29E−04
γ 46	1.48E−04	7.457E−01	1.10E−04
γ 48	4.35E−04	7.755E−01	3.37E−04
γ 49	1.83E−04	7.938E−01	1.45E−04
γ 50	3.57E−04	8.038E−01	2.87E−04
γ 52	2.70E−04	8.085E−01	2.18E−04
γ 53	7.83E−05	8.165E−01	6.39E−05
γ 54	8.70E−05	8.330E−01	7.25E−05
γ 55	2.78E−03	8.357E−01	2.33E−03
γ 57	2.52E−04	9.214E−01	2.32E−04
γ 58	6.96E−05	9.373E−01	6.52E−05
γ 59	8.70E−05	9.500E−01	8.26E−05
γ 60	3.91E−04	9.555E−01	3.74E−04
γ 61	6.35E−04	1.002E+00	6.37E−04
γ 62	8.70E−05	1.015E+00	8.83E−05
γ 63	6.96E−05	1.022E+00	7.11E−05
γ 64	8.70E−05	1.027E+00	8.93E−05
γ 66	1.31E−04	1.060E+00	1.38E−04
γ 67	1.31E−04	1.067E+00	1.39E−04
γ 68	6.96E−05	1.098E+00	7.64E−05
γ 69	1.39E−03	1.120E+00	1.56E−03
γ 71	8.70E−05	1.270E+00	1.10E−04
γ 72	7.83E−05	1.311E+00	1.03E−04
γ 73	1.74E−04	1.348E+00	2.35E−04
γ 74	5.57E−03	1.388E+00	7.73E−03
γ 75	4.35E−05	1.395E+00	6.07E−05
γ 76	5.83E−03	1.459E+00	8.50E−03
γ 78	2.26E−04	1.543E+00	3.49E−04
γ 79	5.22E−05	1.549E+00	8.09E−05
γ 80	2.70E−04	1.574E+00	4.25E−04
γ 81	2.00E−04	1.644E+00	3.29E−04
γ 82	2.61E−05	1.863E+00	4.86E−05
K_{α_1} X-ray	3.74E−03	2.216E−02	8.29E−05

Listed X, γ and $\gamma^{\pm}$ radiations	4.73E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.63E−04
Listed β, ce and Auger radiations	8.23E−01
Omitted β, ce and Auger radiations**	5.66E−03
Listed radiations	8.70E−01
Omitted radiations**	6.12E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ag-111m daughter, yield 9.976E−01, is radioactive.
Ag-111 daughter, yield 2.4E−03, is radioactive.


$^{111}_{46}$Pd(23.4m)
5/2+ 0.0
(5/2+,7/2+) 1.7048
3/2- 1.6743
3/2+ 1.6218
5/2+ 1.6027
5/2+,7/2+ 1.5188
1.5060
3/2+ 1.2104
3/2+,5/2+ 1.1803
(3/2+,5/2+) 1.1703
(3/2+) 1.1201
(3/2+,5/2+) 1.0865
(7/2+) 1.0857
(3/2+,5/2+) 1.0622
0.8764
5/2- 0.8089
(5/2+,7/2+) 0.7103
7/2+,9/2+ 0.6830
3/2- 0.6420
5/2+ 0.6069
5/2+ 0.5688
5/2+ 0.5685
7/2+ 0.5458
1/2+ 0.4048
5/2- 0.3912
3/2+ 0.3767
3/2- 0.2898
9/2+ 0.1303
7/2+ 0.0598
1/2- 0.0
$^{111}_{47}$Ag(7.45d)

46-Pd-112

02-JAN-97

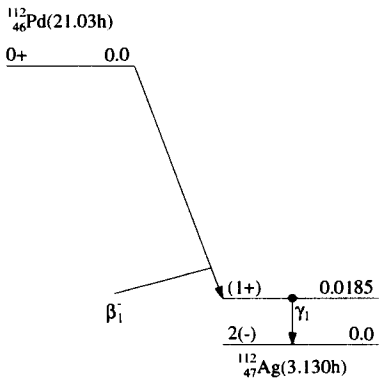
Half-life = 21.03 h
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.00E+00	7.656E−02*	7.66E−02
γ 1	2.69E−01	1.850E−02	4.97E−03
ce-L_1, γ 1	2.82E−01	1.469E−02	4.15E−03
ce-L_2, γ 1	1.20E−01	1.498E−02	1.80E−03
ce-L_3, γ 1	2.00E−01	1.515E−02	3.02E−03
ce-M, γ 1	1.13E−01	1.793E−02*	2.02E−03
ce-N^+, γ 1	1.67E−02	1.850E−02*	3.10E−04
L_α X-ray	1.62E−02	2.984E−03*	4.82E−05
L_β X-ray	1.08E−02	3.203E−03*	3.45E−05
L_γ X-ray	1.15E−03	3.614E−03*	4.16E−06
L_η X-ray	2.32E−04	2.806E−03	6.52E−07
L_ℓ X-ray	4.80E−04	2.634E−03	1.26E−06
Auger-LMM	3.81E−01	2.503E−03*	9.54E−04
Auger-LMX	1.71E−01	3.066E−03*	5.24E−04
Auger-LXY	2.10E−02	3.433E−03*	7.22E−05
Auger-MXY	1.07E+00	4.598E−04*	4.93E−04
ΔE	2.12E−01	1.338E−05*	2.84E−06

Listed X, γ and $\gamma^\pm$ radiations	5.06E−03
Listed β, ce and Auger radiations	8.99E−02
Listed radiations	9.50E−02

* Average energy (MeV)

Ag-112 daughter is radioactive.



47-Ag-101

07-AUG-91

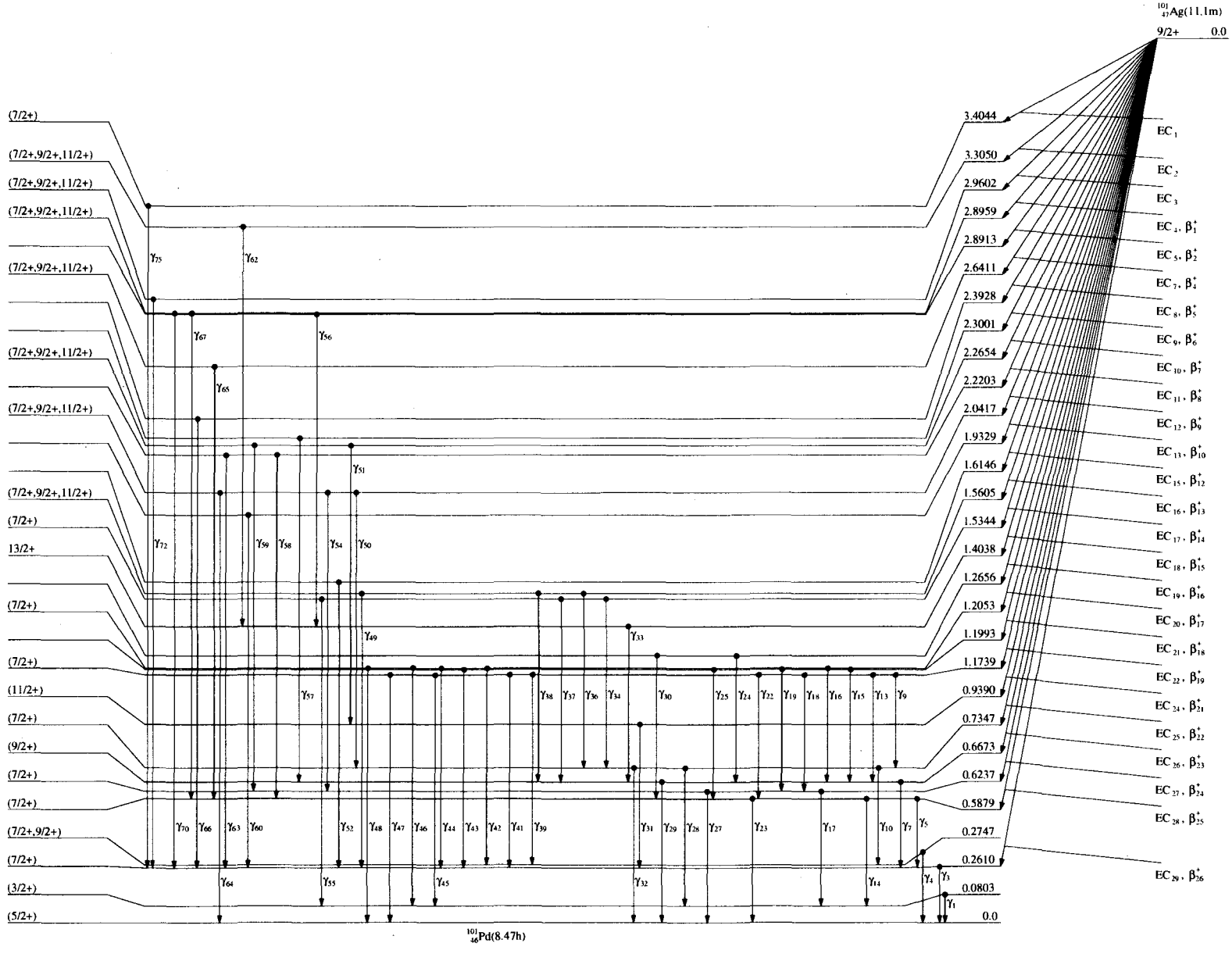
Half-life = 11.1 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 9	4.15E−03	5.047E−01*	2.10E−03
β^+ 12	1.38E−03	6.956E−01*	9.63E−04
β^+ 13	1.25E−02	7.200E−01*	8.97E−03
β^+ 14	5.44E−03	7.318E−01*	3.98E−03
β^+ 15	1.68E−03	8.118E−01*	1.36E−03
β^+ 16	1.19E−02	8.540E−01*	1.01E−02
β^+ 17	4.25E−02	8.815E−01*	3.75E−02
β^+ 18	1.72E−02	8.842E−01*	1.52E−02
β^+ 19	1.13E−01	8.959E−01*	1.01E−01
β^+ 20	2.47E−03	9.381E−01*	2.32E−03
β^+ 21	1.19E−02	1.004E+00*	1.19E−02
β^+ 22	5.93E−03	1.098E+00*	6.51E−03
β^+ 23	3.76E−02	1.129E+00*	4.24E−02
β^+ 24	1.18E−02	1.150E+00*	1.35E−02
β^+ 25	6.92E−02	1.166E+00*	8.07E−02
β^+ 26	3.70E−01	1.319E+00*	4.88E−01
$\gamma^\pm$	1.44E+00	5.110E−01	7.38E−01
γ 1	4.73E−02	8.026E−02	3.80E−03
ce-K, γ 1	2.93E−02	5.591E−02	1.64E−03
γ 3	5.26E−01	2.610E−01	1.37E−01
ce-K, γ 3	1.31E−02	2.367E−01	3.09E−03
γ 4	1.68E−02	2.747E−01	4.62E−03
γ 5	1.89E−02	3.269E−01	6.19E−03
γ 7	6.31E−03	4.063E−01	2.56E−03
γ 9	2.85E−02	4.392E−01	1.25E−02
γ 10	3.68E−03	4.599E−01	1.69E−03
γ 13	5.79E−03	5.066E−01	2.93E−03
γ 14	2.05E−02	5.076E−01	1.04E−02
γ 15	3.16E−03	5.322E−01	1.68E−03
γ 16	1.38E−02	5.379E−01	7.44E−03
γ 17	2.31E−02	5.433E−01	1.26E−02
γ 18	3.89E−03	5.502E−01	2.14E−03
γ 19	3.52E−03	5.756E−01	2.03E−03
γ 22	1.05E−02	5.859E−01	6.16E−03
γ 23	9.99E−02	5.880E−01	5.88E−02
γ 24	6.00E−03	5.982E−01	3.59E−03
γ 25	6.58E−03	6.113E−01	4.02E−03
γ 27	7.73E−03	6.236E−01	4.82E−03
γ 28	1.58E−02	6.544E−01	1.03E−02
γ 29	9.84E−02	6.673E−01	6.56E−02
γ 30	1.32E−02	6.777E−01	8.91E−03
γ 31	2.37E−02	6.779E−01	1.60E−02
γ 32	3.26E−02	7.347E−01	2.40E−02
γ 33	9.47E−03	7.365E−01	6.97E−03
γ 34	2.95E−03	7.999E−01	2.36E−03
γ 36	2.47E−03	8.259E−01	2.04E−03
γ 37	2.79E−03	8.672E−01	2.42E−03
γ 38	1.13E−02	8.932E−01	1.01E−02
γ 39	4.79E−03	8.994E−01	4.31E−03
γ 41	5.79E−03	9.128E−01	5.28E−03
γ 42	3.16E−03	9.305E−01	2.94E−03
γ 43	1.37E−02	9.383E−01	1.28E−02
γ 44	1.16E−02	9.443E−01	1.09E−02
γ 45	2.63E−02	1.094E+00	2.88E−02
γ 46	4.16E−03	1.125E+00	4.68E−03
γ 47	8.94E−02	1.174E+00	1.05E−01
γ 48	2.63E−02	1.205E+00	3.17E−02
γ 49	9.36E−03	1.299E+00	1.22E−02
γ 50	7.36E−03	1.307E+00	9.62E−03
γ 51	6.84E−03	1.326E+00	9.07E−03
γ 52	2.89E−03	1.354E+00	3.92E−03
γ 54	4.21E−03	1.418E+00	5.97E−03
γ 55	4.42E−03	1.454E+00	6.42E−03
γ 56	1.68E−03	1.487E+00	2.50E−03
γ 57	4.21E−03	1.633E+00	6.87E−03
γ 58	4.73E−03	1.633E+00	7.73E−03
γ 59	1.63E−03	1.642E+00	2.68E−03
γ 60	1.37E−03	1.672E+00	2.29E−03
γ 61	2.52E−03	1.816E+00	4.58E−03
γ 62	2.42E−03	1.901E+00	4.60E−03
γ 63	2.47E−03	1.959E+00	4.84E−03
γ 64	6.15E−03	2.042E+00	1.26E−02
γ 65	8.21E−03	2.053E+00	1.68E−02
γ 66	3.16E−03	2.132E+00	6.73E−03
γ 67	6.31E−03	2.308E+00	1.46E−02
γ 68	1.05E−03	2.444E+00	2.57E−03
γ 69	8.42E−04	2.519E+00	2.12E−03
γ 70	2.95E−03	2.635E+00	7.76E−03
γ 71	1.79E−03	2.664E+00	4.76E−03
γ 72	3.68E−03	2.699E+00	9.94E−03
γ 73	1.37E−03	2.854E+00	3.90E−03
γ 74	1.37E−03	2.888E+00	3.95E−03
γ 75	1.74E−03	3.143E+00	5.46E−03
γ 76	6.84E−04	3.197E+00	2.19E−03
K_{α_1} X-ray	1.26E−01	2.118E−02	2.68E−03

Listed X, γ and $\gamma^\pm$ radiations	1.56E+00
Omitted X, γ and $\gamma^\pm$ radiations**	1.23E−02
Listed β, ce and Auger radiations	8.31E−01
Omitted β, ce and Auger radiations**	5.94E−03
Listed radiations	2.39E+00
Omitted radiations**	1.83E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pd-101 daughter is radioactive.


$^{101}_{47}$Ag(11.1m)
9/2+ 0.0
3.4044
3.3050
2.9602
2.8959
2.8913
2.6411
2.3928
2.3001
2.2654
2.2203
2.0417
1.9329
1.6146
1.5605
1.5344
1.4038
1.2656
1.2053
1.1993
1.1739
0.9390
0.7347
0.6673
0.6237
0.5879
0.2747
0.2610
0.0803
0.0
(7/2+)
(7/2+,9/2+,11/2+)
(7/2+,9/2+,11/2+)
(7/2+,9/2+,11/2+)
(7/2+,9/2+,11/2+)
(7/2+,9/2+,11/2+)
(7/2+,9/2+,11/2+)
(7/2+,9/2+,11/2+)
(7/2+,9/2+,11/2+)
(7/2+)
13/2+
(7/2+)
(7/2+)
(11/2+)
(7/2+)
(9/2+)
(7/2+)
(7/2+)
(7/2+,9/2+)
(7/2+)
(3/2+)
(5/2+)
EC_1
EC_2
EC_3
EC_4, β^+_1
EC_5, β^+_2
EC_7, β^+_4
EC_8, β^+_5
EC_9, β^+_6
EC_{10}, β^+_7
EC_{11}, β^+_8
EC_{12}, β^+_9
EC_{13}, β^+_{10}
EC_{15}, β^+_{12}
EC_{16}, β^+_{13}
EC_{17}, β^+_{14}
EC_{18}, β^+_{15}
EC_{19}, β^+_{16}
EC_{20}, β^+_{17}
EC_{21}, β^+_{18}
EC_{22}, β^+_{19}
EC_{24}, β^+_{21}
EC_{25}, β^+_{22}
EC_{26}, β^+_{23}
EC_{27}, β^+_{24}
EC_{28}, β^+_{25}
EC_{29}, β^+_{26}
γ_{75} γ_{62} γ_{67} γ_{56} γ_{65} γ_{51} γ_{72} γ_{59} γ_{58} γ_{54} γ_{50} γ_{49} γ_{33} γ_{57} γ_{38} γ_{37} γ_{36} γ_{34} γ_{30} γ_{25} γ_{24} γ_{22} γ_{19} γ_{18} γ_{16} γ_{15} γ_{13} γ_{9}
γ_{70} γ_{66} γ_{63} γ_{60} γ_{52} γ_{48} γ_{47} γ_{46} γ_{44} γ_{43} γ_{42} γ_{41} γ_{39} γ_{31} γ_{29} γ_{28} γ_{27} γ_{23} γ_{17} γ_{10} γ_{7} γ_{5}
γ_{64} γ_{55} γ_{45} γ_{32} γ_{14} γ_{4} γ_{3} γ_{1}
$^{101}_{46}$Pd(8.47h)

47-Ag-105m

EC, β^+: 21-MAY-93
IT: 24-MAY-93

Half-life = 7.23 m
Decay mode(s): EC, β^+, IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
$\gamma^{\pm}$	8.00E−06	5.110E−01	4.09E−06
γ 4	6.69E−05	2.804E−01	1.88E−05
γ 5	3.35E−04	3.063E−01	1.02E−04
γ 6	1.63E−03	3.192E−01	5.21E−04
γ 8	5.55E−06	3.392E−01	1.88E−06
γ 14	1.53E−04	4.423E−01	6.78E−05
γ 16	4.73E−05	4.871E−01	2.31E−05
γ 17	7.67E−06	5.607E−01	4.30E−06
γ 18	1.31E−05	5.790E−01	7.56E−06
γ 19	2.77E−05	6.090E−01	1.69E−05
γ 21	3.92E−06	6.297E−01	2.47E−06
γ 22	8.16E−06	6.446E−01	5.26E−06
γ 23	2.94E−05	6.492E−01	1.91E−05
γ 24	6.53E−06	6.507E−01	4.25E−06
γ 25	6.53E−06	6.565E−01	4.29E−06
γ 26	4.90E−06	7.813E−01	3.83E−06
γ 27	1.63E−06	7.970E−01	1.30E−06
γ 28	1.04E−04	9.293E−01	9.71E−05
γ 29	2.94E−06	9.624E−01	2.83E−06
γ 30	7.67E−06	1.072E+00	8.22E−06
γ 32	6.04E−05	1.098E+00	6.63E−05
K_{α_1} X-ray	1.31E−03	2.118E−02	2.78E−05
K_{α_2} X-ray	6.95E−04	2.102E−02	1.46E−05
K_{β_1} X-ray	2.34E−04	2.382E−02	5.57E−06
K_{β_2} X-ray	6.31E−05	2.430E−02	1.53E−06
K_{β_3} X-ray	1.22E−04	2.379E−02	2.89E−06
ce-L_2, γ 1	3.20E−01	2.196E−02	7.03E−03
ce-L_3, γ 1	4.75E−01	2.213E−02	1.05E−02
ce-M, γ 1	1.71E−01	2.491E−02*	4.25E−03
ce-N^+, γ 1	2.97E−02	2.548E−02*	7.56E−04
L_α X-ray	2.03E−02	2.984E−03*	6.06E−05
L_β X-ray	1.77E−02	3.178E−03*	5.61E−05
L_γ X-ray	1.61E−03	3.521E−03*	5.67E−06
L_η X-ray	5.52E−04	2.806E−03	1.55E−06
L_ℓ X-ray	6.03E−04	2.634E−03	1.59E−06
Auger-LMM	5.06E−01	2.478E−03*	1.25E−03
Auger-LMX	2.22E−01	3.034E−03*	6.75E−04
Auger-LXY	2.75E−02	3.400E−03*	9.33E−05
Auger-MXY	1.44E+00	4.612E−04*	6.65E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.16E−03
Omitted X, γ and $\gamma^{\pm}$ radiations**	5.24E−06
Listed β, ce and Auger radiations	2.52E−02
Omitted β, ce and Auger radiations**	5.51E−05
Listed radiations	2.64E−02
Omitted radiations**	6.03E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pd-105 daughter, yield 3.4E−03, is stable.
Ag-105 daughter, yield 9.966E−01, is radioactive.

47-Ag-111m

08-APR-96

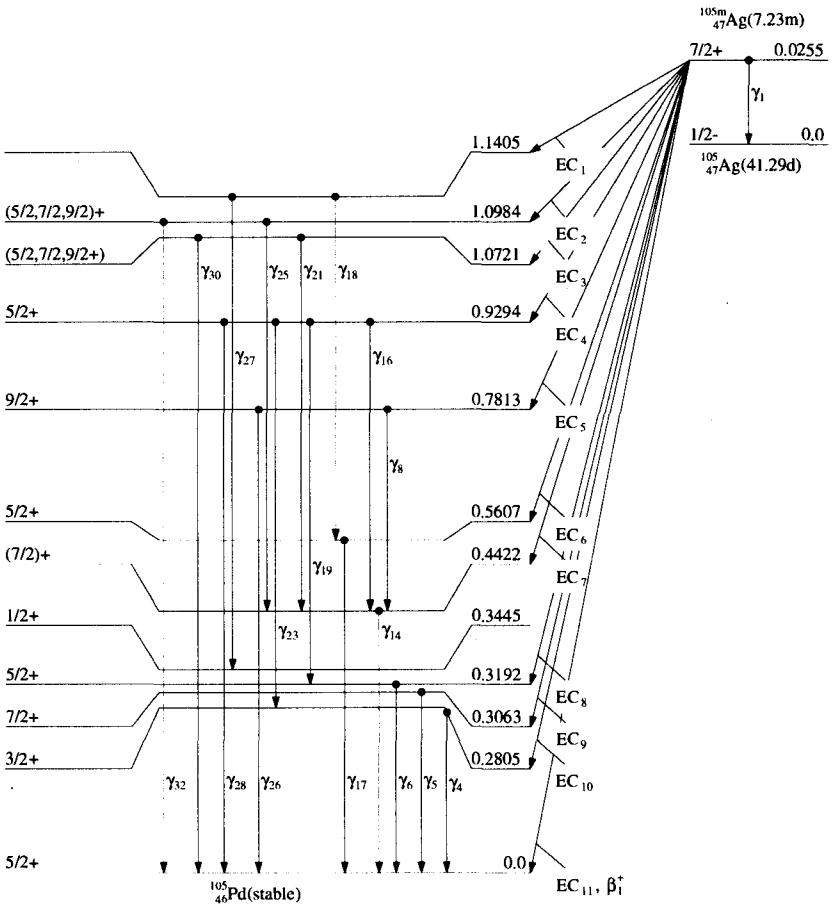
Half-life = 64.8 s
Decay mode(s): β^-, IT

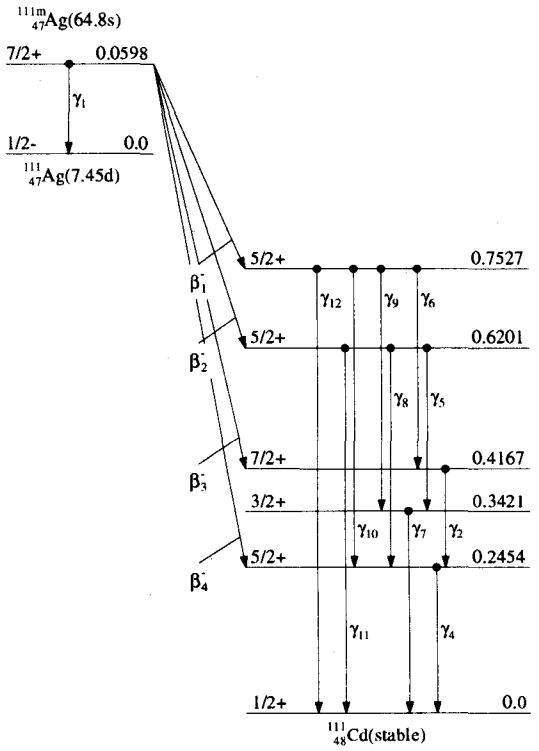
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.38E−03	1.006E−01*	1.39E−04
β^- 2	1.58E−03	1.461E−01*	2.30E−04
β^- 3	1.18E−03	2.212E−01*	2.62E−04
β^- 4	2.86E−03	2.883E−01*	8.24E−04
γ 2	8.82E−04	1.713E−01	1.51E−04
γ 4	3.65E−03	2.454E−01	8.97E−04
γ 5	5.36E−05	2.783E−01	1.49E−05
γ 6	1.01E−04	3.362E−01	3.39E−05
γ 7	3.02E−04	3.421E−01	1.03E−04
γ 8	2.52E−04	3.747E−01	9.44E−05
γ 9	2.65E−04	4.108E−01	1.09E−04
γ 10	3.15E−04	5.069E−01	1.60E−04
γ 11	8.82E−04	6.201E−01	5.47E−04
γ 12	3.15E−04	7.527E−01	2.37E−04
γ 1	5.31E−03	5.977E−02	3.18E−04
ce-K, γ 1	2.29E−01	3.426E−02	7.84E−03
ce-L_1, γ 1	1.55E−02	5.596E−02	8.67E−04
ce-L_2, γ 1	2.61E−01	5.625E−02	1.47E−02
ce-L_3, γ 1	3.35E−01	5.642E−02	1.89E−02
ce-M, γ 1	1.26E−01	5.920E−02*	7.45E−03
ce-N^+, γ 1	2.26E−02	5.977E−02*	1.35E−03
K_{α_1} X-ray	1.02E−01	2.216E−02	2.27E−03
K_{α_2} X-ray	5.43E−02	2.199E−02	1.19E−03
K_{β_1} X-ray	1.84E−02	2.494E−02	4.60E−04
K_{β_2} X-ray	5.17E−03	2.546E−02	1.32E−04
K_{β_3} X-ray	9.45E−03	2.491E−02	2.35E−04
L_α X-ray	2.09E−02	2.984E−03*	6.22E−05
L_β X-ray	1.88E−02	3.178E−03*	5.96E−05
Auger-KLL	2.63E−02	1.838E−02*	4.83E−04
Auger-KLX	1.12E−02	2.137E−02*	2.39E−04
Auger-LMM	5.28E−01	2.482E−03*	1.31E−03
Auger-LMX	2.33E−01	3.039E−03*	7.07E−04
Auger-LXY	2.87E−02	3.405E−03*	9.79E−05
Auger-MXY	1.50E+00	4.630E−04*	6.92E−04

Listed X, γ and $\gamma^{\pm}$ radiations	7.08E−03
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.08E−05
Listed β, ce and Auger radiations	5.61E−02
Omitted β, ce and Auger radiations**	1.15E−04
Listed radiations	6.32E−02
Omitted radiations**	1.36E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cd-111 daughter, yield 7E−03, is stable.
Ag-111 daughter, yield 9.93E−01, is radioactive.


$^{105m}_{47}$Ag(7.23m)
7/2+ 0.0255
γ_1
1/2- 0.0
$^{105}_{47}$Ag(41.29d)
1.1405
(5/2,7/2,9/2)+ 1.0984
(5/2,7/2,9/2+) 1.0721
5/2+ 0.9294
9/2+ 0.7813
5/2+ 0.5607
(7/2)+ 0.4422
1/2+ 0.3445
5/2+ 0.3192
7/2+ 0.3063
3/2+ 0.2805
5/2+ 0.0
EC_1 EC_2 EC_3 EC_4 EC_5 EC_6 EC_7 EC_8 EC_9 EC_{10} EC_{11}, β_1^+
γ_{30} γ_{25} γ_{21} γ_{18} γ_{27} γ_{16} γ_8 γ_{19} γ_{23} γ_{14}
γ_{32} γ_{28} γ_{26} γ_{17} γ_6 γ_5 γ_4
$^{105}_{46}$Pd(stable)


$^{111m}_{47}$Ag(64.8s)
7/2+ 0.0598
γ_1
1/2- 0.0
$^{111}_{47}$Ag(7.45d)
5/2+ 0.7527
5/2+ 0.6201
7/2+ 0.4167
3/2+ 0.3421
5/2+ 0.2454
1/2+ 0.0
β_1^- β_2^- β_3^- β_4^-
γ_{12} γ_9 γ_6 γ_8 γ_5 γ_{10} γ_7 γ_2 γ_{11} γ_4
$^{111}_{48}$Cd(stable)

47-Ag-113

27-AUG-90

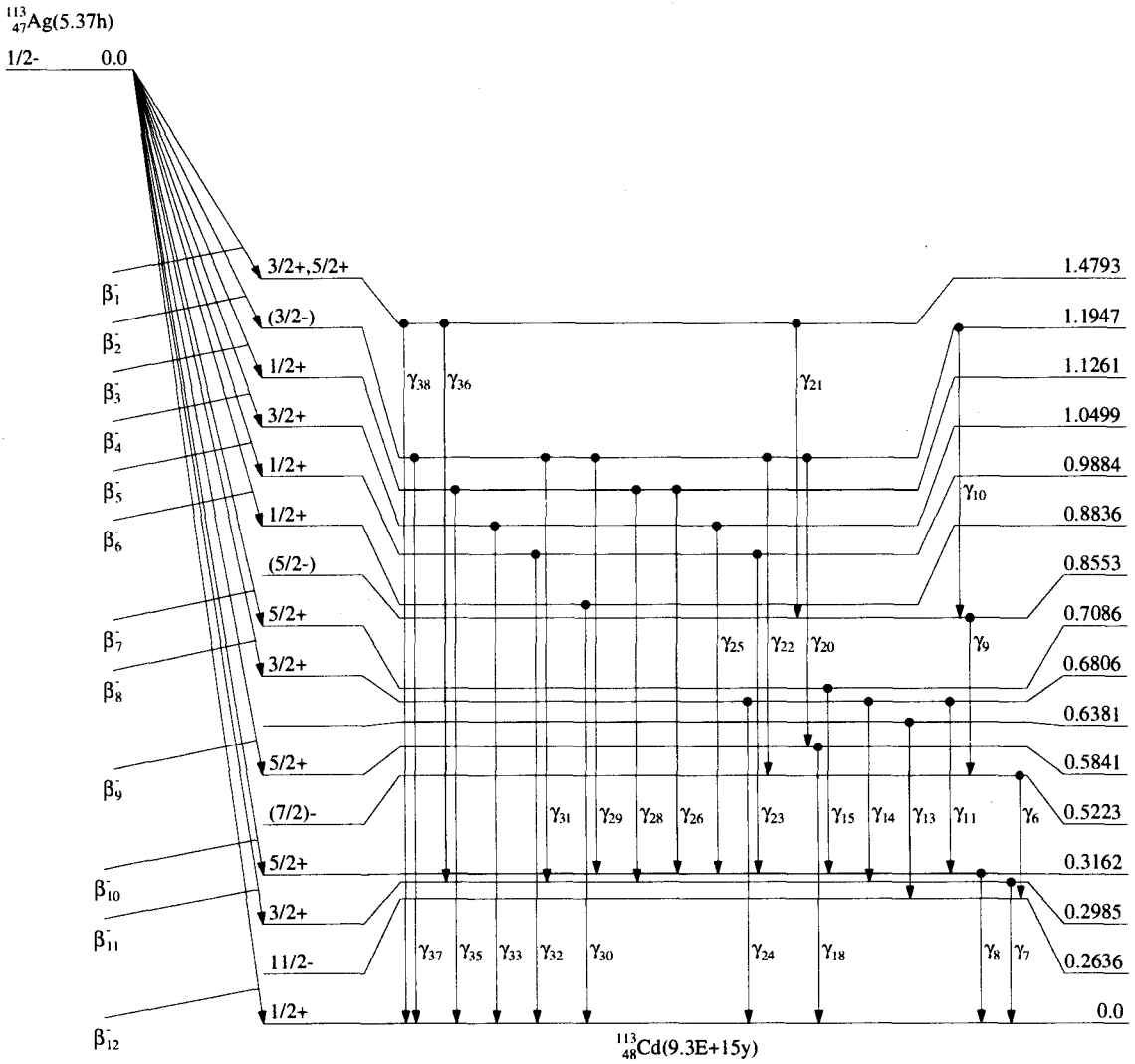
Half-life = 5.37 h
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 2	2.09E−02	2.763E−01*	5.78E−03
β^- 5	4.48E−03	3.601E−01*	1.61E−03
β^- 6	2.89E−03	4.039E−01*	1.17E−03
β^- 8	9.96E−03	4.907E−01*	4.89E−03
β^- 10	1.69E−02	6.573E−01*	1.11E−02
β^- 11	9.37E−02	6.590E−01*	6.17E−02
β^- 12	8.47E−01	7.937E−01*	6.72E−01
γ 3	6.60E−04	1.335E−01	8.81E−05
γ 6	1.63E−02	2.588E−01	4.23E−03
γ 7	1.00E−01	2.986E−01	2.99E−02
γ 8	1.34E−02	3.163E−01	4.25E−03
γ 9	5.98E−03	3.331E−01	1.99E−03
γ 10	6.38E−03	3.394E−01	2.17E−03
γ 11	1.40E−03	3.644E−01	5.10E−04
γ 13	2.50E−04	3.743E−01	9.36E−05
γ 14	1.45E−03	3.821E−01	5.54E−04
γ 15	2.00E−04	3.924E−01	7.85E−05
γ 18	2.10E−03	5.840E−01	1.23E−03
γ 20	4.50E−04	6.110E−01	2.75E−04
γ 21	1.90E−04	6.240E−01	1.19E−04
γ 22	8.70E−03	6.723E−01	5.85E−03
γ 23	3.00E−04	6.723E−01	2.02E−04
γ 24	6.95E−03	6.806E−01	4.73E−03
γ 25	1.00E−04	7.340E−01	7.34E−05
γ 26	1.50E−04	8.099E−01	1.21E−04
γ 27	1.10E−04	8.161E−01	8.98E−05
γ 28	1.00E−04	8.270E−01	8.27E−05
γ 29	5.20E−04	8.785E−01	4.57E−04
γ 30	2.82E−03	8.836E−01	2.49E−03
γ 31	5.80E−04	8.961E−01	5.20E−04
γ 32	4.23E−03	9.884E−01	4.18E−03
γ 33	4.50E−04	1.050E+00	4.72E−04
γ 34	1.60E−04	1.084E+00	1.74E−04
γ 35	6.10E−04	1.126E+00	6.87E−04
γ 36	3.70E−04	1.181E+00	4.37E−04
γ 37	3.78E−03	1.195E+00	4.52E−03
γ 38	6.80E−04	1.479E+00	1.01E−03

Listed X, γ and $\gamma^{\pm}$ radiations	7.15E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.17E−04
Listed β, ce and Auger radiations	7.59E−01
Omitted β, ce and Auger radiations**	2.88E−03
Listed radiations	8.30E−01
Omitted radiations**	3.30E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cd-113 daughter is radioactive.


113 47 Ag(5.37h)
1/2- 0.0
3/2+,5/2+
(3/2-)
1/2+
3/2+
1/2+
1/2+
(5/2-)
5/2+
3/2+
5/2+
(7/2)-
5/2+
3/2+
11/2-
1/2+
1.4793
1.1947
1.1261
1.0499
0.9884
0.8836
0.8553
0.7086
0.6806
0.6381
0.5841
0.5223
0.3162
0.2985
0.2636
0.0
113 48 Cd(9.3E+15y)

48-Cd-105

21-MAY-93

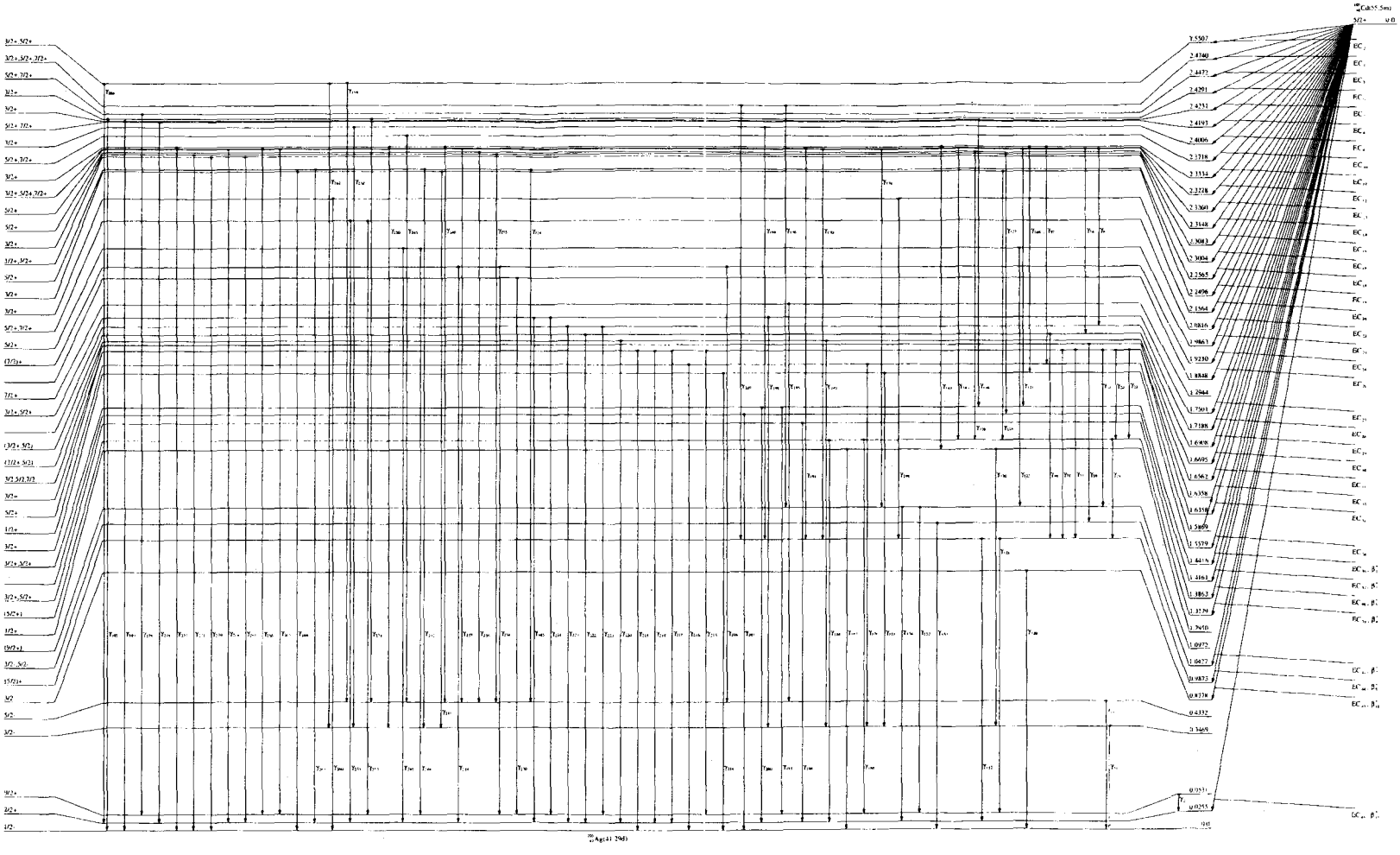
Half-life = 55.5 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 9	9.91E−04	3.272E−01*	3.24E−04
β^+ 11	2.79E−01	7.542E−01*	2.10E−01
$\gamma^{\pm}$	5.60E−01	5.110E−01	2.86E−01
γ 23	8.44E−03	3.078E−01	2.60E−03
γ 24	8.44E−03	3.078E−01	2.60E−03
γ 28	3.89E−03	3.407E−01	1.33E−03
γ 31	4.20E−02	3.469E−01	1.46E−02
γ 41	2.81E−02	4.332E−01	1.22E−02
γ 54	7.08E−03	5.387E−01	3.81E−03
γ 67	3.74E−02	6.072E−01	2.27E−02
γ 69	2.44E−03	6.135E−01	1.50E−03
γ 74	4.78E−03	6.354E−01	3.04E−03
γ 77	1.57E−02	6.485E−01	1.02E−02
γ 78	1.57E−02	6.485E−01	1.02E−02
γ 90	3.00E−03	7.035E−01	2.11E−03
γ 97	5.35E−03	7.464E−01	3.99E−03
γ 104	1.92E−03	7.754E−01	1.49E−03
γ 120	2.16E−03	8.778E−01	1.89E−03
γ 121	5.91E−03	8.846E−01	5.23E−03
γ 122	2.53E−03	8.891E−01	2.25E−03
γ 123	1.78E−03	8.922E−01	1.59E−03
γ 126	4.78E−03	9.216E−01	4.41E−03
γ 128	1.27E−02	9.341E−01	1.19E−02
γ 130	8.54E−03	9.480E−01	8.09E−03
γ 132	4.69E−02	9.618E−01	4.51E−02
γ 136	1.36E−03	9.815E−01	1.33E−03
γ 138	1.64E−03	9.869E−01	1.62E−03
γ 141	1.45E−03	9.984E−01	1.45E−03
γ 149	5.86E−03	1.038E+00	6.09E−03
γ 151	2.11E−03	1.043E+00	2.20E−03
γ 152	2.81E−03	1.044E+00	2.94E−03
γ 154	1.28E−02	1.072E+00	1.37E−02
γ 168	1.13E−03	1.169E+00	1.32E−03
γ 171	1.97E−03	1.211E+00	2.39E−03
γ 174	2.44E−03	1.229E+00	3.00E−03
γ 176	2.86E−03	1.240E+00	3.55E−03
γ 180	8.21E−03	1.275E+00	1.05E−02
γ 183	3.10E−03	1.295E+00	4.01E−03
γ 184	3.98E−02	1.302E+00	5.18E−02
γ 187	1.13E−03	1.322E+00	1.49E−03
γ 190	6.52E−03	1.339E+00	8.73E−03
γ 191	3.10E−03	1.340E+00	4.15E−03
γ 194	5.58E−03	1.361E+00	7.59E−03
γ 195	1.22E−03	1.362E+00	1.66E−03
γ 196	1.13E−03	1.376E+00	1.55E−03
γ 197	2.70E−02	1.388E+00	3.74E−02
γ 198	3.89E−03	1.403E+00	5.46E−03
γ 199	1.41E−03	1.413E+00	1.99E−03
γ 200	1.45E−02	1.416E+00	2.06E−02
γ 201	1.88E−03	1.416E+00	2.66E−03
γ 207	1.69E−03	1.486E+00	2.51E−03
γ 208	4.46E−03	1.490E+00	6.64E−03
γ 214	2.05E−02	1.558E+00	3.19E−02
γ 215	6.33E−03	1.583E+00	1.00E−02
γ 216	2.06E−03	1.587E+00	3.27E−03
γ 217	2.63E−03	1.610E+00	4.23E−03
γ 218	2.63E−03	1.610E+00	4.23E−03
γ 219	1.05E−02	1.636E+00	1.71E−02
γ 220	8.72E−03	1.644E+00	1.43E−02
γ 221	3.52E−03	1.665E+00	5.86E−03
γ 222	9.52E−03	1.666E+00	1.59E−02
γ 223	3.54E−02	1.693E+00	6.00E−02
γ 224	1.17E−03	1.697E+00	1.99E−03
γ 225	6.94E−03	1.725E+00	1.20E−02
γ 229	1.55E−03	1.823E+00	2.82E−03
γ 230	1.55E−03	1.832E+00	2.83E−03
γ 234	6.38E−03	1.870E+00	1.19E−02
γ 235	8.91E−04	1.875E+00	1.67E−03
γ 236	1.31E−03	1.881E+00	2.47E−03
γ 237	7.08E−03	1.893E+00	1.34E−02
γ 239	1.44E−02	1.898E+00	2.74E−02
γ 240	1.17E−03	1.900E+00	2.23E−03
γ 241	1.31E−03	1.903E+00	2.50E−03
γ 242	6.10E−03	1.910E+00	1.16E−02
γ 244	1.59E−02	1.933E+00	3.07E−02
γ 245	2.95E−03	1.939E+00	5.73E−03
γ 248	8.86E−03	1.961E+00	1.74E−02
γ 249	2.44E−03	1.976E+00	4.82E−03
γ 250	7.55E−03	1.987E+00	1.50E−02
γ 251	1.36E−03	1.996E+00	2.71E−03
γ 253	6.33E−03	2.028E+00	1.28E−02
γ 254	1.59E−03	2.054E+00	3.27E−03
γ 255	2.44E−03	2.056E+00	5.01E−03
γ 259	8.91E−04	2.117E+00	1.89E−03
γ 260	3.75E−03	2.156E+00	8.09E−03
γ 262	9.38E−04	2.204E+00	2.07E−03
γ 263	1.97E−03	2.231E+00	4.39E−03
γ 264	4.92E−03	2.249E+00	1.11E−02
γ 265	1.03E−02	2.273E+00	2.35E−02
γ 266	8.44E−03	2.275E+00	1.92E−02
γ 267	8.44E−03	2.275E+00	1.92E−02
γ 269	5.16E−03	2.301E+00	1.19E−02
γ 270	5.16E−03	2.301E+00	1.19E−02
γ 271	1.03E−03	2.308E+00	2.38E−03
γ 273	1.98E−02	2.333E+00	4.62E−02
γ 278	1.78E−03	2.394E+00	4.27E−03
γ 279	1.78E−03	2.394E+00	4.27E−03
γ 281	3.52E−03	2.423E+00	8.52E−03
γ 282	6.10E−04	2.429E+00	1.48E−03
γ 286	7.83E−04	2.525E+00	1.98E−03
K_{α_1} X-ray	2.92E−01	2.216E−02	6.48E−03
K_{α_2} X-ray	1.55E−01	2.199E−02	3.41E−03
K_{β_1} X-ray	5.26E−02	2.494E−02	1.31E−03
Auger-KLL	7.51E−02	1.838E−02*	1.38E−03
Auger-KLX	3.19E−02	2.137E−02*	6.82E−04
Auger-LMM	4.55E−01	2.483E−03*	1.13E−03
Auger-LMX	2.02E−01	3.042E−03*	6.13E−04
Auger-MXY	1.28E+00	4.685E−04*	6.00E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.22E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	8.15E−02
Listed β, ce and Auger radiations	2.15E−01
Omitted β, ce and Auger radiations**	1.87E−03
Listed radiations	1.43E+00
Omitted radiations**	8.34E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ag-105m daughter, yield 8.291E−01, is radioactive.
Ag-105 daughter, yield 1.709E−01, is radioactive.



48-Cd-111m

08-APR-96

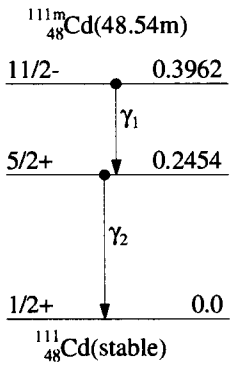
Half-life = 48.54 m
Decay mode(s): IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	2.91E−01	1.508E−01	4.40E−02
ce-K, γ 1	4.25E−01	1.241E−01	5.27E−02
ce-L_1, γ 1	3.84E−02	1.468E−01	5.64E−03
ce-L_2, γ 1	8.14E−02	1.471E−01	1.20E−02
ce-L_3, γ 1	7.81E−02	1.473E−01	1.15E−02
ce-M, γ 1	4.01E−02	1.502E−01*	6.03E−03
ce-N^+, γ 1	7.56E−03	1.508E−01*	1.14E−03
γ 2	9.40E−01	2.454E−01	2.31E−01
ce-K, γ 2	5.03E−02	2.187E−01	1.10E−02
ce-L_1, γ 2	5.15E−03	2.414E−01	1.24E−03
ce-L_2, γ 2	1.38E−03	2.417E−01	3.32E−04
ce-L_3, γ 2	1.32E−03	2.419E−01	3.19E−04
ce-M, γ 2	1.52E−03	2.448E−01*	3.71E−04
K_{α_1} X-ray	2.14E−01	2.317E−02	4.97E−03
K_{α_2} X-ray	1.14E−01	2.298E−02	2.62E−03
K_{β_1} X-ray	3.90E−02	2.609E−02	1.02E−03
K_{β_2} X-ray	1.14E−02	2.664E−02	3.03E−04
K_{β_3} X-ray	2.00E−02	2.606E−02	5.22E−04
Auger-KLL	5.12E−02	1.917E−02*	9.82E−04
Auger-KLX	2.20E−02	2.232E−02*	4.91E−04
Auger-LMM	4.13E−01	2.592E−03*	1.07E−03
Auger-LMX	1.87E−01	3.188E−03*	5.97E−04
Auger-MXY	1.17E+00	5.084E−04*	5.96E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.84E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.22E−04
Listed β, ce and Auger radiations	1.06E−01
Omitted β, ce and Auger radiations**	2.35E−04
Listed radiations	3.90E−01
Omitted radiations**	3.57E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cd-111 daughter is stable.



48-Cd-118

05-SEP-95

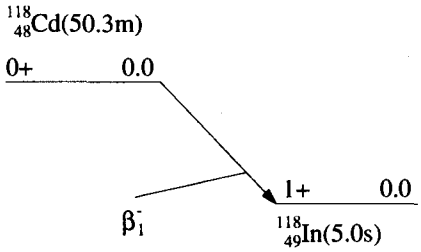
Half-life = 50.3 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.00E+00	1.618E−01*	1.62E−01

Listed β, ce and Auger radiations	1.62E−01
Listed radiations	1.62E−01

* Average energy (MeV)

In-118 daughter is radioactive.



49-In-107

21-MAY-96

Half-life = 32.4 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 11	5.54E−03	4.579E−01*	2.54E−03
β^+ 13	1.78E−02	5.061E−01*	9.01E−03
β^+ 14	7.02E−03	6.555E−01*	4.60E−03
β^+ 15	1.05E−02	6.606E−01*	6.92E−03
β^+ 16	3.56E−03	6.948E−01*	2.47E−03
β^+ 17	1.26E−02	7.113E−01*	8.94E−03
β^+ 18	1.99E−02	8.489E−01*	1.69E−02
β^+ 19	2.65E−01	9.864E−01*	2.61E−01
$\gamma^{\pm}$	6.92E−01	5.110E−01	3.54E−01
γ 2	4.72E−01	2.050E−01	9.67E−02
ce-K, γ 2	2.78E−02	1.782E−01	4.96E−03
ce-L_1, γ 2	3.15E−03	2.009E−01	6.34E−04
γ 4	6.32E−03	3.035E−01	1.92E−03
γ 5	1.02E−01	3.209E−01	3.27E−02
ce-K, γ 5	1.79E−03	2.942E−01	5.26E−04
γ 7	3.82E−02	3.653E−01	1.40E−02
γ 10	8.02E−03	4.137E−01	3.32E−03
γ 11	1.70E−02	4.164E−01	7.08E−03
γ 12	5.43E−03	4.561E−01	2.48E−03
γ 17	1.19E−01	5.055E−01	6.01E−02
γ 19	7.55E−03	5.542E−01	4.19E−03
γ 21	2.74E−03	6.009E−01	1.65E−03
γ 22	1.34E−02	6.040E−01	8.07E−03
γ 23	5.66E−03	6.114E−01	3.46E−03
γ 24	2.74E−03	6.173E−01	1.69E−03
γ 25	5.66E−03	6.406E−01	3.63E−03
γ 29	4.44E−03	7.023E−01	3.12E−03
γ 31	3.30E−03	7.164E−01	2.37E−03
γ 33	3.30E−02	7.280E−01	2.41E−02
γ 34	7.36E−03	7.629E−01	5.62E−03
γ 37	3.26E−02	8.090E−01	2.63E−02
γ 41	5.52E−03	8.717E−01	4.81E−03
γ 42	4.72E−03	9.033E−01	4.26E−03
γ 43	1.89E−03	9.064E−01	1.71E−03
γ 44	1.12E−02	9.151E−01	1.03E−02
γ 45	3.30E−03	9.196E−01	3.04E−03
γ 46	1.23E−02	9.218E−01	1.13E−02
γ 47	8.54E−03	9.473E−01	8.09E−03
γ 48	3.49E−03	9.539E−01	3.33E−03
γ 50	1.60E−03	9.675E−01	1.55E−03
γ 51	1.03E−02	9.987E−01	1.03E−02
γ 52	1.89E−03	9.987E−01	1.89E−03
γ 53	2.64E−03	1.003E+00	2.65E−03
γ 56	1.94E−03	1.036E+00	2.01E−03
γ 57	7.41E−03	1.057E+00	7.83E−03
γ 58	1.24E−02	1.063E+00	1.32E−02
γ 59	4.72E−03	1.067E+00	5.04E−03
γ 60	1.65E−03	1.082E+00	1.79E−03
γ 63	2.12E−03	1.140E+00	2.42E−03
γ 64	8.02E−03	1.145E+00	9.19E−03
γ 67	1.56E−03	1.172E+00	1.83E−03
γ 68	2.36E−03	1.197E+00	2.83E−03
γ 72	2.60E−03	1.236E+00	3.21E−03
γ 74	5.43E−02	1.268E+00	6.88E−02
γ 75	5.00E−03	1.326E+00	6.63E−03
γ 76	1.39E−02	1.344E+00	1.87E−02
γ 77	1.89E−03	1.366E+00	2.58E−03
γ 78	1.49E−02	1.377E+00	2.05E−02
γ 79	2.36E−03	1.404E+00	3.31E−03
γ 80	1.15E−02	1.411E+00	1.63E−02
γ 81	7.27E−03	1.456E+00	1.06E−02
γ 82	1.02E−02	1.501E+00	1.54E−02
γ 83	1.89E−03	1.508E+00	2.85E−03
γ 84	1.37E−03	1.551E+00	2.12E−03
γ 85	4.81E−03	1.556E+00	7.49E−03
γ 86	1.42E−02	1.571E+00	2.22E−02
γ 87	1.04E−03	1.589E+00	1.65E−03
γ 88	1.18E−03	1.591E+00	1.88E−03
γ 89	5.81E−03	1.601E+00	9.30E−03
γ 90	1.18E−03	1.607E+00	1.90E−03
γ 91	1.18E−03	1.641E+00	1.94E−03
γ 92	3.21E−03	1.653E+00	5.31E−03
γ 93	2.74E−03	1.664E+00	4.55E−03
γ 94	1.89E−03	1.685E+00	3.18E−03
γ 96	1.65E−03	1.712E+00	2.83E−03
γ 97	3.12E−03	1.717E+00	5.35E−03
γ 98	1.32E−03	1.733E+00	2.29E−03
γ 99	4.48E−03	1.743E+00	7.82E−03
γ 100	2.60E−03	1.768E+00	4.59E−03
γ 101	1.38E−02	1.779E+00	2.45E−02
γ 102	9.44E−04	1.798E+00	1.70E−03
γ 103	1.42E−03	1.801E+00	2.55E−03
γ 104	7.22E−03	1.831E+00	1.32E−02
γ 105	1.23E−03	1.843E+00	2.26E−03
γ 106	3.54E−03	1.859E+00	6.58E−03
γ 107	5.29E−03	1.879E+00	9.93E−03
γ 108	1.18E−03	1.899E+00	2.24E−03
γ 109	1.51E−03	1.908E+00	2.88E−03
γ 110	1.79E−02	1.922E+00	3.45E−02
γ 111	1.18E−03	1.936E+00	2.28E−03
γ 112	6.37E−03	1.956E+00	1.25E−02
γ 113	4.53E−03	1.964E+00	8.90E−03
γ 114	4.77E−03	1.978E+00	9.43E−03
γ 115	1.19E−02	1.984E+00	2.37E−02
γ 116	1.58E−02	2.007E+00	3.17E−02
γ 117	4.15E−03	2.045E+00	8.50E−03
γ 118	1.70E−02	2.065E+00	3.52E−02
γ 119	1.46E−03	2.079E+00	3.04E−03
γ 120	8.59E−03	2.100E+00	1.80E−02
γ 121	1.18E−03	2.169E+00	2.56E−03
γ 122	4.15E−03	2.183E+00	9.07E−03
γ 123	2.36E−03	2.183E+00	5.15E−03
γ 124	1.09E−03	2.202E+00	2.39E−03
γ 125	8.97E−04	2.227E+00	2.00E−03
γ 126	1.18E−03	2.259E+00	2.67E−03
γ 127	1.04E−03	2.263E+00	2.35E−03
γ 128	1.13E−02	2.285E+00	2.59E−02
γ 129	1.23E−02	2.304E+00	2.83E−02
γ 130	3.92E−03	2.331E+00	9.13E−03
γ 131	9.44E−04	2.343E+00	2.21E−03
γ 132	8.50E−04	2.372E+00	2.01E−03
γ 133	1.98E−03	2.405E+00	4.77E−03
γ 134	1.56E−03	2.433E+00	3.79E−03
γ 135	8.02E−04	2.462E+00	1.98E−03
γ 136	1.04E−03	2.469E+00	2.56E−03
γ 137	1.04E−03	2.483E+00	2.58E−03
γ 138	1.51E−03	2.496E+00	3.77E−03
γ 139	1.75E−03	2.507E+00	4.38E−03
γ 140	7.08E−04	2.549E+00	1.80E−03
γ 141	1.13E−03	2.554E+00	2.89E−03
γ 142	2.08E−03	2.584E+00	5.37E−03
γ 143	9.44E−04	2.637E+00	2.49E−03
γ 144	2.08E−03	2.653E+00	5.51E−03
γ 145	4.39E−03	2.666E+00	1.17E−02
γ 146	3.02E−03	2.670E+00	8.07E−03
γ 147	2.74E−03	2.681E+00	7.34E−03
γ 148	8.02E−04	2.701E+00	2.17E−03
γ 149	4.91E−03	2.717E+00	1.33E−02
γ 150	1.13E−03	2.783E+00	3.15E−03
γ 152	5.66E−04	2.819E+00	1.60E−03
γ 153	1.27E−03	2.866E+00	3.65E−03
γ 154	8.40E−03	2.875E+00	2.42E−02
γ 155	9.91E−04	2.986E+00	2.96E−03

K_{α_1} X-ray	2.69E−01	2.317E−02	6.23E−03
K_{α_2} X-ray	1.43E−01	2.298E−02	3.28E−03
Auger-KLL	6.41E−02	1.917E−02*	1.23E−03
Auger-KLX	2.76E−02	2.232E−02*	6.16E−04
Auger-LMM	4.04E−01	2.590E−03*	1.05E−03
Auger-LMX	1.84E−01	3.187E−03*	5.86E−04
Auger-MXY	1.15E+00	5.105E−04*	5.86E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.50E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	3.49E−02
Listed β, ce and Auger radiations	3.23E−01
Omitted β, ce and Auger radiations**	3.41E−03
Listed radiations	1.82E+00
Omitted radiations**	3.83E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Cd-107 daughter is radioactive.

49-In-108m

Cd-108 daughter is stable.

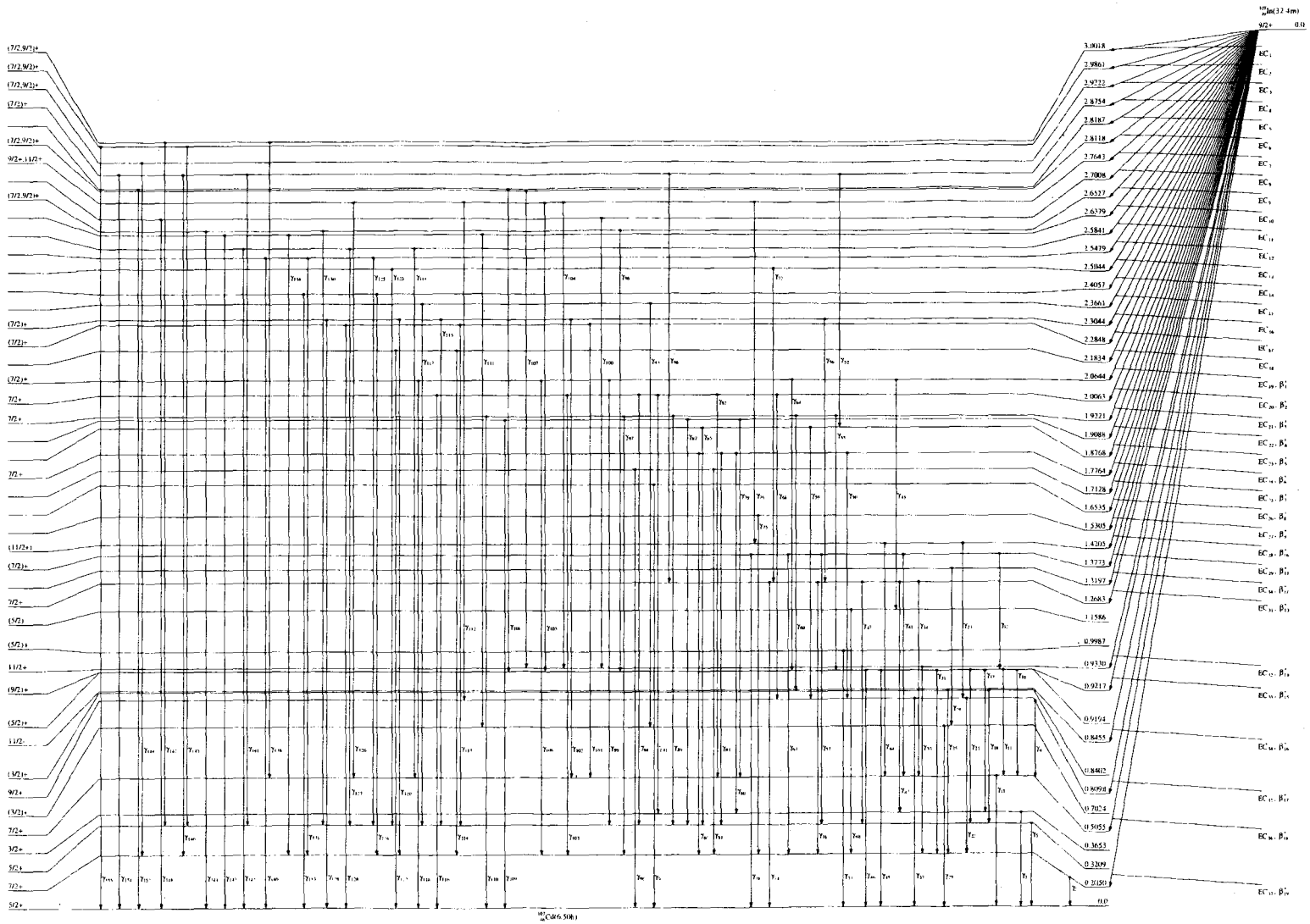
26-JAN-93

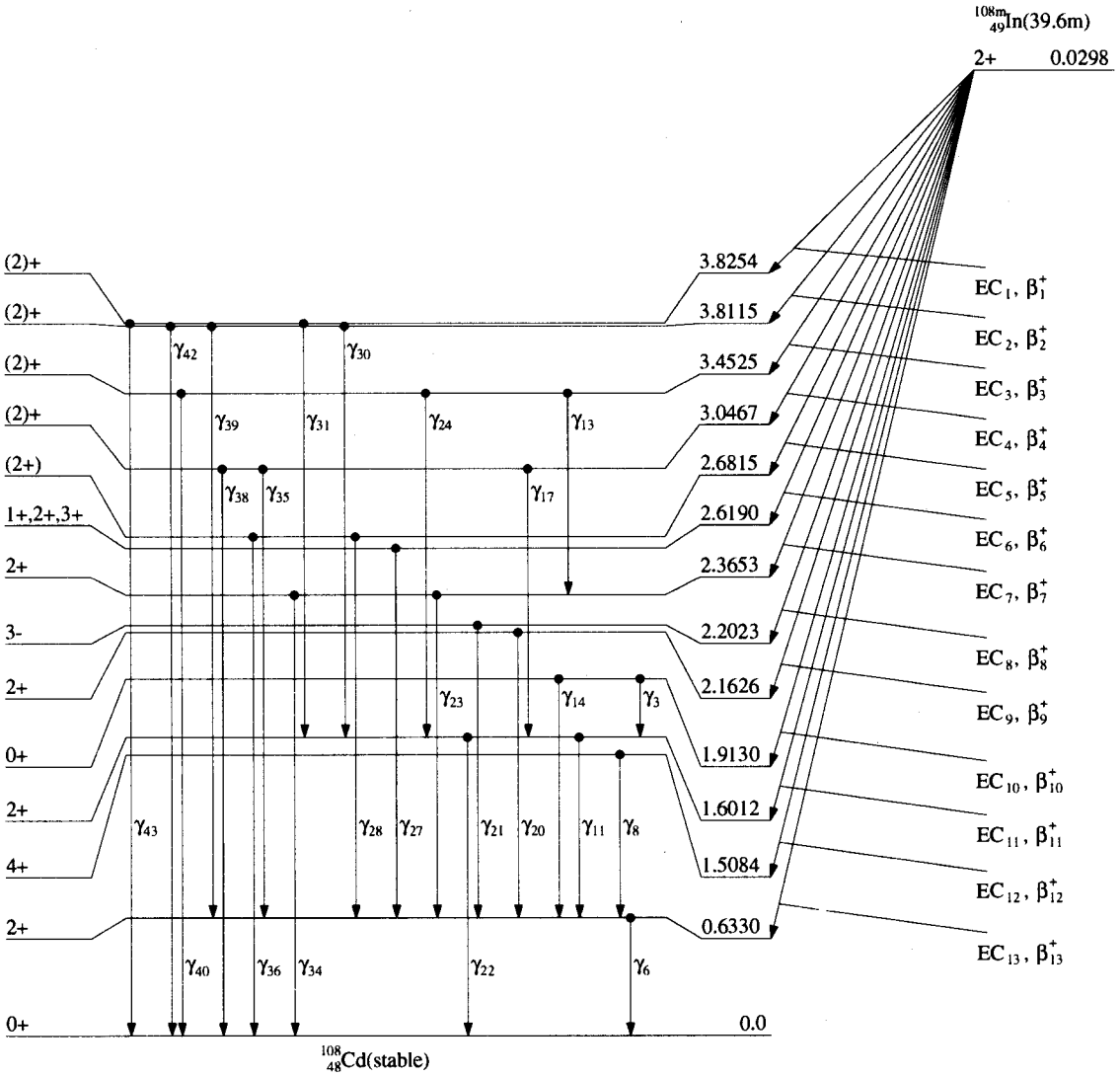
Half-life = 39.6 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 3	6.86E−03	3.216E−01*	2.21E−03
β^+ 4	8.55E−03	4.996E−01*	4.27E−03
β^+ 5	1.29E−02	6.624E−01*	8.56E−03
β^+ 6	5.07E−02	6.905E−01*	3.50E−02
β^+ 7	1.49E−02	8.052E−01*	1.20E−02
β^+ 8	5.87E−03	8.794E−01*	5.16E−03
β^+ 9	4.28E−02	8.976E−01*	3.84E−02
β^+ 10	1.09E−02	1.028E+00*	1.12E−02
β^+ 11	1.59E−02	1.156E+00*	1.84E−02
β^+ 12	1.99E−02	1.211E+00*	2.41E−02
β^+ 13	3.48E−01	1.610E+00*	5.60E−01
$\gamma^\pm$	1.08E+00	5.110E−01	5.50E−01
γ 3	1.01E−02	3.116E−01	3.14E−03
γ 5	8.10E−03	5.361E−01	4.34E−03
γ 6	7.64E−01	6.329E−01	4.84E−01
ce-K, γ 6	2.30E−03	6.062E−01	1.39E−03
γ 8	2.44E−02	8.754E−01	2.14E−02
γ 11	4.38E−02	9.685E−01	4.24E−02
γ 13	1.53E−02	1.087E+00	1.66E−02
γ 14	4.97E−03	1.280E+00	6.36E−03
γ 15	7.18E−03	1.294E+00	9.29E−03
γ 17	2.44E−03	1.446E+00	3.53E−03
γ 18	5.88E−03	1.475E+00	8.68E−03
γ 19	9.09E−03	1.513E+00	1.38E−02
γ 20	7.33E−02	1.529E+00	1.12E−01
γ 21	9.78E−03	1.569E+00	1.53E−02
γ 22	4.05E−02	1.601E+00	6.48E−02
γ 23	3.82E−02	1.732E+00	6.62E−02
γ 24	3.06E−02	1.852E+00	5.66E−02
γ 25	5.35E−03	1.864E+00	9.97E−03
γ 27	1.24E−01	1.986E+00	2.46E−01
γ 28	3.06E−02	2.048E+00	6.26E−02
γ 29	2.52E−03	2.112E+00	5.33E−03
γ 30	5.35E−03	2.211E+00	1.18E−02
γ 31	1.38E−02	2.224E+00	3.06E−02
γ 32	6.26E−03	2.278E+00	1.43E−02
γ 33	3.06E−03	2.317E+00	7.08E−03
γ 34	5.35E−03	2.365E+00	1.26E−02
γ 35	1.45E−02	2.413E+00	3.50E−02
γ 36	7.64E−03	2.681E+00	2.05E−02
γ 37	6.95E−03	2.816E+00	1.96E−02
γ 38	2.44E−02	3.047E+00	7.45E−02
γ 39	1.60E−02	3.178E+00	5.10E−02
γ 40	9.17E−02	3.452E+00	3.16E−01
γ 41	1.07E−02	3.689E+00	3.95E−02
γ 42	4.20E−02	3.812E+00	1.60E−01
γ 43	2.37E−02	3.826E+00	9.06E−02
γ 44	6.11E−03	4.052E+00	2.48E−02
γ 45	7.64E−03	4.343E+00	3.32E−02
K_{α_1} X-ray	1.81E−01	2.317E−02	4.20E−03
Auger-KLL	4.33E−02	1.917E−02*	8.30E−04

Listed X, γ and $\gamma^\pm$ radiations	2.75E+00
Omitted X, γ and $\gamma^\pm$ radiations**	1.72E−02
Listed β, ce and Auger radiations	7.22E−01
Omitted β, ce and Auger radiations**	3.06E−03
Listed radiations	3.47E+00
Omitted radiations**	2.03E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.


$^{109}_{48}$In(32.4m)
9/2+ 0.0
3.0018
2.9861
2.9722
2.8754
2.8187
2.8118
2.7643
2.7008
2.6527
2.6379
2.5841
2.5479
2.5044
2.4057
2.3663
2.3044
2.2848
2.1834
2.0644
2.0063
1.9221
1.9088
1.8768
1.7764
1.7128
1.6535
1.5305
1.4205
1.3773
1.3197
1.2683
1.1586
0.9987
0.9330
0.9217
0.9194
0.8455
0.8402
0.8098
0.7024
0.5055
0.3653
0.3209
0.2150
0.0
$^{109}_{47}$Ag(6.50h)


$^{108m}_{49}$In(39.6m)
2+ 0.0298
(2)+
(2)+
(2)+
(2)+
(2+)
1+,2+,3+
2+
3-
2+
0+
2+
4+
2+
0+
3.8254
3.8115
3.4525
3.0467
2.6815
2.6190
2.3653
2.2023
2.1626
1.9130
1.6012
1.5084
0.6330
0.0
γ_{42} γ_{30} γ_{39} γ_{31} γ_{24} γ_{13} γ_{38} γ_{35} γ_{17} γ_{23} γ_{14} γ_{3} γ_{43} γ_{28} γ_{27} γ_{21} γ_{20} γ_{11} γ_{8} γ_{40} γ_{36} γ_{34} γ_{22} γ_{6}
EC_1, β^+_1
EC_2, β^+_2
EC_3, β^+_3
EC_4, β^+_4
EC_5, β^+_5
EC_6, β^+_6
EC_7, β^+_7
EC_8, β^+_8
EC_9, β^+_9
EC_{10}, β^+_{10}
EC_{11}, β^+_{11}
EC_{12}, β^+_{12}
EC_{13}, β^+_{13}
$^{108}_{48}$Cd(stable)

49-In-108

24-MAY-91

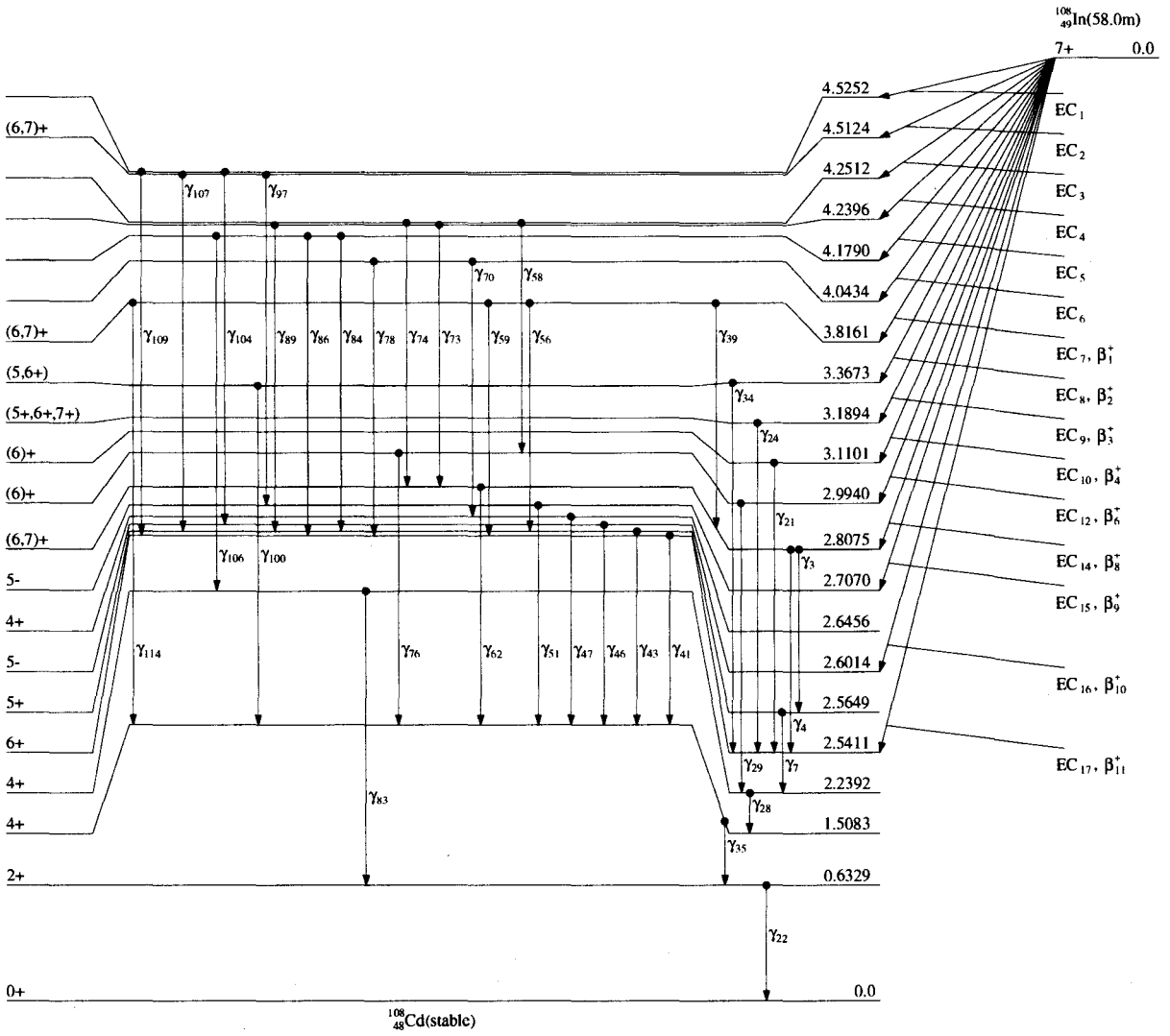
Half-life = 58 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 2	6.23E−04	3.666E−01*	2.28E−04
β^+ 3	3.83E−03	4.453E−01*	1.70E−03
β^+ 4	8.10E−03	4.571E−01*	3.70E−03
β^+ 5	2.05E−03	4.804E−01*	9.83E−04
β^+ 6	1.25E−02	5.084E−01*	6.33E−03
β^+ 7	2.85E−03	5.168E−01*	1.47E−03
β^+ 8	1.51E−01	5.913E−01*	8.95E−02
β^+ 9	1.87E−03	6.584E−01*	1.23E−03
β^+ 10	4.90E−03	7.052E−01*	3.45E−03
β^+ 11	6.59E−02	7.108E−01*	4.68E−02
$\gamma^\pm$	5.08E−01	5.110E−01	2.59E−01
γ 3	4.11E−01	2.426E−01	9.97E−02
ce-K, γ 3	1.49E−02	2.159E−01	3.21E−03
ce-L_1, γ 3	1.70E−03	2.386E−01	4.07E−04
γ 4	3.15E−02	2.664E−01	8.39E−03
ce-K, γ 4	8.93E−04	2.397E−01	2.14E−04
γ 7	1.37E−01	3.256E−01	4.46E−02
ce-K, γ 7	2.32E−03	2.989E−01	6.93E−04
γ 21	5.75E−02	5.690E−01	3.27E−02
γ 22	1.00E+00	6.329E−01	6.33E−01
ce-K, γ 22	3.01E−03	6.062E−01	1.83E−03
ce-L_1, γ 22	3.29E−04	6.289E−01	2.07E−04
γ 23	1.78E−02	6.374E−01	1.14E−02
γ 24	3.56E−02	6.483E−01	2.31E−02
γ 27	6.30E−03	7.080E−01	4.46E−03
γ 28	9.32E−02	7.308E−01	6.81E−02
γ 29	1.78E−02	7.547E−01	1.34E−02
γ 30	5.48E−03	7.600E−01	4.16E−03
γ 32	5.48E−03	7.705E−01	4.22E−03
γ 34	1.01E−02	8.262E−01	8.38E−03
γ 35	1.00E+00	8.754E−01	8.75E−01
ce-K, γ 35	1.35E−03	8.487E−01	1.14E−03
γ 37	2.74E−02	9.688E−01	2.65E−02
γ 38	7.40E−03	9.961E−01	7.37E−03
γ 39	6.17E−03	1.008E+00	6.22E−03
γ 41	3.53E−01	1.033E+00	3.65E−01
ce-K, γ 41	3.27E−04	1.006E+00	3.29E−04
γ 43	2.88E−01	1.057E+00	3.04E−01
ce-K, γ 43	2.98E−04	1.030E+00	3.07E−04
γ 44	6.03E−03	1.064E+00	6.41E−03
γ 45	5.48E−03	1.088E+00	5.96E−03
γ 46	5.48E−02	1.093E+00	5.99E−02
γ 47	1.12E−02	1.137E+00	1.28E−02
γ 48	1.51E−02	1.142E+00	1.72E−02
γ 49	3.97E−03	1.167E+00	4.64E−03
γ 50	3.56E−03	1.189E+00	4.24E−03
γ 51	3.15E−02	1.199E+00	3.78E−02
γ 54	8.08E−03	1.230E+00	9.94E−03
γ 55	1.22E−02	1.247E+00	1.52E−02
γ 56	4.79E−03	1.251E+00	6.00E−03
γ 58	6.85E−03	1.257E+00	8.61E−03
γ 59	6.85E−03	1.275E+00	8.73E−03
γ 61	9.73E−03	1.282E+00	1.25E−02
γ 62	1.51E−01	1.299E+00	1.96E−01
γ 63	5.48E−03	1.305E+00	7.15E−03
γ 64	1.92E−02	1.322E+00	2.54E−02
γ 66	4.25E−03	1.367E+00	5.81E−03
γ 69	6.71E−03	1.388E+00	9.32E−03
γ 70	1.27E−02	1.398E+00	1.78E−02
γ 71	5.62E−03	1.409E+00	7.91E−03
γ 73	6.85E−03	1.432E+00	9.81E−03
γ 74	5.62E−03	1.444E+00	8.11E−03
γ 75	4.79E−03	1.468E+00	7.04E−03
γ 76	5.89E−02	1.486E+00	8.75E−02
γ 77	4.66E−03	1.490E+00	6.94E−03
γ 78	8.77E−03	1.503E+00	1.32E−02
γ 79	1.37E−02	1.513E+00	2.07E−02
γ 80	3.43E−03	1.534E+00	5.25E−03
γ 81	8.22E−03	1.569E+00	1.29E−02
γ 82	3.01E−02	1.602E+00	4.83E−02
γ 83	8.49E−02	1.606E+00	1.36E−01
γ 84	5.48E−03	1.614E+00	8.85E−03
γ 85	3.01E−03	1.623E+00	4.89E−03
γ 86	1.05E−02	1.638E+00	1.73E−02
γ 88	3.01E−03	1.666E+00	5.02E−03
γ 89	3.15E−03	1.675E+00	5.28E−03
γ 91	4.79E−03	1.692E+00	8.11E−03
γ 92	3.97E−03	1.729E+00	6.87E−03
γ 93	1.33E−02	1.733E+00	2.30E−02
γ 94	3.97E−03	1.742E+00	6.92E−03
γ 95	3.97E−03	1.784E+00	7.09E−03
γ 96	3.01E−03	1.795E+00	5.41E−03
γ 97	7.67E−03	1.805E+00	1.38E−02
γ 99	1.05E−02	1.853E+00	1.95E−02
γ 100	5.62E−03	1.859E+00	1.04E−02
γ 104	5.34E−03	1.923E+00	1.03E−02
γ 105	5.75E−03	1.927E+00	1.11E−02
γ 106	2.47E−03	1.940E+00	4.78E−03
γ 107	5.89E−03	1.947E+00	1.15E−02
γ 108	3.01E−03	1.960E+00	5.91E−03
γ 109	6.99E−03	1.984E+00	1.39E−02
γ 110	4.52E−02	1.987E+00	8.98E−02
γ 111	1.08E−02	2.049E+00	2.22E−02
γ 112	7.26E−03	2.223E+00	1.61E−02
γ 113	4.93E−03	2.226E+00	1.10E−02
γ 114	7.95E−03	2.307E+00	1.83E−02
γ 115	4.11E−03	2.415E+00	9.92E−03
γ 116	3.01E−03	2.441E+00	7.36E−03
γ 117	6.85E−03	2.671E+00	1.83E−02
K_{α_1} X-ray	3.01E−01	2.317E−02	6.97E−03
Auger-KLL	7.18E−02	1.917E−02*	1.38E−03
Auger-KLX	3.09E−02	2.232E−02*	6.90E−04
Auger-LMM	4.52E−01	2.590E−03*	1.17E−03
Auger-LMX	2.06E−01	3.187E−03*	6.55E−04
Auger-MXY	1.28E+00	5.105E−04*	6.55E−04

Listed X, γ and $\gamma^\pm$ radiations	4.03E+00
Omitted X, γ AND $\gamma^\pm$ radiations**	8.39E−02
Listed β, ce AND Auger radiations	1.68E−01
Omitted β, ce AND Auger radiations**	2.34E−03
Listed radiations	4.20E+00
Omitted radiations**	8.62E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cd-108 daughter is stable.


$^{108}_{49}$In(58.0m)
7+ 0.0
4.5252
4.5124
4.2512
4.2396
4.1790
4.0434
3.8161
3.3673
3.1894
3.1101
2.9940
2.8075
2.7070
2.6456
2.6014
2.5649
2.5411
2.2392
1.5083
0.6329
0.0
(6,7)+
(6,7)+
(5,6+)
(5+,6+,7+)
(6)+
(6)+
(6,7)+
5-
4+
5-
5+
6+
4+
4+
2+
0+
EC1
EC2
EC3
EC4
EC5
EC6
EC7, β1+
EC8, β2+
EC9, β3+
EC10, β4+
EC12, β6+
EC14, β8+
EC15, β9+
EC16, β10+
EC17, β11+
γ107
γ97
γ70
γ58
γ109
γ104
γ89
γ86
γ84
γ78
γ74
γ73
γ59
γ56
γ39
γ34
γ24
γ21
γ3
γ106
γ100
γ114
γ76
γ62
γ51
γ47
γ46
γ43
γ41
γ4
γ29
γ7
γ83
γ28
γ35
γ22
$^{108}_{48}$Cd(stable)

49-In-109m

10-DEC-91

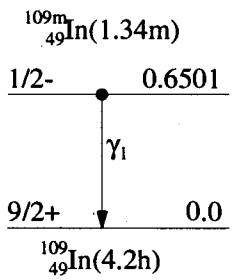
Half-life = 1.34 m
Decay mode(s): IT

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	9.35E−01	6.501E−01	6.08E−01
ce-K, γ 1	5.46E−02	6.222E−01	3.40E−02
ce-L_1, γ 1	7.12E−03	6.459E−01	4.60E−03
ce-L_2, γ 1	8.24E−04	6.462E−01	5.32E−04
ce-L_3, γ 1	6.63E−04	6.464E−01	4.29E−04
ce-M, γ 1	1.70E−03	6.494E−01*	1.10E−03
ce-N^+, γ 1	3.82E−04	6.501E−01*	2.48E−04
Auger-KLL	5.49E−03	1.999E−02*	1.10E−04
Auger-KLX	2.39E−03	2.329E−02*	5.58E−05
Auger-LMM	3.70E−02	2.698E−03*	9.98E−05
Auger-LMX	1.72E−02	3.335E−03*	5.75E−05
Auger-MXY	1.06E−01	5.546E−04*	5.89E−05

Listed X, γ and $\gamma^{\pm}$ radiations	6.08E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.16E−03
Listed β, ce and Auger radiations	4.13E−02
Omitted β, ce and Auger radiations**	1.72E−05
Listed radiations	6.49E−01
Omitted radiations**	1.18E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

In-109 daughter is radioactive.



49-In-112m

02-JAN-97

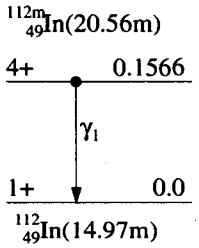
Half-life = 20.56 m
Decay mode(s): IT

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	1.31E−01	1.564E−01	2.05E−02
ce-K, γ 1	6.67E−01	1.285E−01	8.57E−02
ce-L_1, γ 1	1.08E−01	1.522E−01	1.65E−02
ce-L_2, γ 1	1.72E−02	1.525E−01	2.62E−03
ce-L_3, γ 1	3.58E−02	1.527E−01	5.47E−03
ce-M, γ 1	3.31E−02	1.557E−01*	5.15E−03
ce-N^+, γ 1	7.46E−03	1.564E−01*	1.17E−03
K_{α_1} X-ray	3.04E−01	2.421E−02	7.36E−03
K_{α_2} X-ray	1.62E−01	2.400E−02	3.89E−03
K_{β_1} X-ray	5.56E−02	2.728E−02	1.52E−03
K_{β_2} X-ray	1.64E−02	2.786E−02	4.57E−04
K_{β_3} X-ray	2.87E−02	2.724E−02	7.82E−04
L_α X-ray	2.53E−02	3.286E−03*	8.32E−05
L_β X-ray	1.98E−02	3.539E−03*	7.02E−05
Auger-KLL	6.71E−02	1.999E−02*	1.34E−03
Auger-KLX	2.92E−02	2.329E−02*	6.81E−04
Auger-LMM	4.86E−01	2.698E−03*	1.31E−03
Auger-LMX	2.27E−01	3.335E−03*	7.56E−04
Auger-MXY	1.40E+00	5.540E−04*	7.74E−04

Listed X, γ and $\gamma^{\pm}$ radiations	3.46E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.58E−05
Listed β, ce and Auger radiations	1.21E−01
Omitted β, ce and Auger radiations**	2.18E−04
Listed radiations	1.56E−01
Omitted radiations**	2.44E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

In-112 daughter is radioactive.



49-In-118

05-SEP-95

Half-life = 5.0 s
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 2	4.30E−03	7.927E−01*	3.41E−03
β^- 5	3.00E−03	9.574E−01*	2.87E−03
β^- 6	7.00E−03	1.089E+00*	7.62E−03
β^- 7	3.40E−02	1.336E+00*	4.54E−02
β^- 8	9.49E−01	1.916E+00*	1.82E+00
γ 2	7.00E−03	5.280E−01	3.70E−03
γ 3	1.95E−03	8.130E−01	1.59E−03
γ 4	3.50E−04	8.270E−01	2.89E−04
γ 5	1.00E−03	1.097E+00	1.10E−03
γ 6	4.30E−03	1.173E+00	5.05E−03
γ 7	5.00E−02	1.230E+00	6.15E−02
γ 9	1.30E−03	1.908E+00	2.48E−03
γ 10	1.05E−03	2.043E+00	2.15E−03

Listed X, γ and $\gamma^{\pm}$ radiations	7.78E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.94E−06
Listed β, ce and Auger radiations	1.88E+00
Omitted β, ce and Auger radiations**	1.86E−03
Listed radiations	1.96E+00
Omitted radiations**	1.86E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sn-118 daughter is stable.

50-Sn-108

24-MAY-91

Half-life = 10.3 m
Decay mode(s): EC, β^+

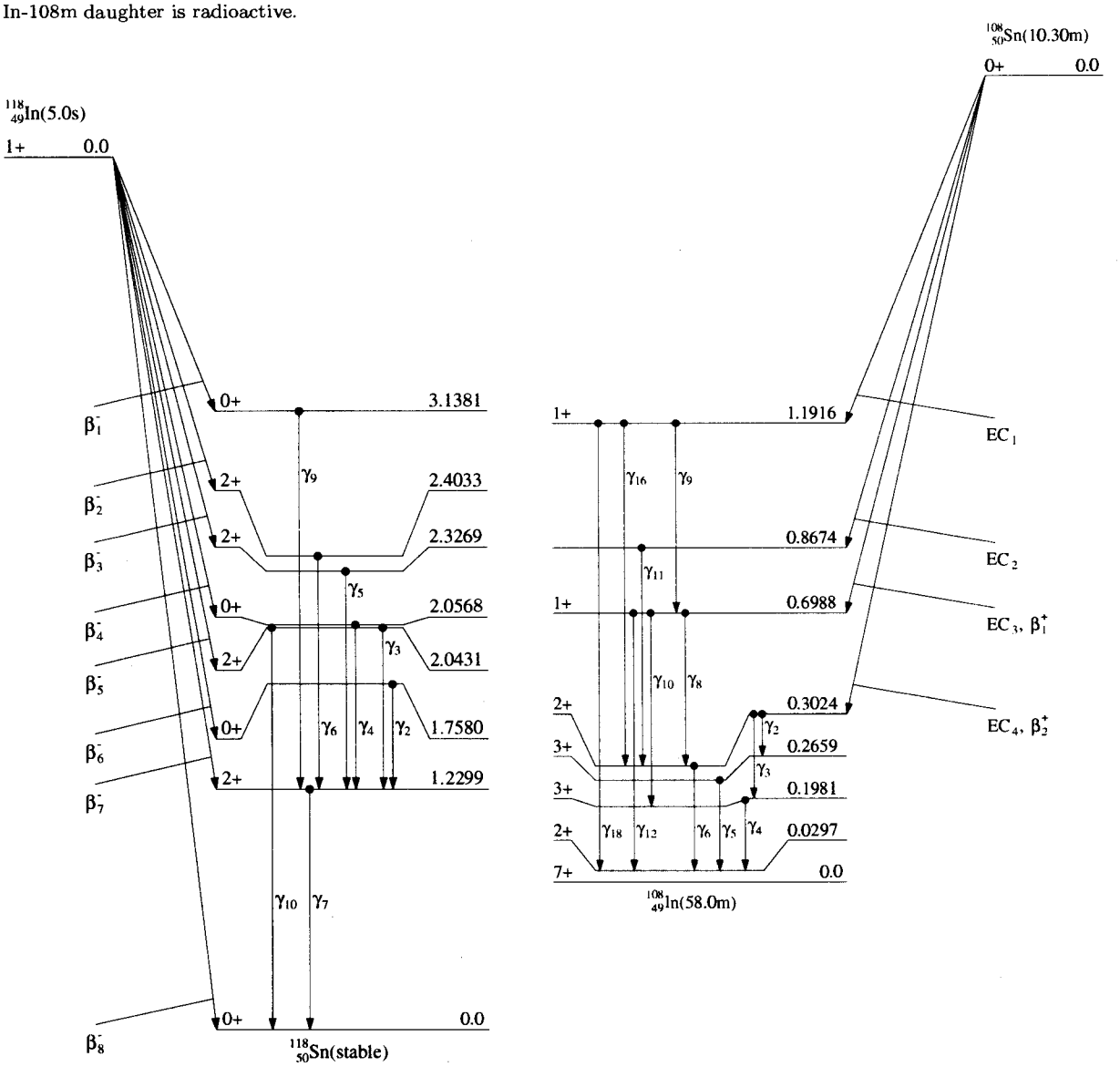
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	3.35E−03	1.731E−01*	5.79E−04
β^+ 2	3.04E−03	3.670E−01*	1.12E−03
$\gamma^{\pm}$	1.28E−02	5.110E−01	6.53E−03
ce-K, γ 2	3.37E−02	8.760E−03	2.95E−04
ce-L$_1$, γ 2	3.63E−03	3.246E−02	1.18E−04
ce-L$_2$, γ 2	7.68E−03	3.276E−02	2.52E−04
ce-L$_3$, γ 2	1.09E−02	3.297E−02	3.58E−04
ce-M, γ 2	4.46E−03	3.604E−02*	1.61E−04
ce-N$^+$, γ 2	8.73E−04	3.670E−02*	3.20E−05
γ 3	1.38E−01	1.043E−01	1.44E−02
ce-K, γ 3	5.50E−02	7.637E−02	4.20E−03
ce-L$_1$, γ 3	6.40E−03	1.001E−01	6.40E−04
ce-L$_2$, γ 3	4.55E−04	1.004E−01	4.57E−05
ce-M, γ 3	1.36E−03	1.036E−01*	1.40E−04
ce-N$^+$, γ 3	2.95E−04	1.043E−01*	3.08E−05
γ 4	1.99E−01	1.682E−01	3.35E−02
ce-K, γ 4	2.10E−02	1.403E−01	2.94E−03
ce-L$_1$, γ 4	2.44E−03	1.640E−01	4.00E−04
ce-M, γ 4	5.06E−04	1.676E−01*	8.48E−05
γ 5	6.24E−02	2.362E−01	1.47E−02
ce-K, γ 5	2.66E−03	2.083E−01	5.53E−04
ce-L$_1$, γ 5	3.07E−04	2.320E−01	7.13E−05
γ 6	4.55E−01	2.727E−01	1.24E−01
ce-K, γ 6	1.34E−02	2.448E−01	3.28E−03
ce-L$_1$, γ 6	1.54E−03	2.685E−01	4.13E−04
ce-M, γ 6	3.19E−04	2.720E−01*	8.69E−05
γ 8	6.43E−01	3.963E−01	2.55E−01
ce-K, γ 8	7.31E−03	3.684E−01	2.69E−03
ce-L$_1$, γ 8	8.33E−04	3.921E−01	3.27E−04
ce-M, γ 8	1.75E−04	3.957E−01*	6.91E−05
γ 9	1.03E−02	4.927E−01	5.07E−03
ce-K, γ 9	6.72E−05	4.647E−01	3.12E−05
γ 10	1.09E−02	5.004E−01	5.47E−03
ce-K, γ 10	6.57E−05	4.725E−01	3.10E−05
γ 11	1.29E−03	5.650E−01	7.27E−04
γ 12	2.26E−01	6.692E−01	1.51E−01
ce-K, γ 12	7.16E−04	6.412E−01	4.59E−04
ce-L$_1$, γ 12	8.20E−05	6.649E−01	5.45E−05
γ 13	1.29E−03	8.293E−01	1.07E−03
γ 14	1.29E−03	8.476E−01	1.09E−03
γ 15	1.29E−03	8.587E−01	1.10E−03
γ 16	3.28E−02	8.892E−01	2.92E−02
ce-K, γ 16	4.85E−05	8.612E−01	4.18E−05
γ 17	1.29E−03	9.035E−01	1.16E−03
γ 18	9.00E−03	1.162E+00	1.05E−02
γ 19	1.29E−03	1.231E+00	1.58E−03
γ 20	1.29E−03	1.654E+00	2.13E−03
γ 21	1.29E−03	1.685E+00	2.17E−03
γ 22	1.29E−03	1.957E+00	2.52E−03
K$_{\alpha_1}$ X-ray	4.49E−01	2.421E−02	1.09E−02
K$_{\alpha_2}$ X-ray	2.39E−01	2.400E−02	5.75E−03
K$_{\beta_1}$ X-ray	8.22E−02	2.728E−02	2.24E−03
K$_{\beta_3}$ X-ray	4.24E−02	2.724E−02	1.16E−03
Auger-KLL	9.91E−02	1.999E−02*	1.98E−03
Auger-KLX	4.32E−02	2.329E−02*	1.01E−03
Auger-KXY	5.61E−03	2.657E−02*	1.49E−04
Auger-LMM	6.63E−01	2.698E−03*	1.79E−03
Auger-LMX	3.09E−01	3.335E−03*	1.03E−03
Auger-LXY	3.98E−02	3.761E−03*	1.50E−04
Auger-MXY	1.90E+00	5.548E−04*	1.06E−03

Listed X, γ and $\gamma^{\pm}$ radiations	6.83E−01

Omitted X, γ and $\gamma^{\pm}$ radiations**	1.55E−03
Listed β, ce and Auger radiations	2.67E−02
Omitted β, ce and Auger radiations**	2.57E−04
Listed radiations	7.10E−01
Omitted radiations**	1.81E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

In-108m daughter is radioactive.



50-Sn-109

20-MAY-96

Half-life = 18 m
Decay mode(s): EC, β^+

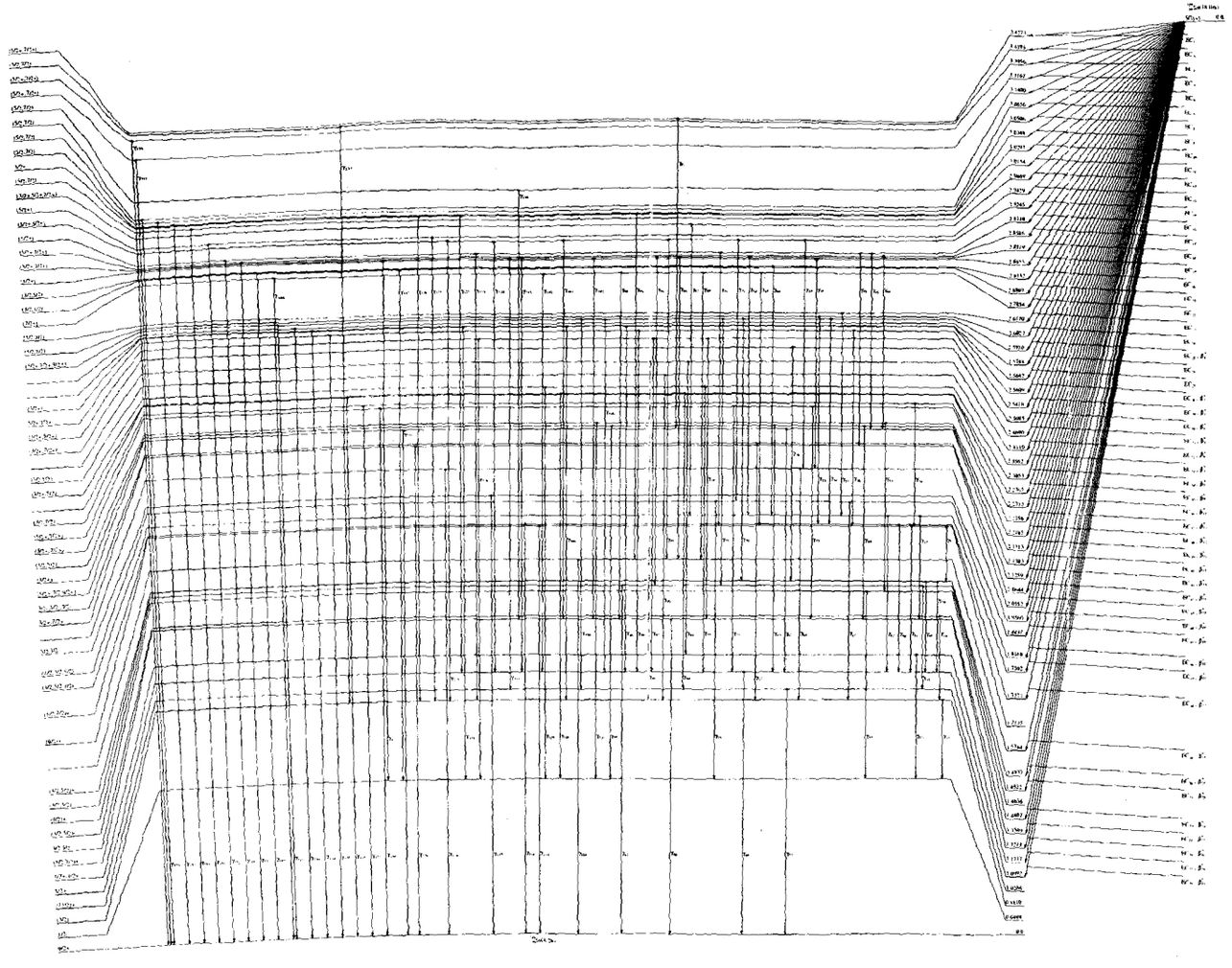
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 12	1.12E−03	2.764E−01*	3.08E−04
β^+ 13	3.04E−04	3.056E−01*	9.30E−05
β^+ 14	3.45E−03	3.113E−01*	1.07E−03
β^+ 15	2.13E−03	3.167E−01*	6.74E−04
β^+ 16	3.04E−04	3.434E−01*	1.04E−04
β^+ 17	7.20E−04	3.475E−01*	2.50E−04
β^+ 18	2.03E−04	3.904E−01*	7.92E−05
β^+ 19	9.13E−04	4.401E−01*	4.02E−04
β^+ 20	1.72E−03	4.519E−01*	7.79E−04
β^+ 21	2.84E−03	4.773E−01*	1.35E−03
β^+ 22	3.14E−03	4.936E−01*	1.55E−03
β^+ 23	5.88E−03	5.591E−01*	3.29E−03
β^+ 24	7.81E−03	5.996E−01*	4.68E−03
β^+ 25	3.45E−03	6.002E−01*	2.07E−03
β^+ 26	3.55E−03	6.188E−01*	2.20E−03
β^+ 27	3.24E−03	6.662E−01*	2.16E−03
β^+ 28	9.13E−03	6.723E−01*	6.13E−03
β^+ 29	6.69E−03	7.599E−01*	5.09E−03
β^+ 30	1.93E−02	7.724E−01*	1.49E−02
$\gamma^{\pm}$	1.53E−01	5.110E−01	7.83E−02
ce-K, γ 7	1.30E−03	2.013E−01	2.62E−04
γ 12	9.69E−02	3.312E−01	3.21E−02
ce-K, γ 12	1.72E−03	3.033E−01	5.21E−04
ce-L_1, γ 12	1.98E−04	3.270E−01	6.47E−05
γ 14	1.02E−02	3.539E−01	3.62E−03
γ 18	9.03E−03	3.830E−01	3.46E−03
γ 19	3.31E−02	3.845E−01	1.27E−02
ce-K, γ 19	4.03E−04	3.566E−01	1.44E−04
γ 21	2.59E−02	4.372E−01	1.13E−02
ce-K, γ 21	2.29E−04	4.093E−01	9.37E−05
γ 22	2.59E−02	4.374E−01	1.13E−02
ce-K, γ 22	2.29E−04	4.095E−01	9.37E−05
γ 33	2.89E−02	5.219E−01	1.51E−02
γ 34	6.02E−03	5.220E−01	3.14E−03
γ 39	1.81E−02	6.141E−01	1.11E−02
γ 40	2.17E−02	6.234E−01	1.35E−02
γ 42	1.44E−02	6.601E−01	9.54E−03
γ 43	4.21E−03	7.107E−01	2.99E−03
γ 44	6.32E−03	7.327E−01	4.63E−03
γ 45	3.31E−03	7.453E−01	2.47E−03
γ 47	1.57E−02	7.909E−01	1.24E−02
γ 48	5.42E−03	8.161E−01	4.42E−03
γ 49	5.42E−03	8.162E−01	4.42E−03
γ 50	8.73E−03	8.288E−01	7.23E−03
γ 51	8.73E−03	8.357E−01	7.29E−03
γ 53	5.42E−03	8.579E−01	4.65E−03
γ 54	6.92E−03	8.693E−01	6.02E−03
γ 55	6.02E−03	8.792E−01	5.29E−03
γ 56	6.32E−03	8.887E−01	5.62E−03
γ 57	9.63E−03	8.975E−01	8.64E−03
γ 58	4.82E−03	9.672E−01	4.66E−03
γ 59	1.08E−02	9.763E−01	1.06E−02
γ 60	3.91E−03	9.853E−01	3.86E−03
γ 61	5.30E−02	1.026E+00	5.44E−02
ce-K, γ 61	6.35E−05	9.985E−01	6.34E−05
γ 62	5.30E−02	1.026E+00	5.44E−02
ce-K, γ 62	6.35E−05	9.985E−01	6.34E−05
γ 63	4.51E−02	1.039E+00	4.69E−02
γ 64	6.32E−03	1.054E+00	6.66E−03
γ 65	2.41E−03	1.073E+00	2.58E−03
γ 67	6.02E−03	1.083E+00	6.52E−03
γ 68	5.42E−03	1.092E+00	5.92E−03
γ 69	3.01E−01	1.099E+00	3.31E−01
ce-K, γ 69	2.58E−04	1.071E+00	2.76E−04
γ 70	4.82E−03	1.107E+00	5.33E−03
γ 71	4.82E−03	1.108E+00	5.33E−03
γ 72	3.16E−02	1.119E+00	3.54E−02
γ 73	1.41E−02	1.128E+00	1.60E−02
γ 75	5.12E−03	1.158E+00	5.92E−03
γ 76	4.51E−03	1.167E+00	5.27E−03
γ 78	2.41E−03	1.188E+00	2.86E−03
γ 79	3.91E−03	1.206E+00	4.72E−03
γ 80	9.93E−03	1.211E+00	1.20E−02
γ 82	3.31E−03	1.227E+00	4.06E−03
γ 83	3.91E−03	1.240E+00	4.85E−03
γ 84	2.41E−03	1.250E+00	3.01E−03
γ 85	4.82E−03	1.271E+00	6.12E−03
γ 87	5.12E−03	1.301E+00	6.66E−03
γ 88	1.19E−01	1.321E+00	1.57E−01
ce-K, γ 88	6.91E−05	1.293E+00	8.93E−05
γ 89	9.03E−03	1.350E+00	1.22E−02
γ 90	3.91E−03	1.375E+00	5.38E−03
γ 91	2.41E−03	1.388E+00	3.34E−03
γ 92	6.92E−03	1.409E+00	9.75E−03
γ 93	3.01E−03	1.430E+00	4.30E−03
γ 94	7.22E−03	1.443E+00	1.04E−02
γ 95	6.62E−03	1.455E+00	9.64E−03
γ 96	2.11E−02	1.462E+00	3.08E−02
γ 97	3.01E−02	1.464E+00	4.41E−02
γ 98	3.61E−02	1.464E+00	5.29E−02
γ 99	4.06E−02	1.489E+00	6.05E−02
γ 100	1.35E−02	1.492E+00	2.02E−02
γ 101	1.50E−03	1.502E+00	2.26E−03
γ 102	5.12E−03	1.525E+00	7.80E−03
γ 104	2.41E−03	1.566E+00	3.77E−03
γ 105	5.48E−02	1.574E+00	8.62E−02
γ 106	1.14E−02	1.581E+00	1.81E−02
γ 107	3.91E−03	1.603E+00	6.27E−03
γ 108	4.51E−03	1.622E+00	7.32E−03
γ 109	4.82E−03	1.656E+00	7.97E−03
γ 110	7.52E−03	1.686E+00	1.27E−02
γ 113	9.93E−03	1.714E+00	1.70E−02
γ 114	1.05E−02	1.722E+00	1.81E−02
γ 115	1.11E−02	1.760E+00	1.96E−02
γ 116	1.81E−03	1.819E+00	3.29E−03
γ 117	6.32E−03	1.825E+00	1.15E−02
γ 118	6.32E−03	1.825E+00	1.15E−02
γ 119	7.22E−03	1.844E+00	1.33E−02
γ 120	3.91E−03	1.859E+00	7.27E−03
γ 121	1.54E−02	1.890E+00	2.90E−02
γ 122	5.81E−02	1.911E+00	1.11E−01
γ 123	5.12E−03	1.931E+00	9.88E−03
γ 124	1.69E−02	1.944E+00	3.28E−02
γ 126	3.91E−03	1.957E+00	7.66E−03
γ 127	1.50E−03	1.962E+00	2.95E−03
γ 128	3.01E−03	2.049E+00	6.17E−03
γ 129	1.78E−02	2.055E+00	3.65E−02
γ 131	1.38E−02	2.126E+00	2.94E−02
γ 132	7.22E−03	2.159E+00	1.56E−02
γ 133	1.38E−02	2.196E+00	3.04E−02
γ 134	2.20E−03	2.218E+00	4.87E−03
γ 135	1.08E−03	2.236E+00	2.42E−03
γ 136	2.41E−03	2.276E+00	5.48E−03
γ 137	1.41E−03	2.438E+00	3.45E−03
γ 138	2.62E−02	2.542E+00	6.66E−02
γ 139	1.02E−03	2.564E+00	2.62E−03
γ 140	1.11E−03	2.575E+00	2.87E−03
γ 141	6.02E−03	2.592E+00	1.56E−02
γ 144	1.75E−02	2.785E+00	4.86E−02
γ 145	3.91E−03	2.813E+00	1.10E−02
γ 147	1.02E−02	2.859E+00	2.93E−02
γ 148	8.13E−04	2.871E+00	2.33E−03
γ 150	1.11E−03	2.943E+00	3.28E−03

γ 151	1.26E−03	3.013E+00	3.81E−03
γ 153	1.23E−03	3.035E+00	3.75E−03
γ 154	3.61E−03	3.051E+00	1.10E−02
γ 155	7.83E−04	3.066E+00	2.40E−03
γ 157	9.03E−04	3.317E+00	2.99E−03
γ 159	1.11E−03	3.396E+00	3.78E−03
K_{α_1} X-ray	3.64E−01	2.421E−02	8.80E−03
K_{α_2} X-ray	1.94E−01	2.400E−02	4.65E−03
Auger-KLL	8.02E−02	1.999E−02*	1.60E−03
Auger-KLX	3.50E−02	2.329E−02*	8.15E−04
Auger-KXY	4.54E−03	2.657E−02*	1.21E−04
Auger-LMM	5.28E−01	2.698E−03*	1.42E−03
Auger-LMX	2.46E−01	3.335E−03*	8.20E−04
Auger-LXY	3.17E−02	3.761E−03*	1.19E−04
Auger-MXY	1.52E+00	5.550E−04*	8.41E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.15E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	5.35E−02
Listed β, ce and Auger radiations	5.46E−02
Omitted β, ce and Auger radiations**	1.77E−03
Listed radiations	2.21E+00
Omitted radiations**	5.53E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

In-109m daughter, yield 2.826E−01, is radioactive.
In-109 daughter, yield 7.174E−01, is radioactive.



50-Sn-113m

27-AUG-90

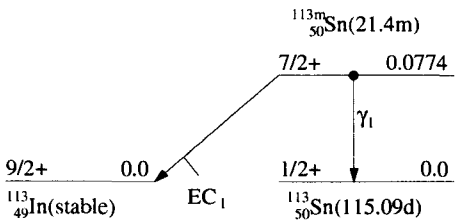
Half-life = 21.4 m
Decay mode(s): EC, IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
K_{α_1} X-ray	3.47E−02	2.421E−02	8.41E−04
K_{α_2} X-ray	1.85E−02	2.400E−02	4.44E−04
K_{β_1} X-ray	6.36E−03	2.728E−02	1.73E−04
K_{β_2} X-ray	1.88E−03	2.786E−02	5.23E−05
K_{β_3} X-ray	3.28E−03	2.724E−02	8.94E−05
Auger-KLL	7.66E−03	1.999E−02*	1.53E−04
Auger-KLX	3.34E−03	2.329E−02*	7.78E−05
Auger-LMM	5.05E−02	2.698E−03*	1.36E−04
Auger-LMX	2.35E−02	3.335E−03*	7.84E−05
Auger-MXY	1.45E−01	5.550E−04*	8.04E−05
γ 1	5.01E−03	7.738E−02	3.88E−04
ce-K, γ 1	5.17E−01	4.818E−02	2.49E−02
ce-L_1, γ 1	1.22E−01	7.292E−02	8.89E−03
ce-L_2, γ 1	5.15E−02	7.322E−02	3.77E−03
ce-L_3, γ 1	1.32E−01	7.345E−02	9.73E−03
ce-M, γ 1	6.68E−02	7.667E−02*	5.12E−03
ce-N^+, γ 1	1.57E−02	7.738E−02*	1.21E−03
K_{α_1} X-ray	2.37E−01	2.527E−02	6.00E−03
K_{α_2} X-ray	1.27E−01	2.504E−02	3.18E−03
K_{β_1} X-ray	4.39E−02	2.849E−02	1.25E−03
K_{β_2} X-ray	1.31E−02	2.911E−02	3.80E−04
K_{β_3} X-ray	2.27E−02	2.844E−02	6.46E−04
L_α X-ray	2.77E−02	3.443E−03*	9.55E−05
L_β X-ray	2.25E−02	3.722E−03*	8.36E−05
Auger-KLL	4.86E−02	2.082E−02*	1.01E−03
Auger-KLX	2.15E−02	2.429E−02*	5.22E−04
Auger-KXY	2.82E−03	2.773E−02*	7.81E−05
Auger-LMM	4.77E−01	2.805E−03*	1.34E−03
Auger-LMX	2.28E−01	3.483E−03*	7.93E−04
Auger-LXY	3.00E−02	3.942E−03*	1.18E−04
Auger-MXY	1.39E+00	5.982E−04*	8.32E−04

Listed X, γ and $\gamma^\pm$ radiations	1.36E−02
Omitted X, γ and $\gamma^\pm$ radiations**	4.57E−05
Listed β, ce and Auger radiations	5.89E−02
Omitted β, ce and Auger radiations**	3.41E−05
Listed radiations	7.25E−02
Omitted radiations**	7.98E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

In-113 daughter, yield 8.9E−02, is stable.
Sn-113 daughter, yield 9.11E−01, is radioactive.



51-Sb-118

05-SEP-95

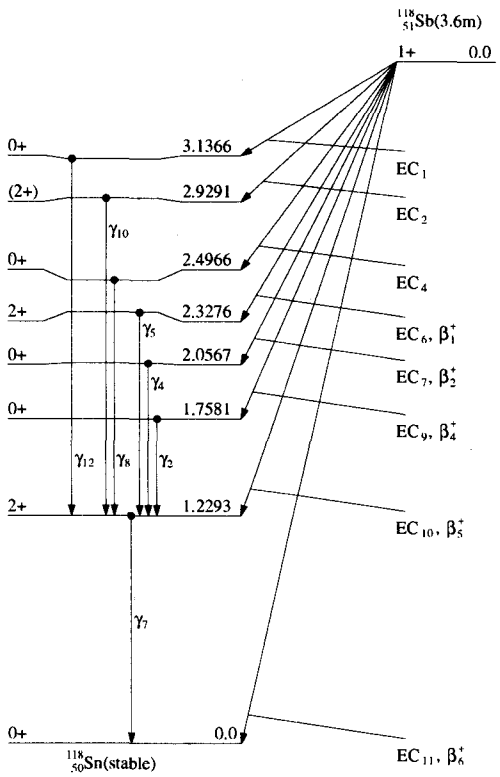
Half-life = 3.6 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 5	2.40E−03	6.276E−01*	1.51E−03
β^+ 6	7.32E−01	1.188E+00*	8.70E−01
$\gamma^\pm$	1.47E+00	5.110E−01	7.51E−01
γ 2	4.77E−03	5.287E−01	2.52E−03
γ 4	4.00E−03	8.273E−01	3.31E−03
γ 5	8.00E−04	1.099E+00	8.79E−04
γ 7	2.50E−02	1.229E+00	3.07E−02
γ 8	5.17E−03	1.267E+00	6.56E−03
γ 10	7.75E−04	1.700E+00	1.32E−03
γ 12	4.50E−04	1.907E+00	8.58E−04
K_{α_1} X-ray	1.05E−01	2.527E−02	2.65E−03
K_{α_2} X-ray	5.59E−02	2.504E−02	1.40E−03

Listed X, γ and $\gamma^\pm$ radiations	8.01E−01
Omitted X, γ and $\gamma^\pm$ radiations**	2.81E−03
Listed β, ce and Auger radiations	8.71E−01
Omitted β, ce and Auger radiations**	1.89E−03
Listed radiations	1.67E+00
Omitted radiations**	4.70E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sn-118 daughter is stable.



52-Te-117

26-AUG-92

Half-life = 62 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 4	2.80E−03	3.183E−01*	8.90E−04
β^+ 5	1.01E−02	3.593E−01*	3.62E−03
β^+ 7	9.99E−04	5.184E−01*	5.18E−04
β^+ 8	1.60E−02	7.107E−01*	1.14E−02
β^+ 9	2.38E−01	8.029E−01*	1.91E−01
$\gamma^\pm$	5.36E−01	5.110E−01	2.74E−01
γ 1	6.47E−03	5.688E−01	3.68E−03
γ 2	4.53E−03	6.345E−01	2.87E−03
γ 3	6.47E−01	7.197E−01	4.66E−01
ce-K, γ 3	1.65E−03	6.892E−01	1.14E−03
γ 4	5.18E−03	8.310E−01	4.30E−03
γ 5	1.49E−02	8.867E−01	1.32E−02
γ 6	6.21E−02	9.239E−01	5.74E−02
γ 7	1.94E−03	9.302E−01	1.81E−03
γ 8	3.95E−02	9.967E−01	3.93E−02
γ 9	6.86E−02	1.091E+00	7.48E−02
γ 10	5.18E−03	1.355E+00	7.01E−03
γ 11	4.53E−03	1.360E+00	6.16E−03
γ 12	8.41E−03	1.454E+00	1.22E−02
γ 13	9.70E−03	1.565E+00	1.52E−02
γ 14	1.94E−03	1.581E+00	3.07E−03
γ 15	1.94E−03	1.595E+00	3.10E−03
γ 16	1.59E−01	1.716E+00	2.72E−01
γ 17	3.23E−03	2.213E+00	7.16E−03
γ 18	3.88E−03	2.285E+00	8.87E−03
γ 19	1.12E−01	2.300E+00	2.57E−01
γ 20	1.29E−03	2.379E+00	3.08E−03
γ 21	6.47E−04	2.885E+00	1.87E−03
K_{α_1} X-ray	2.90E−01	2.636E−02	7.66E−03
K_{α_2} X-ray	1.56E−01	2.611E−02	4.06E−03
K_{β_1} X-ray	5.43E−02	2.973E−02	1.61E−03
Auger-KLL	5.55E−02	2.167E−02*	1.20E−03
Auger-KLX	2.49E−02	2.531E−02*	6.29E−04
Auger-LMM	3.96E−01	2.962E−03*	1.17E−03
Auger-LMX	1.96E−01	3.687E−03*	7.22E−04
Auger-MXY	1.16E+00	6.492E−04*	7.54E−04

Listed X, γ and $\gamma^\pm$ radiations	1.55E+00
Omitted X, γ and $\gamma^\pm$ radiations**	1.52E−03
Listed β, ce and Auger radiations	2.13E−01
Omitted β, ce and Auger radiations**	1.17E−03
Listed radiations	1.76E+00
Omitted radiations**	2.70E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sb-117 daughter is radioactive.

52-Te-118

05-SEP-95

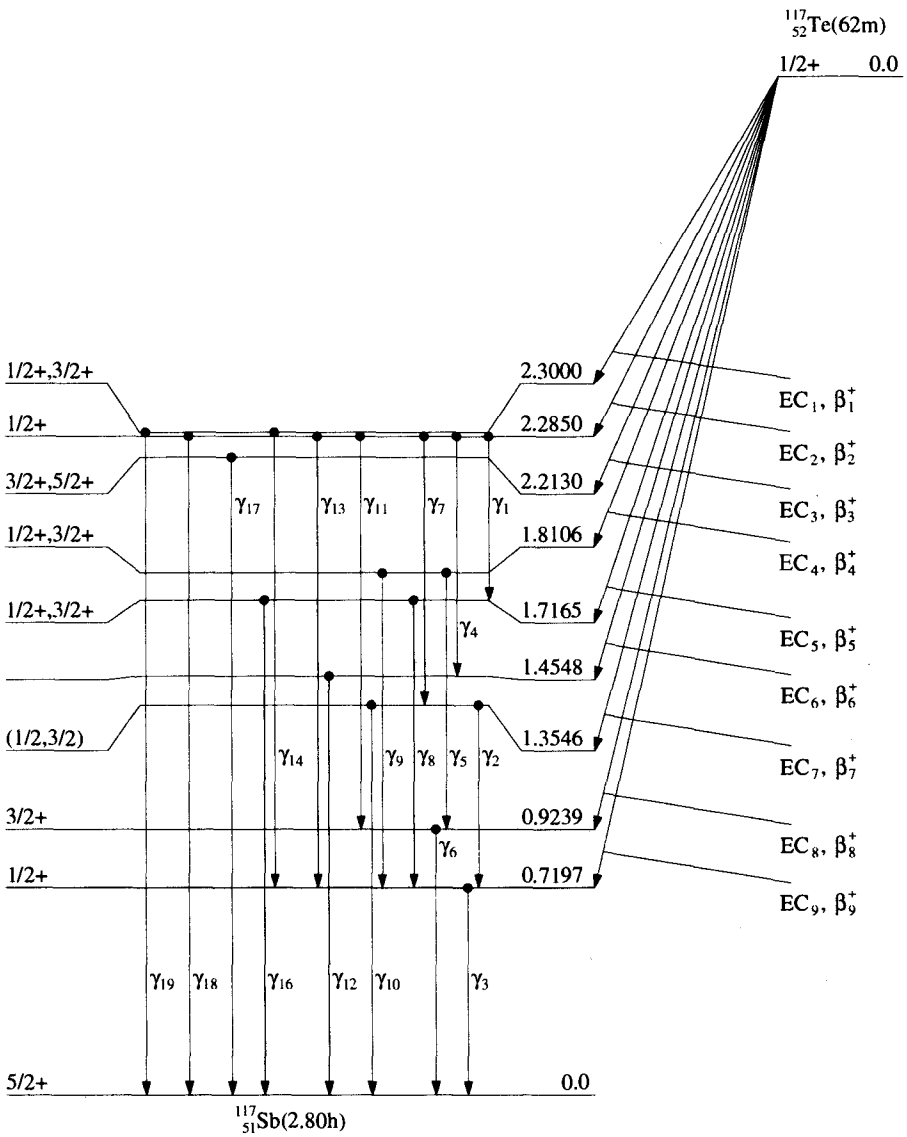
Half-life = 6 d
Decay mode(s): EC

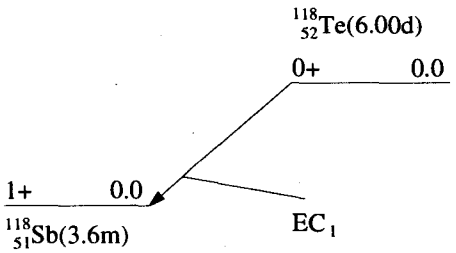
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
K_{α_1} X-ray	3.84E−01	2.636E−02	1.01E−02
K_{α_2} X-ray	2.06E−01	2.611E−02	5.37E−03
K_{β_1} X-ray	7.18E−02	2.973E−02	2.13E−03
K_{β_2} X-ray	2.17E−02	3.040E−02	6.60E−04
K_{β_3} X-ray	3.71E−02	2.968E−02	1.10E−03
K_{β_5} X-ray	7.07E−04	2.996E−02	2.12E−05
L_α X-ray	3.01E−02	3.604E−03*	1.08E−04
L_β X-ray	2.84E−02	3.902E−03*	1.11E−04
Auger-KLL	7.34E−02	2.167E−02*	1.59E−03
Auger-KLX	3.29E−02	2.531E−02*	8.32E−04
Auger-KXY	4.34E−03	2.892E−02*	1.26E−04
Auger-LMM	5.37E−01	2.966E−03*	1.59E−03
Auger-LMX	2.66E−01	3.692E−03*	9.81E−04
Auger-LXY	3.61E−02	4.187E−03*	1.51E−04
Auger-MXY	1.57E+00	6.490E−04*	1.02E−03
ΔE	3.17E−01	4.477E−05*	1.42E−05

Listed X, γ and $\gamma^\pm$ radiations	1.96E−02
Omitted X, γ and $\gamma^\pm$ radiations**	2.05E−05
Listed β, ce and Auger radiations	6.31E−03
Listed radiations	2.59E−02
Omitted radiations**	2.05E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sb-118 daughter is radioactive.


$^{117}_{52}$Te(62m)
1/2+ 0.0
1/2+,3/2+
1/2+
3/2+,5/2+
1/2+,3/2+
1/2+,3/2+
(1/2,3/2)
3/2+
1/2+
5/2+
2.3000
2.2850
2.2130
1.8106
1.7165
1.4548
1.3546
0.9239
0.7197
0.0
γ_{17} γ_{13} γ_{11} γ_7 γ_1
γ_4
γ_{14} γ_9 γ_8 γ_5 γ_2
γ_6
γ_{19} γ_{18} γ_{16} γ_{12} γ_{10} γ_3
EC_1, β_1^+
EC_2, β_2^+
EC_3, β_3^+
EC_4, β_4^+
EC_5, β_5^+
EC_6, β_6^+
EC_7, β_7^+
EC_8, β_8^+
EC_9, β_9^+
$^{117}_{51}$Sb(2.80h)


$^{118}_{52}$Te(6.00d)
0+ 0.0
1+ 0.0
$^{118}_{51}$Sb(3.6m)
EC_1

52-Te-119m

06-JAN-93

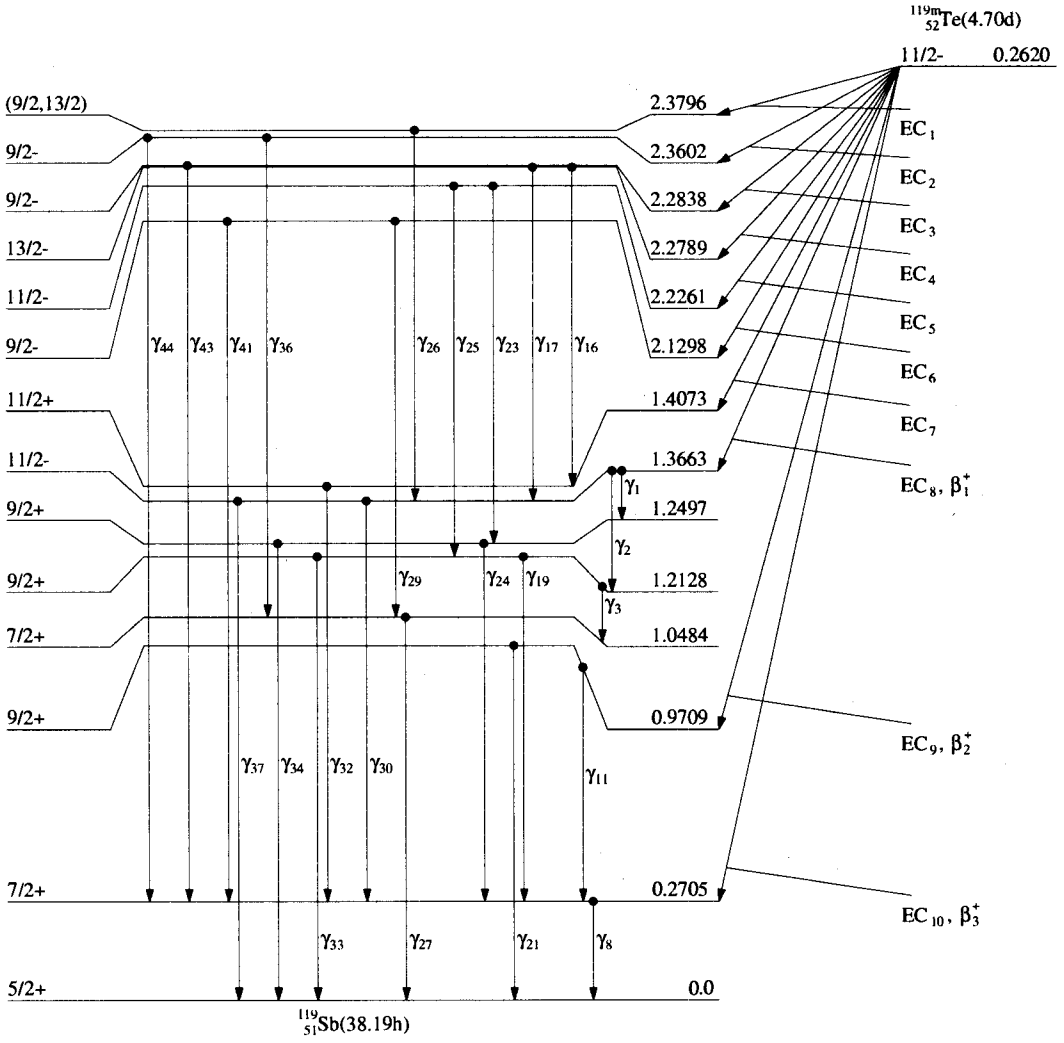
Half-life = 4.7 d
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 3	3.73E−03	5.868E−01*	2.19E−03
$\gamma^\pm$	7.69E−03	5.110E−01	3.93E−03
ce-K, γ 1	4.78E−04	8.613E−02	4.12E−05
γ 2	6.62E−01	1.536E−01	1.02E−01
ce-K, γ 2	3.24E−02	1.231E−01	3.98E−03
ce-L_1, γ 2	3.34E−03	1.489E−01	4.97E−04
ce-L_2, γ 2	2.94E−04	1.492E−01	4.38E−05
ce-L_3, γ 2	4.03E−04	1.495E−01	6.03E−05
ce-M, γ 2	7.85E−04	1.528E−01*	1.20E−04
ce-N^+, γ 2	1.77E−04	1.536E−01*	2.72E−05
γ 3	1.30E−02	1.643E−01	2.13E−03
ce-K, γ 3	2.35E−03	1.338E−01	3.14E−04
ce-L_1, γ 3	2.48E−04	1.596E−01	3.96E−05
γ 8	2.80E−01	2.705E−01	7.58E−02
ce-K, γ 8	1.00E−02	2.400E−01	2.40E−03
ce-L_1, γ 8	1.17E−03	2.658E−01	3.12E−04
ce-M, γ 8	2.48E−04	2.698E−01*	6.69E−05
γ 11	4.63E−03	7.003E−01	3.25E−03
γ 16	3.84E−03	8.715E−01	3.35E−03
γ 17	6.25E−02	9.126E−01	5.70E−02
ce-K, γ 17	1.11E−04	8.821E−01	9.76E−05
γ 19	5.09E−02	9.422E−01	4.80E−02
ce-K, γ 19	8.03E−05	9.117E−01	7.32E−05
γ 21	2.32E−03	9.709E−01	2.25E−03
γ 23	2.71E−02	9.764E−01	2.65E−02
γ 24	3.01E−02	9.793E−01	2.95E−02
ce-K, γ 24	4.56E−05	9.488E−01	4.33E−05
γ 25	2.50E−02	1.013E+00	2.54E−02
γ 26	2.50E−02	1.013E+00	2.54E−02
ce-K, γ 26	3.61E−05	9.827E−01	3.54E−05
γ 27	3.19E−02	1.048E+00	3.35E−02
ce-K, γ 27	3.84E−05	1.018E+00	3.91E−05
γ 29	1.60E−02	1.081E+00	1.73E−02
γ 30	2.24E−02	1.096E+00	2.45E−02
ce-K, γ 30	6.35E−05	1.065E+00	6.77E−05
γ 32	7.66E−02	1.137E+00	8.71E−02
ce-K, γ 32	6.86E−05	1.106E+00	7.59E−05
γ 33	6.62E−01	1.213E+00	8.03E−01
ce-K, γ 33	5.18E−04	1.182E+00	6.12E−04
ce-L_1, γ 33	5.89E−05	1.208E+00	7.12E−05
γ 34	1.73E−03	1.250E+00	2.17E−03
γ 36	1.22E−03	1.312E+00	1.61E−03
γ 37	1.07E−02	1.366E+00	1.46E−02
γ 39	1.32E−03	1.407E+00	1.86E−03
γ 41	1.39E−03	1.859E+00	2.58E−03
γ 43	3.18E−03	2.013E+00	6.40E−03
γ 44	4.69E−02	2.090E+00	9.79E−02
ce-K, γ 44	1.15E−05	2.059E+00	2.36E−05
γ 48	6.62E−04	2.360E+00	1.56E−03
K_{α_1} X-ray	4.12E−01	2.636E−02	1.09E−02
K_{α_2} X-ray	2.21E−01	2.611E−02	5.76E−03
K_{β_1} X-ray	7.71E−02	2.973E−02	2.29E−03
Auger-KLL	7.88E−02	2.167E−02*	1.71E−03
Auger-KLX	3.53E−02	2.531E−02*	8.93E−04
Auger-KXY	4.66E−03	2.892E−02*	1.35E−04
Auger-LMM	5.66E−01	2.963E−03*	1.68E−03
Auger-LMX	2.80E−01	3.688E−03*	1.03E−03
Auger-LXY	3.80E−02	4.183E−03*	1.59E−04
Auger-MXY	1.66E+00	6.491E−04*	1.08E−03

Listed X, γ and $\gamma^\pm$ radiations	1.52E+00
Omitted X, γ and $\gamma^\pm$ radiations**	1.41E−02
Listed β, ce and Auger radiations	1.79E−02
Omitted β, ce and Auger radiations**	3.37E−04
Listed radiations	1.53E+00
Omitted radiations**	1.44E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sb-119 daughter is radioactive.


$^{119m}_{52}$Te(4.70d)
11/2- 0.2620
(9/2,13/2) 2.3796
9/2- 2.3602
9/2- 2.2838
13/2- 2.2789
11/2- 2.2261
9/2- 2.1298
11/2+ 1.4073
11/2- 1.3663
9/2+ 1.2497
9/2+ 1.2128
7/2+ 1.0484
9/2+ 0.9709
7/2+ 0.2705
5/2+ 0.0
$^{119}_{51}$Sb(38.19h)
EC$_1$
EC$_2$
EC$_3$
EC$_4$
EC$_5$
EC$_6$
EC$_7$
EC$_8$, β_1^+
EC$_9$, β_2^+
EC$_{10}$, β_3^+
γ_{44} γ_{43} γ_{41} γ_{36} γ_{26} γ_{25} γ_{23} γ_{17} γ_{16}
γ_1 γ_2 γ_3
γ_{29} γ_{24} γ_{19}
γ_{37} γ_{34} γ_{32} γ_{30} γ_{11}
γ_{33} γ_{27} γ_{21} γ_8

52-Te-119

06-JAN-93

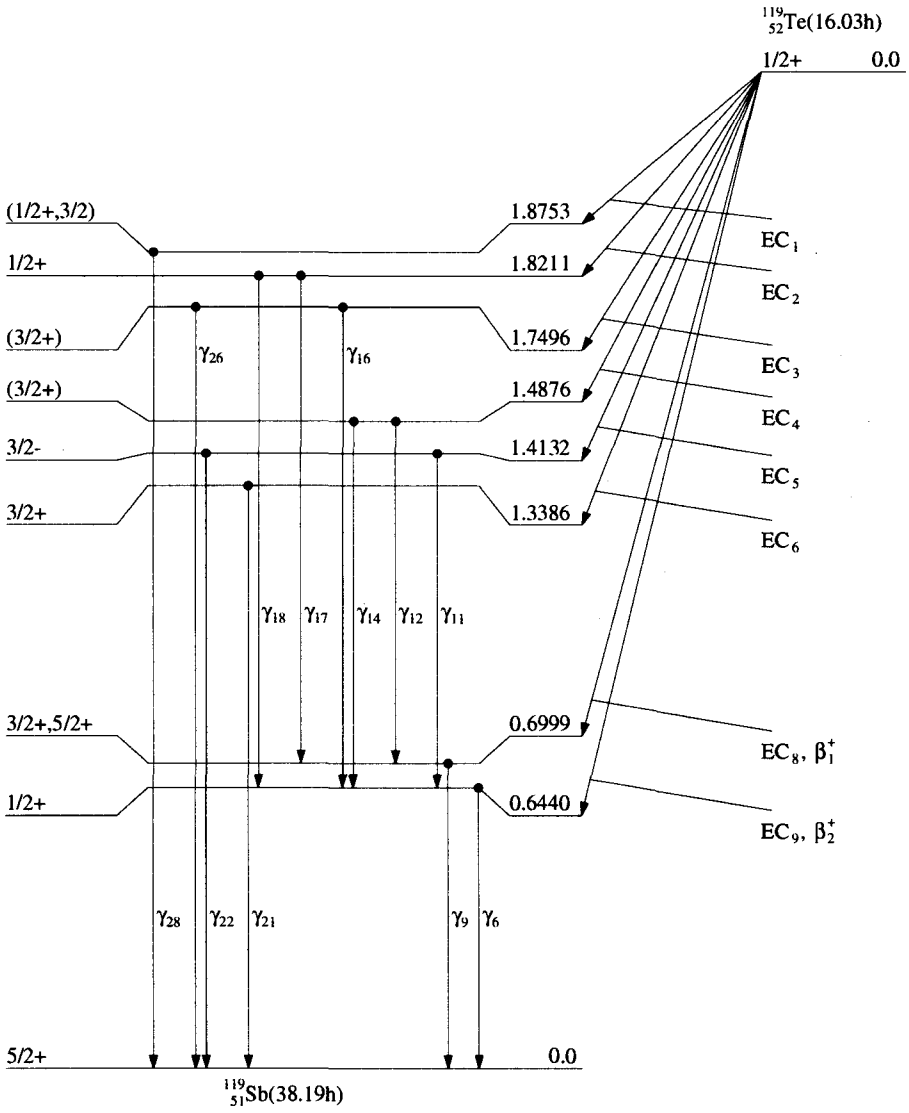
Half-life = 16.03 h
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.60E−03	2.612E−01*	4.18E−04
β^+ 2	1.89E−02	2.855E−01*	5.40E−03
$\gamma^\pm$	4.10E−02	5.110E−01	2.10E−02
γ 6	8.40E−01	6.440E−01	5.41E−01
ce-K, γ 6	2.83E−03	6.135E−01	1.74E−03
ce-L_1, γ 6	3.15E−04	6.393E−01	2.02E−04
ce-L_2, γ 6	3.22E−05	6.396E−01	2.06E−05
ce-L_3, γ 6	2.28E−05	6.399E−01	1.46E−05
ce-M, γ 6	7.33E−05	6.432E−01*	4.71E−05
γ 9	1.01E−01	6.999E−01	7.05E−02
ce-K, γ 9	3.40E−04	6.694E−01	2.28E−04
ce-L_1, γ 9	3.94E−05	6.952E−01	2.74E−05
γ 11	1.09E−03	7.693E−01	8.40E−04
γ 12	2.69E−03	7.878E−01	2.12E−03
γ 14	2.94E−03	8.436E−01	2.48E−03
γ 16	5.54E−03	1.106E+00	6.13E−03
γ 17	2.02E−03	1.121E+00	2.26E−03
γ 18	7.14E−03	1.177E+00	8.40E−03
γ 21	2.27E−03	1.339E+00	3.04E−03
γ 22	1.09E−02	1.413E+00	1.54E−02
γ 26	3.95E−02	1.750E+00	6.91E−02
ce-K, γ 26	1.74E−05	1.719E+00	3.00E−05
γ 28	4.20E−04	1.875E+00	7.88E−04
K_{α_1} X-ray	3.88E−01	2.636E−02	1.02E−02
K_{α_2} X-ray	2.08E−01	2.611E−02	5.43E−03
K_{β_1} X-ray	7.26E−02	2.973E−02	2.16E−03
K_{β_3} X-ray	3.75E−02	2.968E−02	1.11E−03
Auger-KLL	7.42E−02	2.167E−02*	1.61E−03
Auger-KLX	3.32E−02	2.531E−02*	8.41E−04
Auger-KXY	4.39E−03	2.892E−02*	1.27E−04
Auger-LMM	5.30E−01	2.962E−03*	1.57E−03
Auger-LMX	2.62E−01	3.687E−03*	9.67E−04
Auger-LXY	3.56E−02	4.182E−03*	1.49E−04
Auger-MXY	1.55E+00	6.492E−04*	1.01E−03

Listed X, γ and $\gamma^\pm$ radiations	7.62E−01
Omitted X, γ and $\gamma^\pm$ radiations**	5.68E−03
Listed β, ce and Auger radiations	1.44E−02
Omitted β, ce and Auger radiations**	1.10E−04
Listed radiations	7.76E−01
Omitted radiations**	5.79E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sb-119 daughter is radioactive.


$^{119}_{52}$Te(16.03h)
1/2+ 0.0
(1/2+,3/2) 1.8753
1/2+ 1.8211
(3/2+) 1.7496
(3/2+) 1.4876
3/2- 1.4132
3/2+ 1.3386
3/2+,5/2+ 0.6999
1/2+ 0.6440
5/2+ 0.0
EC_1
EC_2
EC_3
EC_4
EC_5
EC_6
EC_8, β_1^+
EC_9, β_2^+
γ_{26} γ_{16} γ_{18} γ_{17} γ_{14} γ_{12} γ_{11}
γ_{28} γ_{22} γ_{21} γ_9 γ_6
$^{119}_{51}$Sb(38.19h)

53-I-118

05-SEP-95

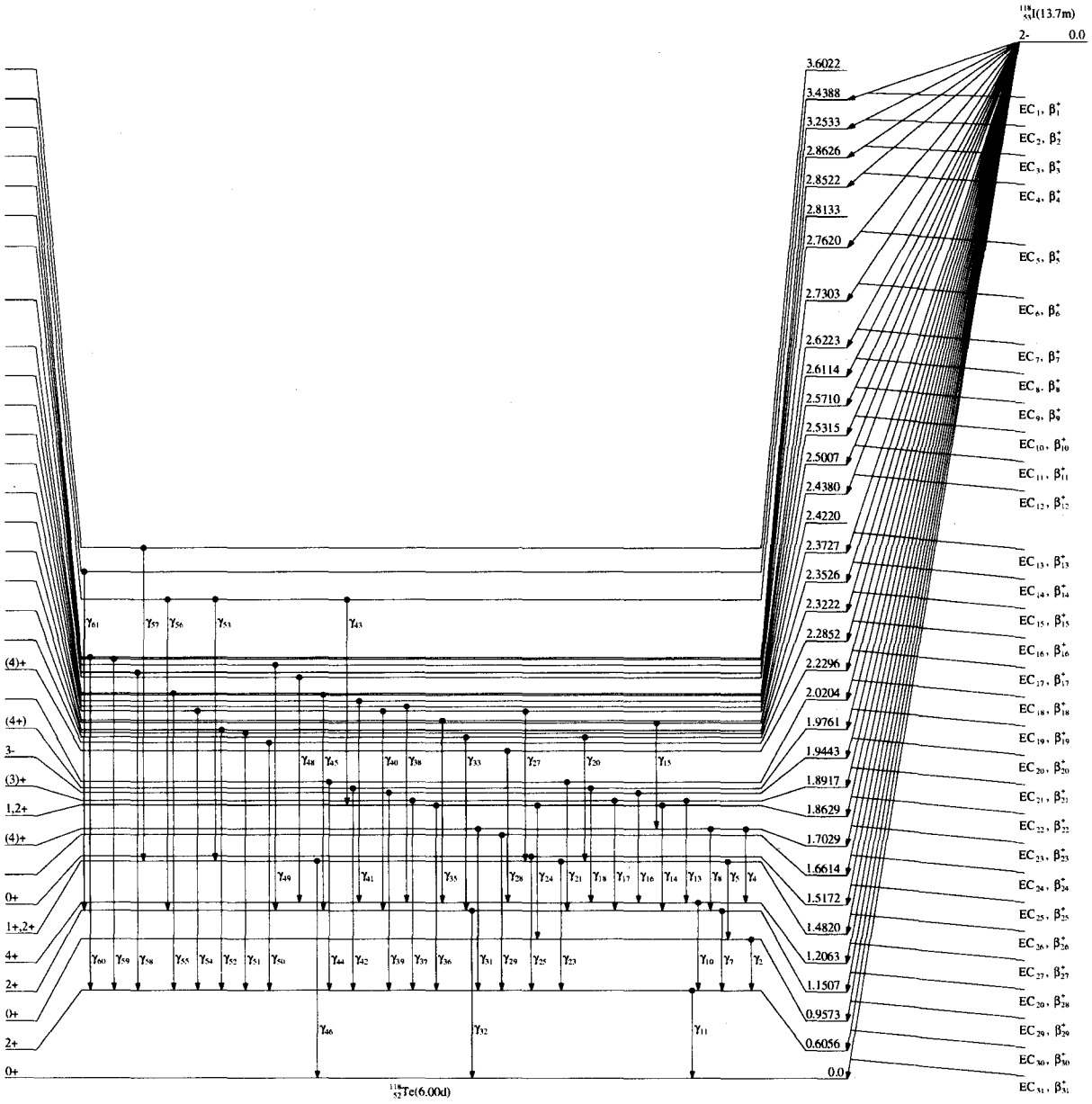
Half-life = 13.7 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	3.65E−03	1.159E+00*	4.23E−03
β^+ 2	1.07E−02	1.245E+00*	1.34E−02
β^+ 3	2.50E−03	1.427E+00*	3.57E−03
β^+ 4	5.63E−03	1.432E+00*	8.06E−03
β^+ 5	2.50E−03	1.474E+00*	3.69E−03
β^+ 6	2.08E−03	1.489E+00*	3.10E−03
β^+ 7	3.65E−03	1.539E+00*	5.61E−03
β^+ 8	6.31E−03	1.544E+00*	9.75E−03
β^+ 9	4.69E−03	1.563E+00*	7.33E−03
β^+ 10	2.92E−03	1.582E+00*	4.62E−03
β^+ 11	1.49E−02	1.597E+00*	2.38E−02
β^+ 12	3.23E−03	1.626E+00*	5.25E−03
β^+ 13	8.23E−03	1.657E+00*	1.36E−02
β^+ 14	1.77E−03	1.666E+00*	2.95E−03
β^+ 15	5.73E−03	1.681E+00*	9.63E−03
β^+ 16	2.29E−03	1.698E+00*	3.89E−03
β^+ 17	6.25E−03	1.721E+00*	1.08E−02
β^+ 18	1.76E−02	1.823E+00*	3.21E−02
β^+ 19	1.24E−02	1.838E+00*	2.28E−02
β^+ 20	3.75E−02	1.859E+00*	6.97E−02
β^+ 21	2.03E−02	1.884E+00*	3.83E−02
β^+ 22	2.24E−02	1.898E+00*	4.25E−02
β^+ 23	2.47E−02	1.965E+00*	4.85E−02
β^+ 24	3.33E−03	1.994E+00*	6.65E−03
β^+ 25	5.31E−03	2.051E+00*	1.09E−02
β^+ 26	6.15E−02	2.079E+00*	1.28E−01
β^+ 27	4.06E−02	2.196E+00*	8.92E−02
β^+ 28	6.46E−02	2.237E+00*	1.45E−01
β^+ 29	1.15E−02	2.313E+00*	2.65E−02
β^+ 30	3.42E−01	2.499E+00*	8.54E−01
β^+ 31	1.74E−01	2.764E+00*	4.81E−01
$\gamma^\pm$	1.85E+00	5.110E−01	9.45E−01
γ 2	2.33E−02	3.517E−01	8.18E−03
γ 4	7.85E−03	4.968E−01	3.90E−03
γ 5	8.42E−03	5.244E−01	4.42E−03
γ 7	1.00E−01	5.450E−01	5.48E−02
γ 8	1.48E−02	5.518E−01	8.19E−03
γ 10	8.04E−02	6.006E−01	4.83E−02
γ 11	7.76E−01	6.056E−01	4.70E−01
γ 13	4.02E−03	6.852E−01	2.75E−03
γ 14	4.31E−03	7.125E−01	3.07E−03
γ 15	3.25E−03	7.196E−01	2.34E−03
γ 16	3.35E−03	7.381E−01	2.47E−03
γ 17	1.32E−02	7.412E−01	9.79E−03
γ 18	4.21E−03	7.700E−01	3.24E−03
γ 20	3.06E−03	8.400E−01	2.57E−03
γ 21	2.87E−03	8.697E−01	2.50E−03
γ 23	5.61E−02	8.764E−01	4.91E−02
γ 24	2.39E−03	9.057E−01	2.17E−03
γ 25	3.06E−03	9.116E−01	2.79E−03
γ 27	3.45E−03	1.018E+00	3.51E−03
γ 28	5.36E−03	1.023E+00	5.48E−03
γ 29	3.54E−03	1.056E+00	3.74E−03
γ 31	3.25E−03	1.097E+00	3.57E−03
γ 32	3.73E−02	1.151E+00	4.29E−02
γ 33	3.25E−03	1.172E+00	3.81E−03
γ 35	3.64E−03	1.232E+00	4.48E−03
γ 36	2.01E−02	1.257E+00	2.53E−02
γ 37	4.31E−03	1.286E+00	5.54E−03
γ 38	3.25E−03	1.325E+00	4.31E−03
γ 39	7.76E−02	1.339E+00	1.04E−01
γ 40	7.18E−03	1.350E+00	9.69E−03
γ 41	3.92E−03	1.365E+00	5.35E−03
γ 42	9.00E−03	1.370E+00	1.23E−02
γ 43	3.06E−03	1.390E+00	4.26E−03
γ 44	1.60E−02	1.415E+00	2.26E−02
γ 45	7.18E−03	1.461E+00	1.05E−02
γ 46	6.89E−03	1.482E+00	1.02E−02
γ 48	2.39E−03	1.524E+00	3.65E−03
γ 49	2.58E−03	1.663E+00	4.30E−03
γ 50	2.49E−03	1.680E+00	4.18E−03
γ 51	2.01E−03	1.747E+00	3.51E−03
γ 52	9.09E−03	1.767E+00	1.61E−02
γ 53	4.21E−03	1.772E+00	7.46E−03
γ 54	6.03E−03	1.895E+00	1.14E−02
γ 55	4.21E−03	2.017E+00	8.49E−03
γ 56	6.60E−03	2.102E+00	1.39E−02
γ 57	2.68E−03	2.120E+00	5.68E−03
γ 58	2.87E−03	2.156E+00	6.19E−03
γ 59	6.60E−03	2.247E+00	1.48E−02
γ 60	2.87E−03	2.257E+00	6.48E−03
γ 61	4.98E−03	2.288E+00	1.14E−02

Listed X, γ and $\gamma^\pm$ radiations	2.02E+00
Omitted X, γ and $\gamma^\pm$ radiations**	7.30E−03
Listed β, ce and Auger radiations	2.13E+00
Omitted β, ce and Auger radiations**	4.32E−03
Listed radiations	4.15E+00
Omitted radiations**	1.16E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Te-118 daughter is radioactive.


118 53 I(13.7m)
2- 0.0
3.6022
3.4388
3.2533
2.8626
2.8522
2.8133
2.7620
2.7303
2.6223
2.6114
2.5710
2.5315
2.5007
2.4380
2.4220
2.3727
2.3526
2.3222
2.2852
2.2296
2.0204
1.9761
1.9443
1.8917
1.8629
1.7029
1.6614
1.5172
1.4820
1.2063
1.1507
0.9573
0.6056
0.0
(4)+
(4+)
3-
(3)+
1,2+
(4)+
0+
1+,2+
4+
2+
0+
2+
0+
118 52 Te(6.00d)

53-I-119

06-JAN-93

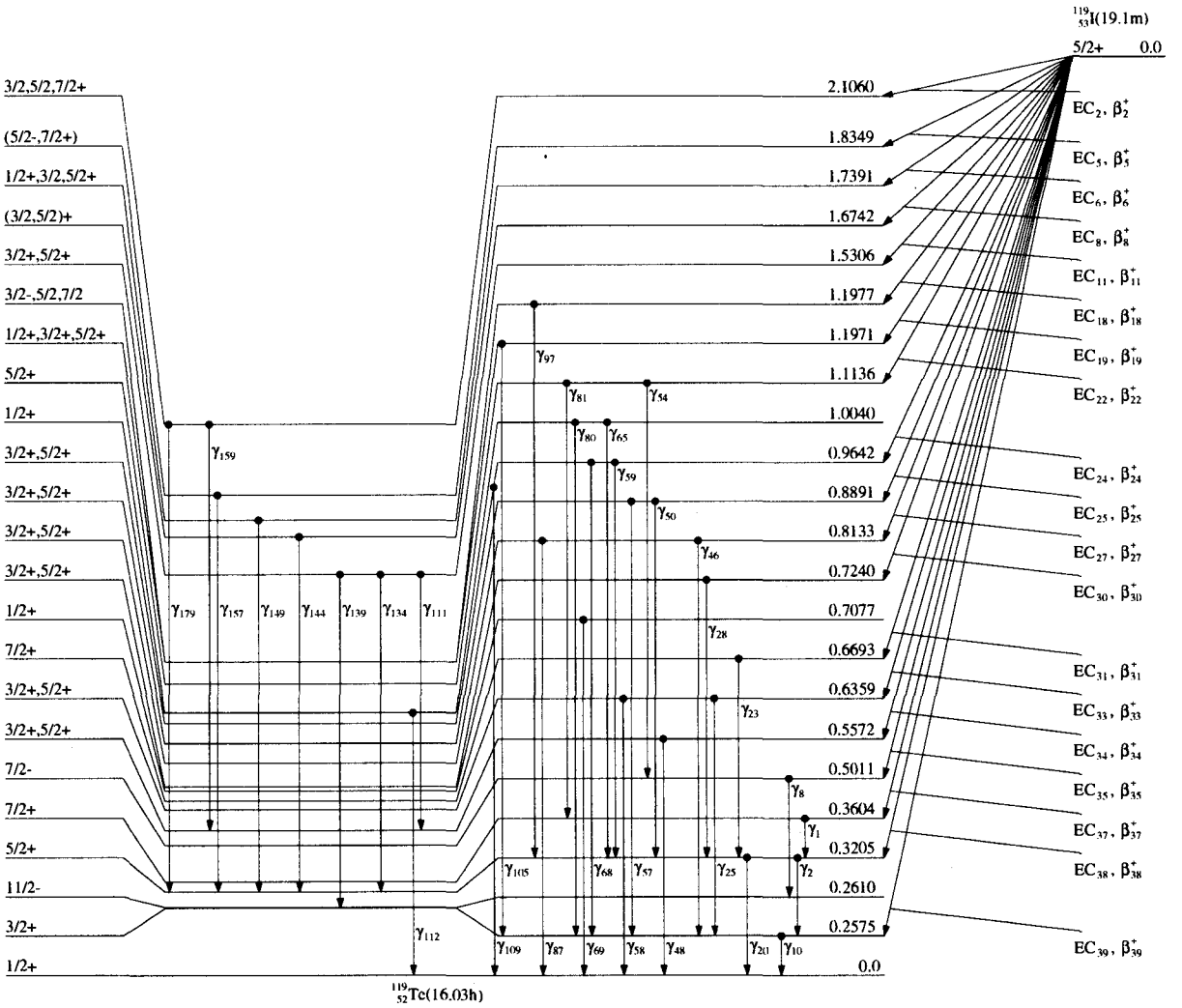
Half-life = 19.1 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 22	1.64E−03	6.152E−01*	1.01E−03
β^+ 24	4.31E−03	6.821E−01*	2.94E−03
β^+ 25	3.61E−03	7.158E−01*	2.58E−03
β^+ 27	1.94E−03	7.499E−01*	1.45E−03
β^+ 30	1.48E−03	7.903E−01*	1.17E−03
β^+ 31	1.30E−03	8.150E−01*	1.06E−03
β^+ 32	1.51E−03	8.187E−01*	1.24E−03
β^+ 33	1.40E−02	8.302E−01*	1.17E−02
β^+ 34	4.41E−03	8.659E−01*	3.82E−03
β^+ 35	1.00E−03	8.915E−01*	8.94E−04
β^+ 37	9.03E−03	9.557E−01*	8.63E−03
β^+ 38	6.02E−03	9.739E−01*	5.86E−03
β^+ 39	5.07E−01	1.003E+00*	5.08E−01
$\gamma^\pm$	1.12E+00	5.110E−01	5.74E−01
ce-K, γ 2	2.41E−02	3.128E−02	7.53E−04
γ 8	5.38E−03	2.402E−01	1.29E−03
γ 10	8.67E−01	2.575E−01	2.23E−01
ce-K, γ 10	3.87E−02	2.257E−01	8.73E−03
ce-L_1, γ 10	4.56E−03	2.526E−01	1.15E−03
γ 20	2.17E−02	3.205E−01	6.95E−03
γ 23	3.81E−03	3.488E−01	1.33E−03
γ 25	3.99E−03	3.784E−01	1.51E−03
γ 28	3.29E−03	4.035E−01	1.33E−03
γ 46	1.91E−03	5.559E−01	1.06E−03
γ 48	1.77E−02	5.572E−01	9.86E−03
γ 50	1.99E−03	5.687E−01	1.13E−03
γ 54	1.65E−03	6.124E−01	1.01E−03
γ 57	6.42E−03	6.317E−01	4.05E−03
γ 58	2.69E−02	6.359E−01	1.71E−02
γ 59	2.08E−03	6.438E−01	1.34E−03
γ 65	1.82E−03	6.835E−01	1.24E−03
γ 68	9.80E−03	7.067E−01	6.92E−03
γ 69	2.17E−03	7.077E−01	1.53E−03
γ 80	1.56E−03	7.465E−01	1.17E−03
γ 81	1.30E−03	7.531E−01	9.79E−04
γ 87	3.47E−03	8.133E−01	2.82E−03
γ 97	1.65E−03	8.772E−01	1.45E−03
γ 105	1.40E−03	9.396E−01	1.31E−03
γ 109	1.04E−03	9.642E−01	1.00E−03
γ 111	4.68E−03	9.734E−01	4.56E−03
ce-K, γ 112	4.47E−03	9.722E−01	4.34E−03
γ 134	1.73E−03	1.210E+00	2.10E−03
γ 139	1.40E−03	1.273E+00	1.78E−03
γ 144	1.99E−03	1.354E+00	2.70E−03
γ 149	1.22E−03	1.419E+00	1.73E−03
γ 156	8.06E−04	1.504E+00	1.21E−03
γ 157	1.39E−03	1.514E+00	2.10E−03
γ 159	8.76E−04	1.549E+00	1.36E−03
γ 179	7.46E−04	1.785E+00	1.33E−03
K_{α_1} X-ray	2.15E−01	2.747E−02	5.91E−03
K_{α_2} X-ray	1.15E−01	2.720E−02	3.14E−03
K_{β_1} X-ray	4.06E−02	3.100E−02	1.26E−03
Auger-KLL	3.82E−02	2.254E−02*	8.61E−04
Auger-LMM	2.83E−01	3.079E−03*	8.72E−04
Auger-MXY	8.40E−01	6.992E−04*	5.87E−04

Listed X, γ and $\gamma^\pm$ radiations	8.93E−01
Omitted X, γ and $\gamma^\pm$ radiations**	4.79E−02
Listed β, ce and Auger radiations	5.68E−01
Omitted β, ce and Auger radiations**	6.48E−03
Listed radiations	1.46E+00
Omitted radiations**	5.44E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Te-119m daughter, yield 9.5E−03, is radioactive.
Te-119 daughter, yield 9.905E−01, is radioactive.


119 53 I(19.1m)
5/2+ 0.0
3/2,5/2,7/2+
(5/2-,7/2+)
1/2+,3/2,5/2+
(3/2,5/2)+
3/2+,5/2+
3/2-,5/2,7/2
1/2+,3/2+,5/2+
5/2+
1/2+
3/2+,5/2+
3/2+,5/2+
3/2+,5/2+
3/2+,5/2+
1/2+
7/2+
3/2+,5/2+
3/2+,5/2+
7/2-
7/2+
5/2+
11/2-
3/2+
1/2+
2.1060
1.8349
1.7391
1.6742
1.5306
1.1977
1.1971
1.1136
1.0040
0.9642
0.8891
0.8133
0.7240
0.7077
0.6693
0.6359
0.5572
0.5011
0.3604
0.3205
0.2610
0.2575
0.0
EC2, β+2
EC5, β+5
EC6, β+6
EC8, β+8
EC11, β+11
EC18, β+18
EC19, β+19
EC22, β+22
EC24, β+24
EC25, β+25
EC27, β+27
EC30, β+30
EC31, β+31
EC33, β+33
EC34, β+34
EC35, β+35
EC37, β+37
EC38, β+38
EC39, β+39
γ179 γ157 γ149 γ144 γ139 γ134 γ111
γ159
γ97
γ81 γ54
γ80 γ65
γ59
γ50
γ46
γ28
γ23
γ8
γ1
γ105 γ68 γ57 γ25 γ2
γ112
γ109 γ87 γ69 γ58 γ48 γ20 γ10
119 52 Te(16.03h)

55-Cs-124

08-MAY-97

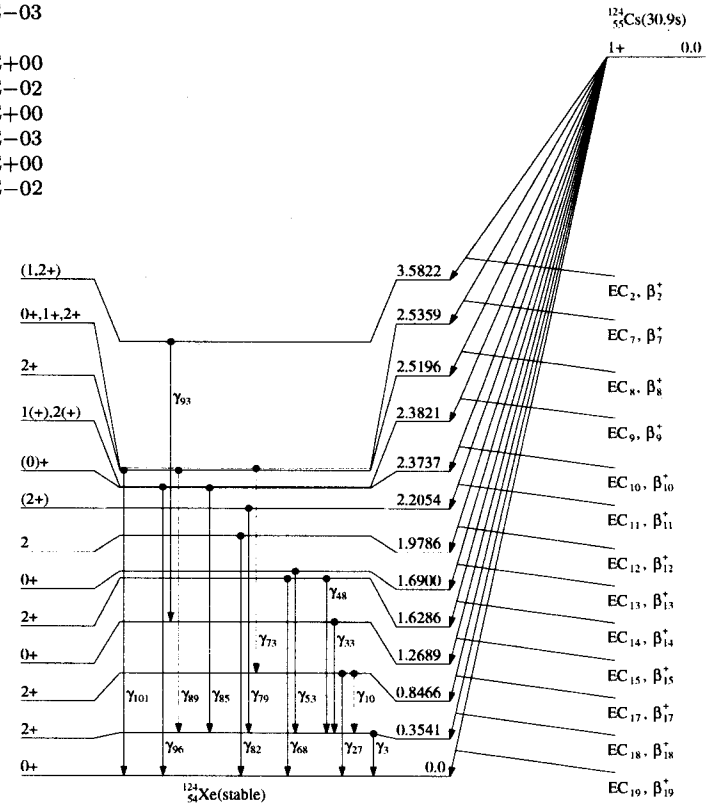
Half-life = 30.9 s
Decay mode(s): EC, β^+

Radiation	y(i) $(\mathrm{Bq\ s})^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 7	2.19E−03	1.062E+00*	2.33E−03
β^+ 8	4.28E−03	1.069E+00*	4.58E−03
β^+ 10	2.69E−03	1.136E+00*	3.06E−03
β^+ 11	1.89E−03	1.214E+00*	2.30E−03
β^+ 12	1.99E−03	1.319E+00*	2.63E−03
β^+ 13	2.59E−03	1.454E+00*	3.77E−03
β^+ 14	8.57E−03	1.482E+00*	1.27E−02
β^+ 15	2.09E−02	1.651E+00*	3.46E−02
β^+ 17	1.59E−02	1.850E+00*	2.95E−02
β^+ 18	1.63E−01	2.084E+00*	3.41E−01
β^+ 19	6.88E−01	2.253E+00*	1.55E+00
$\gamma^\pm$	1.83E+00	5.110E−01	9.35E−01
γ 3	2.40E−01	3.540E−01	8.50E−02
γ 10	2.16E−02	4.925E−01	1.06E−02
γ 27	7.18E−03	8.466E−01	6.08E−03
γ 33	2.40E−02	9.148E−01	2.20E−02
γ 48	2.71E−03	1.274E+00	3.46E−03
γ 53	3.05E−03	1.336E+00	4.07E−03
γ 68	5.33E−03	1.628E+00	8.68E−03
γ 71	9.60E−04	1.666E+00	1.60E−03
γ 73	3.36E−03	1.689E+00	5.68E−03
γ 79	1.68E−03	1.852E+00	3.11E−03
γ 82	6.72E−04	1.979E+00	1.33E−03
γ 85	3.74E−03	2.020E+00	7.56E−03
γ 88	4.80E−03	2.126E+00	1.02E−02
γ 89	5.18E−03	2.165E+00	1.12E−02
γ 93	6.96E−04	2.313E+00	1.61E−03
γ 96	8.16E−04	2.382E+00	1.94E−03
γ 101	6.96E−04	2.519E+00	1.75E−03

Listed X, γ and $\gamma^\pm$ radiations	1.12E+00
Omitted X, γ and $\gamma^\pm$ radiations**	4.02E−02
Listed β, ce and Auger radiations	1.99E+00
Omitted β, ce and Auger radiations**	5.80E−03
Listed radiations	3.11E+00
Omitted radiations**	4.60E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Xe-124 daughter is stable.



56-Ba-124

08-MAY-97

Half-life = 11.0 m
Decay mode(s): EC, β^+

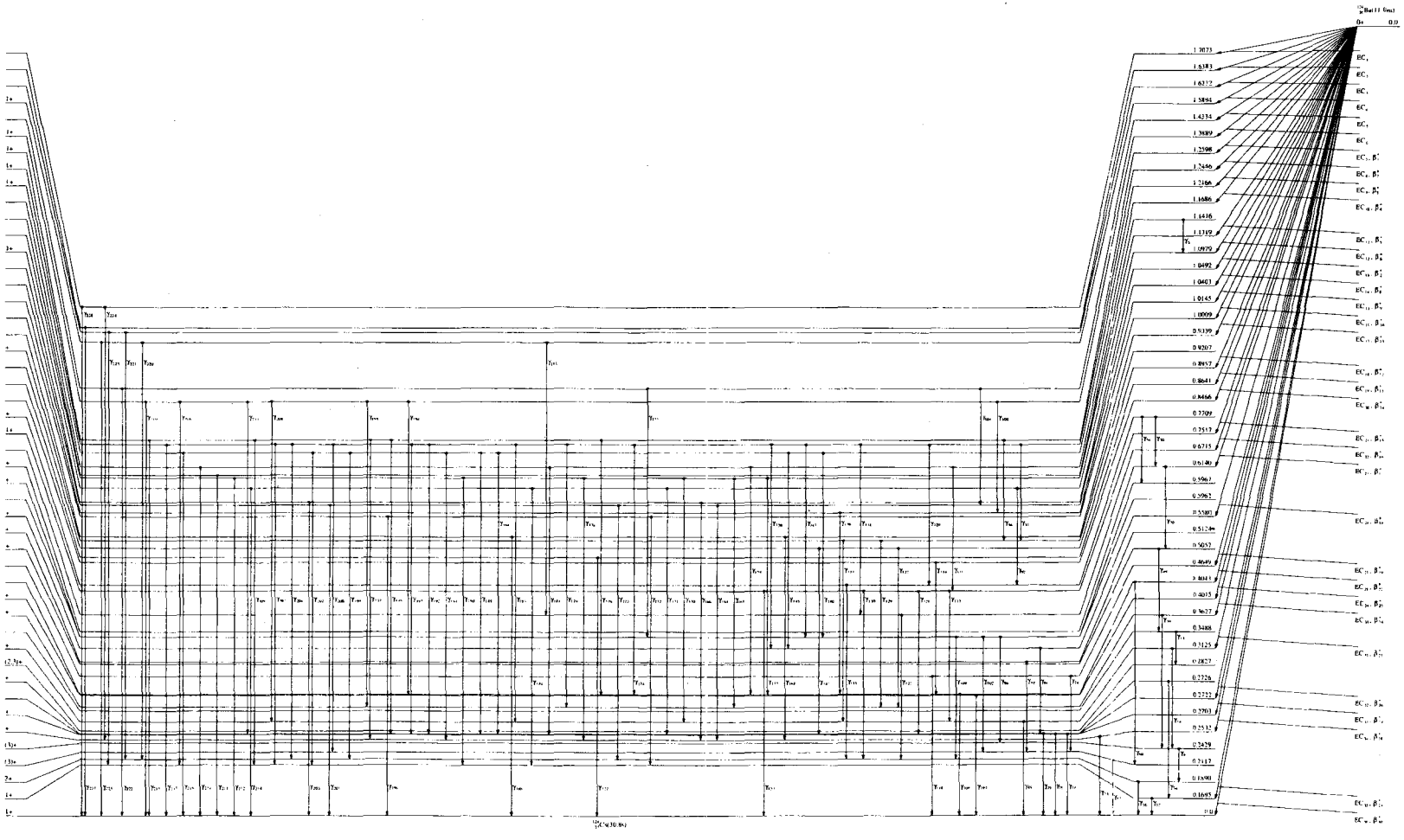
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 15	1.20E−03	3.963E−01*	4.76E−04
β^+ 17	4.71E−04	4.568E−01*	2.15E−04
β^+ 19	6.21E−04	5.226E−01*	3.25E−04
β^+ 22	5.91E−04	5.494E−01*	3.25E−04
β^+ 23	1.00E−03	5.507E−01*	5.52E−04
β^+ 24	8.01E−04	5.678E−01*	4.55E−04
β^+ 25	2.90E−03	5.902E−01*	1.71E−03
β^+ 26	1.90E−03	6.081E−01*	1.16E−03
β^+ 27	1.10E−03	6.089E−01*	6.71E−04
β^+ 28	3.91E−03	6.166E−01*	2.41E−03
β^+ 29	2.20E−02	6.539E−01*	1.44E−02
β^+ 30	1.70E−01	7.299E−01*	1.24E−01
$\gamma^{\pm}$	4.17E−01	5.110E−01	2.13E−01
ce-K, γ 5	2.71E−02	7.715E−03	2.09E−04
ce-L_2, γ 5	3.08E−02	3.834E−02	1.18E−03
ce-L_3, γ 5	4.13E−02	3.869E−02	1.60E−03
ce-M, γ 5	1.62E−02	4.270E−02*	6.92E−04
ce-L_2, γ 6	6.44E−03	3.954E−02	2.55E−04
ce-L_3, γ 6	8.59E−03	3.989E−02	3.43E−04
ce-K, γ 8	4.37E−02	1.787E−02	7.80E−04
ce-L_1, γ 8	5.32E−03	4.814E−02	2.56E−04
ce-K, γ 14	1.63E−02	3.352E−02	5.47E−04
γ 34	7.10E−03	1.032E−01	7.33E−04
ce-K, γ 34	7.89E−03	6.718E−02	5.30E−04
ce-K, γ 36	3.02E−03	7.231E−02	2.18E−04
γ 39	8.28E−03	1.199E−01	9.93E−04
ce-K, γ 39	3.87E−03	8.391E−02	3.24E−04
γ 49	6.48E−03	1.569E−01	1.02E−03
ce-K, γ 49	1.88E−03	1.209E−01	2.27E−04
γ 50	6.48E−03	1.569E−01	1.02E−03
ce-K, γ 50	1.88E−03	1.209E−01	2.27E−04
γ 52	1.11E−01	1.695E−01	1.88E−02
ce-K, γ 52	2.11E−02	1.335E−01	2.82E−03
ce-L_1, γ 52	2.42E−03	1.638E−01	3.96E−04
γ 54	6.12E−03	1.742E−01	1.07E−03
γ 56	6.58E−02	1.890E−01	1.24E−02
ce-K, γ 56	9.02E−03	1.530E−01	1.38E−03
ce-L_1, γ 56	1.06E−03	1.833E−01	1.94E−04
γ 60	4.56E−03	1.927E−01	8.79E−04
γ 61	2.21E−02	2.116E−01	4.67E−03
ce-K, γ 61	2.41E−03	1.756E−01	4.23E−04
γ 73	2.90E−02	2.533E−01	7.35E−03
ce-K, γ 73	1.75E−03	2.173E−01	3.81E−04
γ 74	2.88E−03	2.533E−01	7.29E−04
γ 77	1.74E−02	2.703E−01	4.71E−03
ce-K, γ 77	8.64E−04	2.343E−01	2.02E−04
γ 78	1.85E−02	2.722E−01	5.03E−03
ce-K, γ 78	8.96E−04	2.362E−01	2.12E−04
γ 79	9.12E−03	2.728E−01	2.49E−03
γ 84	2.16E−03	2.876E−01	6.21E−04
γ 88	2.21E−03	3.007E−01	6.64E−04
γ 89	2.26E−03	3.127E−01	7.05E−04
γ 91	2.16E−03	3.239E−01	7.00E−04
γ 92	2.40E−03	3.269E−01	7.85E−04
γ 94	2.40E−03	3.388E−01	8.13E−04
γ 96	1.92E−03	3.539E−01	6.79E−04
γ 97	5.76E−03	3.552E−01	2.05E−03
γ 100	2.64E−03	3.742E−01	9.88E−04
γ 102	1.68E−03	3.850E−01	6.47E−04
γ 104	1.68E−03	3.925E−01	6.59E−04
γ 107	1.06E−02	4.016E−01	4.24E−03
γ 108	1.92E−03	4.042E−01	7.76E−04
γ 109	5.28E−03	4.072E−01	2.15E−03
γ 111	2.40E−03	4.169E−01	1.00E−03
γ 113	1.68E−03	4.391E−01	7.38E−04
γ 114	1.68E−03	4.450E−01	7.48E−04
γ 118	2.88E−03	4.644E−01	1.34E−03
γ 120	1.08E−02	4.737E−01	5.12E−03
γ 121	5.76E−03	4.794E−01	2.76E−03
γ 122	3.84E−03	4.823E−01	1.85E−03
γ 127	1.44E−03	5.325E−01	7.67E−04
γ 129	2.40E−03	5.580E−01	1.34E−03
γ 130	1.44E−03	5.627E−01	8.10E−04
γ 131	2.16E−03	5.731E−01	1.24E−03
γ 132	1.20E−03	5.786E−01	6.94E−04
γ 133	1.44E−03	5.826E−01	8.39E−04
γ 137	1.68E−03	6.086E−01	1.02E−03
γ 138	9.60E−04	6.104E−01	5.86E−04
γ 140	4.80E−03	6.206E−01	2.98E−03
γ 141	2.16E−03	6.234E−01	1.35E−03
γ 143	2.88E−03	6.483E−01	1.87E−03
γ 145	9.60E−04	6.591E−01	6.33E−04
γ 148	1.44E−03	6.807E−01	9.80E−04
γ 149	9.60E−04	6.828E−01	6.55E−04
γ 150	9.60E−04	6.865E−01	6.59E−04
γ 155	1.32E−03	7.276E−01	9.60E−04
γ 157	1.58E−02	7.517E−01	1.19E−02
γ 158	2.40E−03	7.538E−01	1.81E−03
γ 159	1.44E−03	7.643E−01	1.10E−03
γ 161	1.68E−03	7.689E−01	1.29E−03
γ 164	1.20E−03	7.868E−01	9.44E−04
γ 166	1.20E−03	7.958E−01	9.55E−04
γ 170	7.20E−04	8.190E−01	5.90E−04
γ 171	2.64E−03	8.256E−01	2.18E−03
γ 172	1.68E−03	8.314E−01	1.40E−03
γ 173	9.60E−04	8.371E−01	8.04E−04
γ 174	9.60E−04	8.403E−01	8.07E−04
γ 175	9.60E−04	8.515E−01	8.17E−04
γ 176	1.68E−03	8.592E−01	1.44E−03
γ 177	1.92E−03	8.640E−01	1.66E−03
γ 178	7.20E−04	8.783E−01	6.32E−04
γ 179	7.20E−03	8.817E−01	6.35E−03
γ 181	1.68E−03	8.964E−01	1.51E−03
γ 183	7.20E−04	9.185E−01	6.61E−04
γ 184	1.08E−03	9.284E−01	1.00E−03
γ 185	8.64E−03	9.321E−01	8.05E−03
γ 186	5.04E−03	9.336E−01	4.71E−03
γ 188	1.44E−03	9.435E−01	1.36E−03
γ 189	6.00E−03	9.465E−01	5.68E−03
γ 190	7.44E−03	9.630E−01	7.16E−03
γ 191	7.44E−03	9.630E−01	7.16E−03
γ 192	4.80E−03	9.721E−01	4.67E−03
γ 193	1.58E−03	9.742E−01	1.54E−03
γ 194	3.29E−03	9.874E−01	3.25E−03
γ 195	2.16E−03	9.900E−01	2.14E−03
γ 196	1.20E−03	1.001E+00	1.20E−03
γ 197	9.60E−04	1.006E+00	9.66E−04
γ 198	1.44E−03	1.027E+00	1.48E−03
γ 199	1.44E−03	1.027E+00	1.48E−03
γ 200	7.20E−04	1.034E+00	7.44E−04
γ 201	3.12E−03	1.040E+00	3.24E−03
γ 202	7.20E−03	1.047E+00	7.54E−03
γ 203	3.55E−03	1.049E+00	3.73E−03
γ 204	2.64E−03	1.056E+00	2.79E−03
γ 207	1.32E−03	1.076E+00	1.42E−03
γ 208	1.32E−03	1.076E+00	1.42E−03
γ 209	6.96E−03	1.090E+00	7.59E−03
γ 210	4.32E−03	1.098E+00	4.74E−03
γ 211	2.40E−03	1.116E+00	2.68E−03
γ 212	7.20E−04	1.132E+00	8.15E−04
γ 213	6.00E−04	1.142E+00	6.85E−04
γ 214	1.20E−03	1.169E+00	1.40E−03
γ 215	4.08E−02	1.217E+00	4.96E−02

γ 216	2.64E−03	1.219E+00	3.22E−03
γ 217	4.80E−04	1.244E+00	5.97E−04
γ 218	3.36E−03	1.260E+00	4.23E−03
γ 219	2.64E−03	1.389E+00	3.67E−03
γ 220	9.60E−04	1.401E+00	1.34E−03
γ 221	1.20E−03	1.434E+00	1.72E−03
γ 222	1.20E−03	1.434E+00	1.72E−03
γ 223	7.20E−04	1.453E+00	1.05E−03
γ 224	7.20E−04	1.453E+00	1.05E−03
γ 225	3.60E−03	1.589E+00	5.72E−03
γ 227	7.20E−04	1.638E+00	1.18E−03
γ 228	1.20E−03	1.708E+00	2.05E−03
K_{α_1} X-ray	4.04E−01	3.097E−02	1.25E−02
K_{α_2} X-ray	2.19E−01	3.063E−02	6.69E−03
K_{β_1} X-ray	7.80E−02	3.499E−02	2.73E−03
K_{β_2} X-ray	2.71E−02	3.584E−02	9.70E−04
K_{β_3} X-ray	4.02E−02	3.492E−02	1.40E−03
Auger-KLL	5.88E−02	2.524E−02*	1.48E−03
Auger-KLX	2.76E−02	2.961E−02*	8.17E−04
Auger-LMM	5.40E−01	3.439E−03*	1.86E−03
Auger-LMX	3.05E−01	4.342E−03*	1.33E−03
Auger-LXY	4.78E−02	4.992E−03*	2.39E−04
Auger-MXY	1.67E+00	8.674E−04*	1.44E−03

Listed X, γ and $\gamma^{\pm}$ radiations	5.51E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.14E−02
Listed β, ce and Auger radiations	1.68E−01
Omitted β, ce and Auger radiations**	8.11E−03
Listed radiations	7.19E−01
Omitted radiations**	2.95E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Cs-124 daughter is radioactive.



56-Ba-127

29-JAN-96

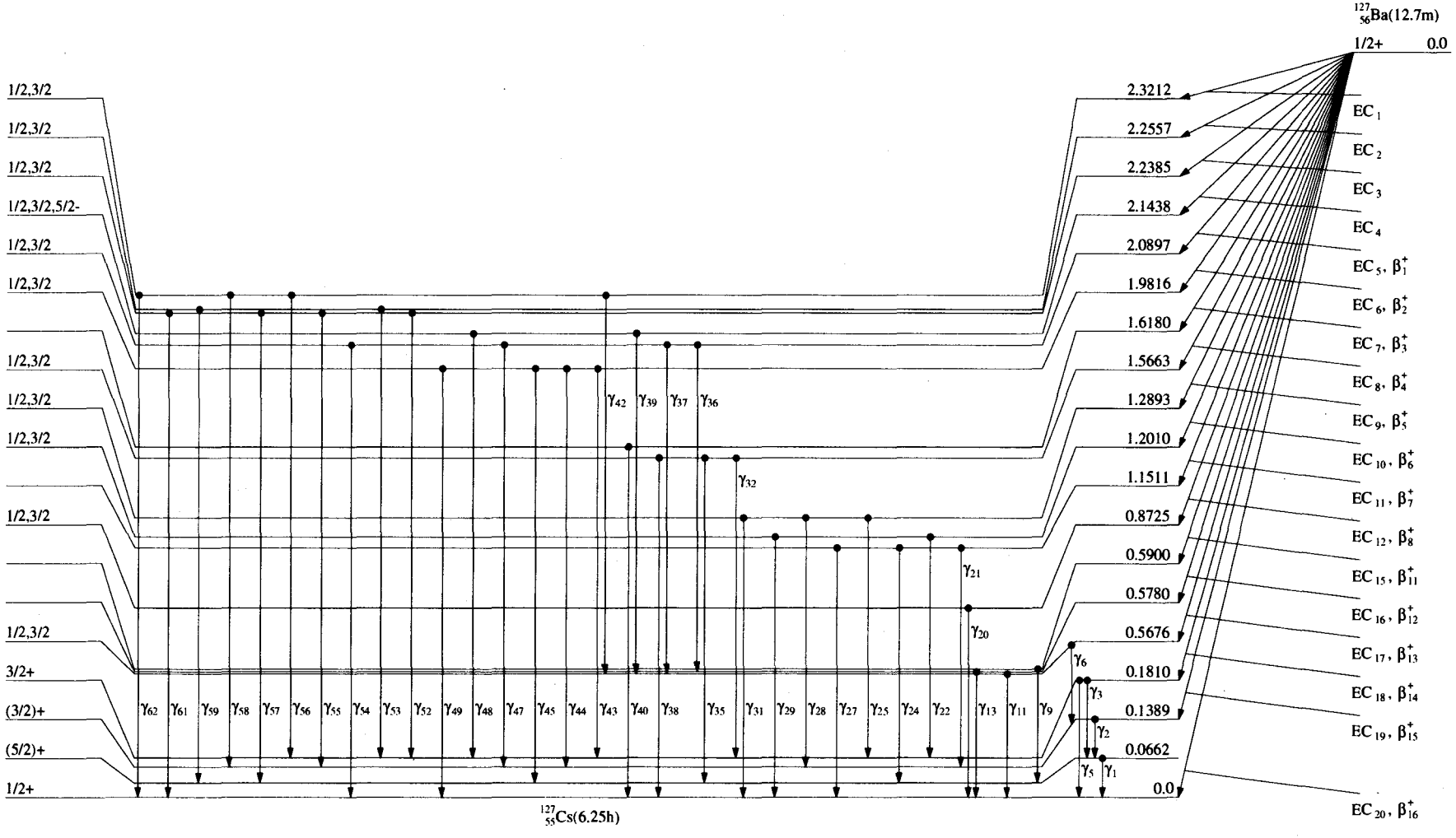
Half-life = 12.7 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 6	2.72E−03	5.518E−01*	1.50E−03
β^+ 7	1.21E−03	5.739E−01*	6.93E−04
β^+ 11	2.01E−03	8.255E−01*	1.66E−03
β^+ 12	2.01E−03	8.309E−01*	1.67E−03
β^+ 13	9.05E−04	8.356E−01*	7.56E−04
β^+ 14	1.56E−01	1.012E+00*	1.58E−01
β^+ 15	6.64E−03	1.031E+00*	6.84E−03
β^+ 16	3.68E−01	1.095E+00*	4.03E−01
$\gamma^\pm$	1.08E+00	5.110E−01	5.54E−01
γ 1	2.12E−02	6.630E−02	1.41E−03
ce-K, γ 1	8.44E−02	3.032E−02	2.56E−03
ce-L_2, γ 1	2.90E−02	6.094E−02	1.77E−03
ce-L_3, γ 1	3.60E−02	6.129E−02	2.21E−03
ce-M, γ 1	1.56E−02	6.530E−02*	1.02E−03
γ 3	9.30E−02	1.148E−01	1.07E−02
ce-K, γ 3	4.91E−02	7.882E−02	3.87E−03
ce-L_1, γ 3	5.99E−03	1.091E−01	6.54E−04
γ 5	1.24E−01	1.808E−01	2.24E−02
ce-K, γ 5	1.92E−02	1.448E−01	2.79E−03
γ 6	2.73E−03	4.293E−01	1.17E−03
γ 9	4.34E−03	5.235E−01	2.27E−03
γ 11	3.47E−03	5.675E−01	1.97E−03
γ 13	6.45E−03	5.780E−01	3.73E−03
γ 20	9.92E−04	8.725E−01	8.66E−04
γ 21	1.12E−03	1.012E+00	1.13E−03
γ 22	1.61E−03	1.020E+00	1.64E−03
γ 24	4.34E−03	1.085E+00	4.71E−03
γ 25	1.12E−03	1.108E+00	1.24E−03
γ 27	1.86E−03	1.151E+00	2.14E−03
γ 28	1.86E−03	1.151E+00	2.14E−03
γ 29	1.61E−02	1.201E+00	1.94E−02
γ 31	1.24E−03	1.289E+00	1.60E−03
γ 32	9.92E−04	1.385E+00	1.37E−03
γ 35	3.72E−03	1.500E+00	5.58E−03
γ 36	1.24E−03	1.511E+00	1.87E−03
γ 37	7.44E−04	1.522E+00	1.13E−03
γ 38	3.84E−03	1.566E+00	6.02E−03
γ 39	6.20E−04	1.576E+00	9.77E−04
γ 40	2.48E−03	1.618E+00	4.01E−03
γ 41	4.96E−04	1.697E+00	8.42E−04
γ 42	2.48E−03	1.754E+00	4.35E−03
γ 43	7.44E−04	1.800E+00	1.34E−03
γ 44	1.12E−03	1.842E+00	2.06E−03
γ 45	1.12E−03	1.915E+00	2.14E−03
γ 47	1.36E−03	1.951E+00	2.66E−03
γ 48	6.20E−04	1.963E+00	1.22E−03
γ 49	2.23E−03	1.982E+00	4.42E−03
γ 50	1.24E−03	1.992E+00	2.47E−03
γ 51	6.20E−04	2.028E+00	1.26E−03
γ 52	1.24E−03	2.057E+00	2.55E−03
γ 53	1.12E−03	2.075E+00	2.32E−03
γ 54	1.61E−03	2.090E+00	3.37E−03
γ 55	1.36E−03	2.100E+00	2.86E−03
γ 56	3.72E−04	2.141E+00	7.96E−04
γ 57	1.36E−03	2.172E+00	2.96E−03
γ 58	2.23E−03	2.182E+00	4.87E−03
γ 59	3.72E−04	2.189E+00	8.14E−04
γ 60	6.20E−04	2.222E+00	1.38E−03
γ 61	4.96E−04	2.238E+00	1.11E−03
γ 62	1.49E−03	2.321E+00	3.45E−03
γ 63	1.49E−03	2.468E+00	3.67E−03
K_{α_1} X-ray	2.63E−01	3.097E−02	8.14E−03
K_{α_2} X-ray	1.42E−01	3.063E−02	4.35E−03
K_{β_1} X-ray	5.07E−02	3.499E−02	1.77E−03
K_{β_3} X-ray	2.61E−02	3.492E−02	9.13E−04
Auger-KLL	3.82E−02	2.524E−02*	9.65E−04
Auger-LMM	3.49E−01	3.439E−03*	1.20E−03
Auger-LMX	1.97E−01	4.341E−03*	8.55E−04
Auger-MXY	1.08E+00	8.675E−04*	9.33E−04

Listed X, γ and $\gamma^\pm$ radiations	7.21E−01
Omitted X, γ and $\gamma^\pm$ radiations**	6.86E−03
Listed β, ce and Auger radiations	5.92E−01
Omitted β, ce and Auger radiations**	4.75E−03
Listed radiations	1.31E+00
Omitted radiations**	1.16E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cs-127 daughter is radioactive.


$^{127}_{56}$Ba(12.7m)
1/2+ 0.0
2.3212
2.2557
2.2385
2.1438
2.0897
1.9816
1.6180
1.5663
1.2893
1.2010
1.1511
0.8725
0.5900
0.5780
0.5676
0.1810
0.1389
0.0662
0.0
EC 1
EC 2
EC 3
EC 4
EC 5, β+ 1
EC 6, β+ 2
EC 7, β+ 3
EC 8, β+ 4
EC 9, β+ 5
EC 10, β+ 6
EC 11, β+ 7
EC 12, β+ 8
EC 15, β+ 11
EC 16, β+ 12
EC 17, β+ 13
EC 18, β+ 14
EC 19, β+ 15
EC 20, β+ 16
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2,5/2-
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
3/2+
(3/2)+
(5/2)+
1/2+
γ42 γ39 γ37 γ36
γ32
γ21
γ20
γ6
γ3
γ2
γ5 γ1
γ62 γ61 γ59 γ58 γ57 γ56 γ55 γ54 γ53 γ52 γ49 γ48 γ47 γ45 γ44 γ43 γ40 γ38 γ35 γ31 γ29 γ28 γ27 γ25 γ24 γ22 γ13 γ11 γ9
$^{127}_{55}$Cs(6.25h)

56-Ba-129m

16-MAY-96

Half-life = 2.16 h
Decay mode(s): EC, β^+

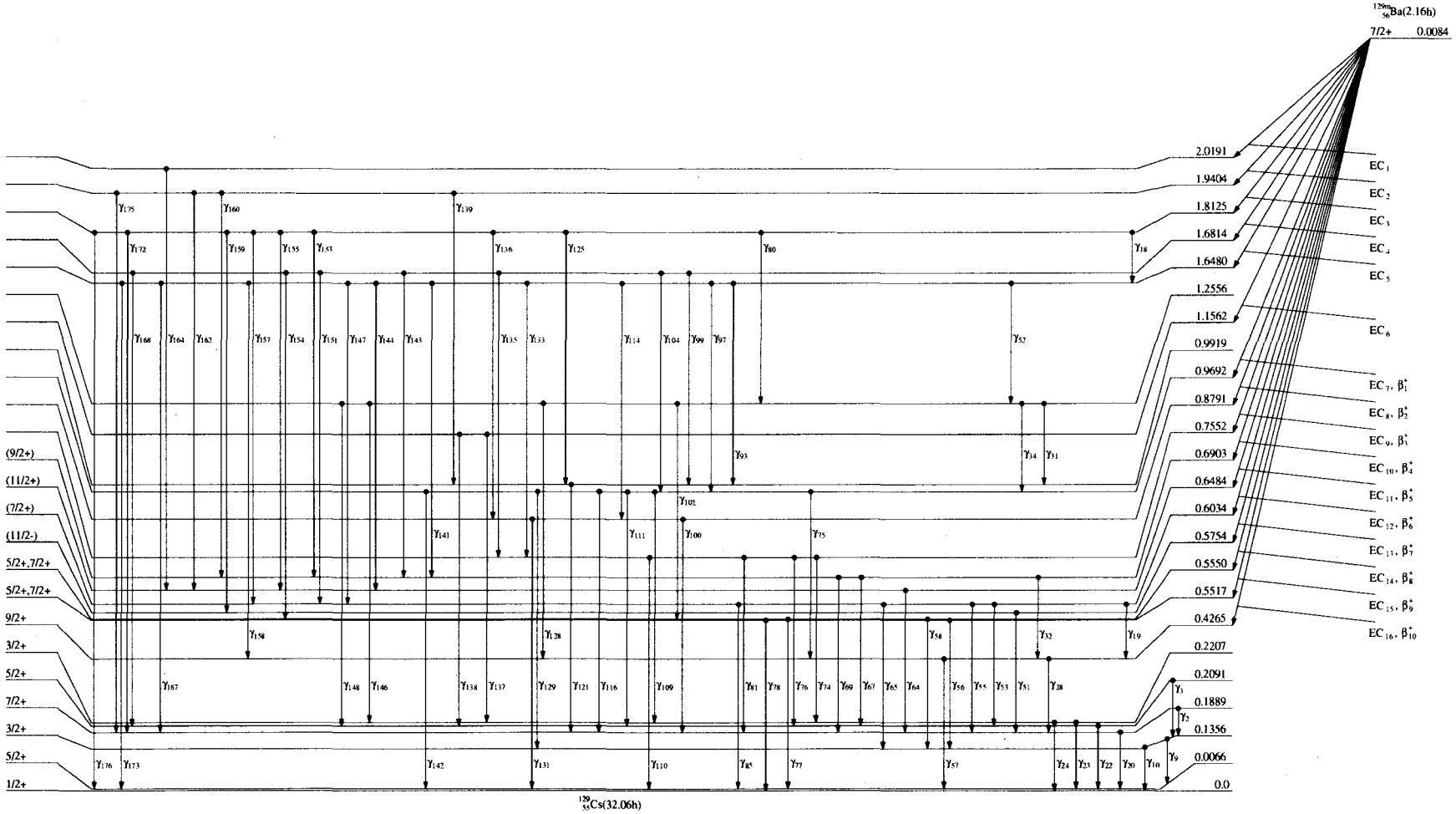
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 3	5.75E−04	3.045E−01*	1.75E−04
β^+ 4	5.50E−04	3.328E−01*	1.83E−04
β^+ 5	4.74E−04	3.714E−01*	1.76E−04
β^+ 6	9.31E−04	3.708E−01*	3.45E−04
β^+ 7	1.02E−03	4.037E−01*	4.10E−04
β^+ 8	4.57E−03	3.920E−01*	1.79E−03
β^+ 9	1.18E−03	3.934E−01*	4.66E−04
β^+ 10	1.35E−03	4.484E−01*	6.07E−04
$\gamma^{\pm}$	2.17E−02	5.110E−01	1.11E−02
ce-K, γ 2	6.28E−03	1.722E−02	1.08E−04
ce-L_2, γ 2	3.72E−03	4.784E−02	1.78E−04
ce-L_3, γ 2	4.81E−03	4.819E−02	2.32E−04
ce-M, γ 2	1.96E−03	5.220E−02*	1.03E−04
ce-K, γ 3	8.29E−03	3.722E−02	3.08E−04
ce-K, γ 4	2.32E−03	3.922E−02	9.11E−05
γ 9	4.84E−02	1.291E−01	6.25E−03
ce-K, γ 9	1.86E−02	9.316E−02	1.74E−03
ce-L_1, γ 9	2.25E−03	1.234E−01	2.77E−04
ce-K, γ 10	2.94E−03	9.963E−02	2.93E−04
ce-K, γ 18	7.41E−04	1.286E−01	9.53E−05
γ 19	3.08E−02	1.770E−01	5.46E−03
ce-K, γ 19	5.82E−03	1.410E−01	8.21E−04
ce-L_1, γ 19	7.10E−04	1.713E−01	1.22E−04
γ 20	4.10E−01	1.823E−01	7.48E−02
ce-K, γ 20	6.05E−02	1.463E−01	8.86E−03
ce-L_1, γ 20	7.30E−03	1.766E−01	1.29E−03
ce-L_2, γ 20	7.38E−04	1.770E−01	1.31E−04
ce-M, γ 20	1.72E−03	1.813E−01*	3.12E−04
ce-N^+, γ 20	4.48E−04	1.823E−01*	8.16E−05
γ 22	1.38E−01	2.024E−01	2.80E−02
ce-K, γ 22	1.52E−02	1.664E−01	2.53E−03
ce-L_1, γ 22	1.85E−03	1.967E−01	3.64E−04
ce-M, γ 22	4.20E−04	2.014E−01*	8.46E−05
γ 23	3.57E−02	2.143E−01	7.65E−03
ce-K, γ 23	3.43E−03	1.783E−01	6.12E−04
ce-L_1, γ 23	4.05E−04	2.086E−01	8.44E−05
γ 24	2.32E−02	2.208E−01	5.13E−03
ce-K, γ 24	2.02E−03	1.848E−01	3.73E−04
ce-K, γ 28	8.45E−04	2.017E−01	1.70E−04
ce-K, γ 31	3.95E−04	2.278E−01	9.01E−05
ce-K, γ 32	3.99E−04	2.278E−01	9.10E−05
ce-K, γ 34	3.92E−04	2.506E−01	9.83E−05
ce-K, γ 51	2.56E−04	3.507E−01	8.99E−05
γ 52	9.10E−02	3.923E−01	3.57E−02
ce-K, γ 52	1.44E−03	3.563E−01	5.12E−04
γ 53	2.66E−02	3.945E−01	1.05E−02
ce-K, γ 53	5.10E−04	3.585E−01	1.83E−04
γ 55	1.13E−02	4.140E−01	4.67E−03
γ 56	1.13E−02	4.161E−01	4.69E−03
γ 57	1.09E−01	4.198E−01	4.60E−02
ce-K, γ 57	1.42E−03	3.838E−01	5.45E−04
γ 58	1.09E−01	4.198E−01	4.60E−02
ce-K, γ 58	1.79E−03	3.838E−01	6.87E−04
ce-L_1, γ 58	2.15E−04	4.141E−01	8.91E−05
γ 64	6.44E−02	4.594E−01	2.96E−02
ce-K, γ 64	6.46E−04	4.234E−01	2.74E−04
γ 65	2.02E−02	4.678E−01	9.44E−03
ce-K, γ 65	1.93E−04	4.318E−01	8.31E−05
γ 67	3.90E−02	4.813E−01	1.88E−02
ce-K, γ 67	3.44E−04	4.453E−01	1.53E−04
γ 69	2.77E−02	5.014E−01	1.39E−02
ce-K, γ 69	2.90E−04	4.654E−01	1.35E−04
γ 74	1.36E−02	5.343E−01	7.25E−03
γ 75	1.58E−02	5.426E−01	8.56E−03
γ 76	4.76E−02	5.464E−01	2.60E−02
ce-K, γ 76	2.98E−04	5.104E−01	1.52E−04
γ 77	1.89E−02	5.490E−01	1.04E−02
ce-K, γ 77	1.58E−04	5.130E−01	8.13E−05
γ 78	1.89E−02	5.515E−01	1.04E−02
γ 79	9.35E−03	5.539E−01	5.18E−03
γ 80	1.37E−02	5.569E−01	7.60E−03
γ 81	3.11E−02	5.662E−01	1.76E−02
ce-K, γ 81	1.77E−04	5.302E−01	9.41E−05
γ 85	2.17E−02	5.968E−01	1.30E−02
ce-K, γ 85	1.49E−04	5.608E−01	8.34E−05
γ 93	1.56E−02	6.561E−01	1.02E−02
γ 97	5.66E−02	6.788E−01	3.84E−02
ce-K, γ 97	2.04E−04	6.428E−01	1.31E−04
γ 99	1.71E−02	6.890E−01	1.18E−02
γ 100	1.71E−02	6.903E−01	1.18E−02
γ 102	1.11E−02	7.006E−01	7.78E−03
γ 104	1.18E−02	7.120E−01	8.41E−03
γ 109	2.84E−02	7.485E−01	2.13E−02
γ 110	2.84E−02	7.485E−01	2.13E−02
γ 111	5.45E−03	7.599E−01	4.14E−03
γ 114	1.21E−02	7.690E−01	9.30E−03
γ 116	2.63E−02	7.802E−01	2.05E−02
γ 117	5.45E−03	7.831E−01	4.27E−03
γ 121	3.49E−02	8.030E−01	2.81E−02
γ 125	1.15E−02	8.207E−01	9.46E−03
γ 128	4.39E−03	8.288E−01	3.64E−03
γ 129	1.06E−02	8.334E−01	8.85E−03
γ 131	2.18E−02	8.725E−01	1.90E−02
γ 133	8.69E−02	8.926E−01	7.76E−02
ce-K, γ 133	1.65E−04	8.566E−01	1.41E−04
γ 135	5.17E−03	9.265E−01	4.79E−03
γ 136	1.85E−02	9.331E−01	1.73E−02
γ 137	1.85E−02	9.350E−01	1.73E−02
γ 138	3.94E−03	9.476E−01	3.73E−03
γ 139	3.94E−03	9.476E−01	3.73E−03
γ 140	3.81E−03	9.554E−01	3.64E−03
γ 141	1.68E−02	9.577E−01	1.61E−02
γ 142	1.14E−02	9.626E−01	1.10E−02
γ 143	6.64E−03	9.912E−01	6.58E−03
γ 144	3.21E−02	9.994E−01	3.20E−02
γ 146	3.32E−02	1.035E+00	3.44E−02
γ 147	5.66E−02	1.045E+00	5.91E−02
γ 148	3.20E−02	1.047E+00	3.35E−02
γ 151	5.74E−03	1.078E+00	6.19E−03
γ 152	3.89E−03	1.115E+00	4.34E−03
γ 153	2.12E−02	1.122E+00	2.38E−02
γ 154	1.08E−02	1.126E+00	1.22E−02
γ 155	4.06E−03	1.164E+00	4.73E−03
γ 156	4.10E−03	1.180E+00	4.84E−03
γ 157	2.75E−02	1.209E+00	3.32E−02
γ 158	2.61E−02	1.222E+00	3.19E−02
γ 159	3.24E−03	1.237E+00	4.01E−03
γ 160	5.21E−03	1.250E+00	6.51E−03
γ 161	3.16E−03	1.286E+00	4.06E−03
γ 162	6.81E−03	1.293E+00	8.80E−03
γ 164	2.83E−03	1.370E+00	3.88E−03
γ 167	2.05E−01	1.459E+00	2.99E−01
ce-K, γ 167	6.53E−05	1.423E+00	9.29E−05
γ 168	2.99E−03	1.473E+00	4.41E−03
γ 172	4.51E−02	1.624E+00	7.32E−02
γ 173	4.26E−03	1.641E+00	7.00E−03
γ 175	3.03E−03	1.752E+00	5.32E−03
γ 176	2.46E−03	1.806E+00	4.44E−03
K_{α_1} X-ray	4.61E−01	3.097E−02	1.43E−02
K_{α_2} X-ray	2.49E−01	3.063E−02	7.64E−03
Auger-KLL	6.71E−02	2.524E−02*	1.69E−03
Auger-KLX	3.15E−02	2.961E−02*	9.32E−04
Auger-KXY	4.30E−03	3.394E−02*	1.46E−04

Auger-LMM	5.62E−01	3.443E−03*	1.93E−03
Auger-LMX	3.18E−01	4.347E−03*	1.38E−03
Auger-LXY	4.99E−02	4.997E−03*	2.49E−04
Auger-MXY	1.73E+00	8.693E−04*	1.51E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.59E+00
Omitted X, γ AND $\gamma^{\pm}$ radiations**	1.18E−01
Listed β, ce AND Auger radiations	3.51E−02
Omitted β, ce AND Auger radiations**	4.59E−03
Listed radiations	1.62E+00
Omitted radiations**	1.23E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Cs-129 daughter is radioactive.


$^{129m}_{56}$Ba(2.16h)
7/2+ 0.0084
2.0191
1.9404
1.8125
1.6814
1.6480
1.2556
1.1562
0.9919
0.9692
0.8791
0.7552
0.6903
0.6484
0.6034
0.5754
0.5550
0.5517
0.4265
0.2207
0.2091
0.1889
0.1356
0.0066
0.0
EC1
EC2
EC3
EC4
EC5
EC6
EC7, β1+
EC8, β2+
EC9, β3+
EC10, β4+
EC11, β5+
EC12, β6+
EC13, β7+
EC14, β8+
EC15, β9+
EC16, β10+
(9/2+)
(11/2+)
(7/2+)
(11/2-)
5/2+,7/2+
5/2+,7/2+
9/2+
3/2+
5/2+
7/2+
3/2+
5/2+
1/2+
$^{129}_{55}$Cs(32.06h)

56-Ba-129

16-MAY-96

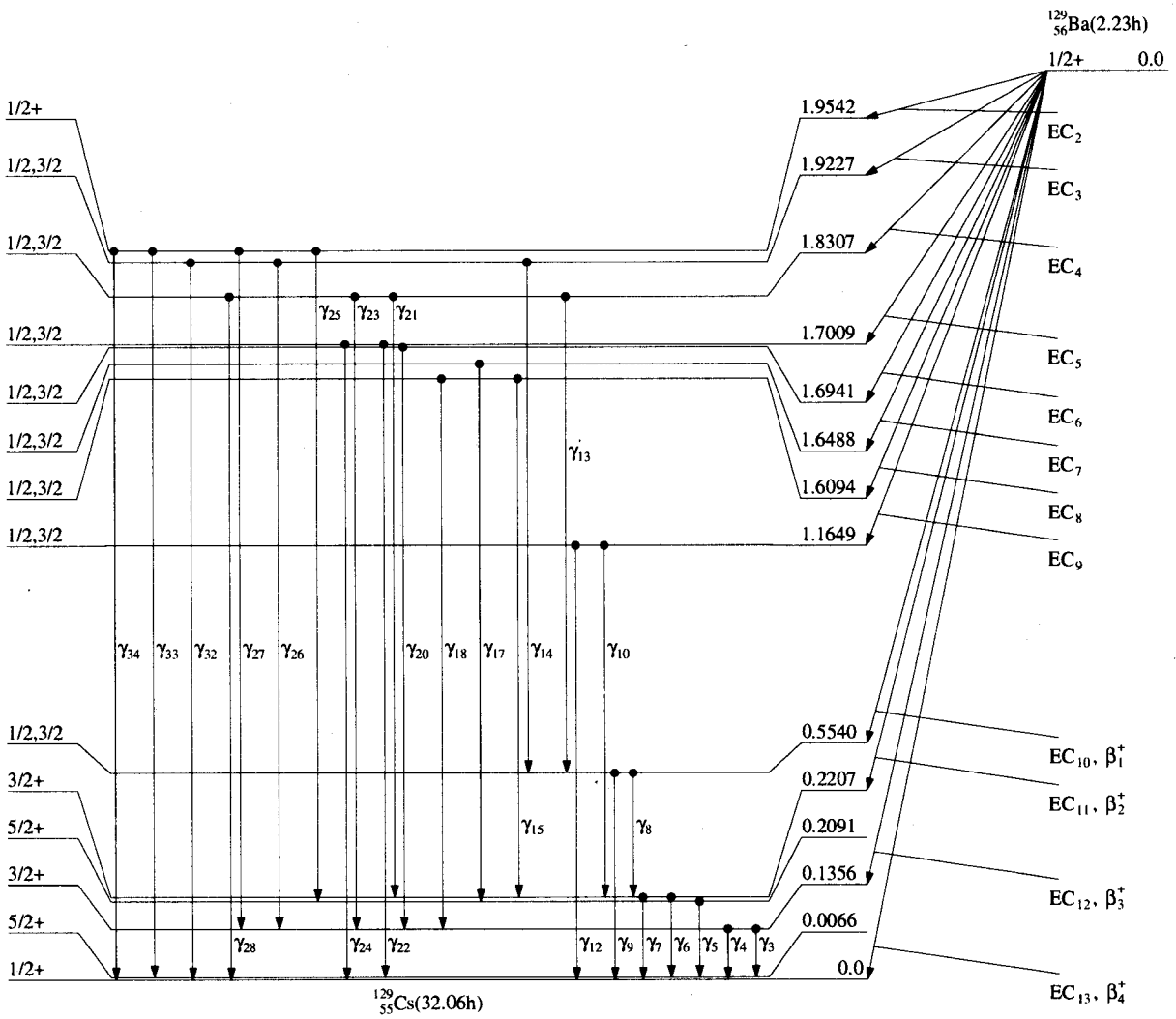
Half-life = 2.23 h
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.50E−03	3.887E−01*	5.82E−04
β^+ 2	2.00E−02	5.355E−01*	1.07E−02
β^+ 3	1.40E−02	5.733E−01*	8.01E−03
β^+ 4	1.50E−01	6.336E−01*	9.49E−02
$\gamma^{\pm}$	3.70E−01	5.110E−01	1.89E−01
γ 3	5.51E−02	1.291E−01	7.12E−03
ce-K, γ 3	2.12E−02	9.316E−02	1.98E−03
ce-L_1, γ 3	2.56E−03	1.234E−01	3.16E−04
γ 4	1.00E−02	1.356E−01	1.36E−03
ce-K, γ 4	4.37E−03	9.963E−02	4.36E−04
γ 5	3.00E−03	2.024E−01	6.07E−04
γ 6	1.34E−01	2.143E−01	2.87E−02
ce-K, γ 6	1.29E−02	1.783E−01	2.30E−03
ce-L_1, γ 6	1.52E−03	2.086E−01	3.17E−04
γ 7	8.50E−02	2.208E−01	1.88E−02
ce-K, γ 7	7.37E−03	1.848E−01	1.36E−03
ce-L_1, γ 7	9.00E−04	2.151E−01	1.94E−04
γ 8	4.40E−03	3.339E−01	1.47E−03
γ 9	2.94E−02	5.541E−01	1.63E−02
γ 10	1.10E−03	9.445E−01	1.04E−03
γ 12	1.10E−02	1.165E+00	1.28E−02
γ 13	1.20E−03	1.277E+00	1.53E−03
γ 14	5.50E−04	1.369E+00	7.53E−04
γ 15	5.10E−04	1.389E+00	7.09E−04
γ 17	4.70E−04	1.440E+00	6.77E−04
γ 18	2.00E−03	1.474E+00	2.95E−03
γ 20	2.80E−04	1.558E+00	4.36E−04
γ 21	3.30E−03	1.611E+00	5.31E−03
γ 22	8.00E−04	1.694E+00	1.36E−03
γ 23	8.00E−04	1.694E+00	1.36E−03
γ 24	8.60E−04	1.702E+00	1.46E−03
γ 25	8.60E−04	1.745E+00	1.50E−03
γ 26	2.20E−04	1.787E+00	3.93E−04
γ 27	8.00E−04	1.819E+00	1.46E−03
γ 28	6.30E−03	1.830E+00	1.15E−02
γ 32	6.60E−04	1.922E+00	1.27E−03
γ 33	2.90E−03	1.947E+00	5.65E−03
γ 34	6.40E−03	1.954E+00	1.25E−02
K_{α_1} X-ray	3.49E−01	3.097E−02	1.08E−02
K_{α_2} X-ray	1.89E−01	3.063E−02	5.77E−03
K_{β_1} X-ray	6.73E−02	3.499E−02	2.35E−03
K_{β_2} X-ray	2.33E−02	3.584E−02	8.37E−04
K_{β_3} X-ray	3.47E−02	3.492E−02	1.21E−03
Auger-KLL	5.07E−02	2.524E−02*	1.28E−03
Auger-KLX	2.38E−02	2.961E−02*	7.05E−04
Auger-LMM	4.19E−01	3.443E−03*	1.44E−03
Auger-LMX	2.37E−01	4.347E−03*	1.03E−03
Auger-LXY	3.71E−02	4.997E−03*	1.86E−04
Auger-MXY	1.29E+00	8.696E−04*	1.12E−03

Listed X, γ and $\gamma^{\pm}$ radiations	3.49E−01
Omitted X, γ AND $\gamma^{\pm}$ radiations**	1.06E−03
Listed β, ce AND Auger radiations	1.27E−01
Omitted β, ce AND Auger radiations**	1.03E−03
Listed radiations	4.76E−01
Omitted radiations**	2.10E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cs-129 daughter is radioactive.


$^{129}_{56}$Ba(2.23h)
1/2+ 0.0
1/2+
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
1/2,3/2
3/2+
5/2+
3/2+
5/2+
1/2+
1.9542
1.9227
1.8307
1.7009
1.6941
1.6488
1.6094
1.1649
0.5540
0.2207
0.2091
0.1356
0.0066
0.0
EC2
EC3
EC4
EC5
EC6
EC7
EC8
EC9
EC10, β1+
EC11, β2+
EC12, β3+
EC13, β4+
γ25 γ23 γ21
γ13
γ34 γ33 γ32 γ27 γ26 γ20 γ18 γ17 γ14 γ10
γ15 γ8
γ28 γ24 γ22 γ12 γ9 γ7 γ6 γ5 γ4 γ3
$^{129}_{55}$Cs(32.06h)

57-La-129

16-MAY-96

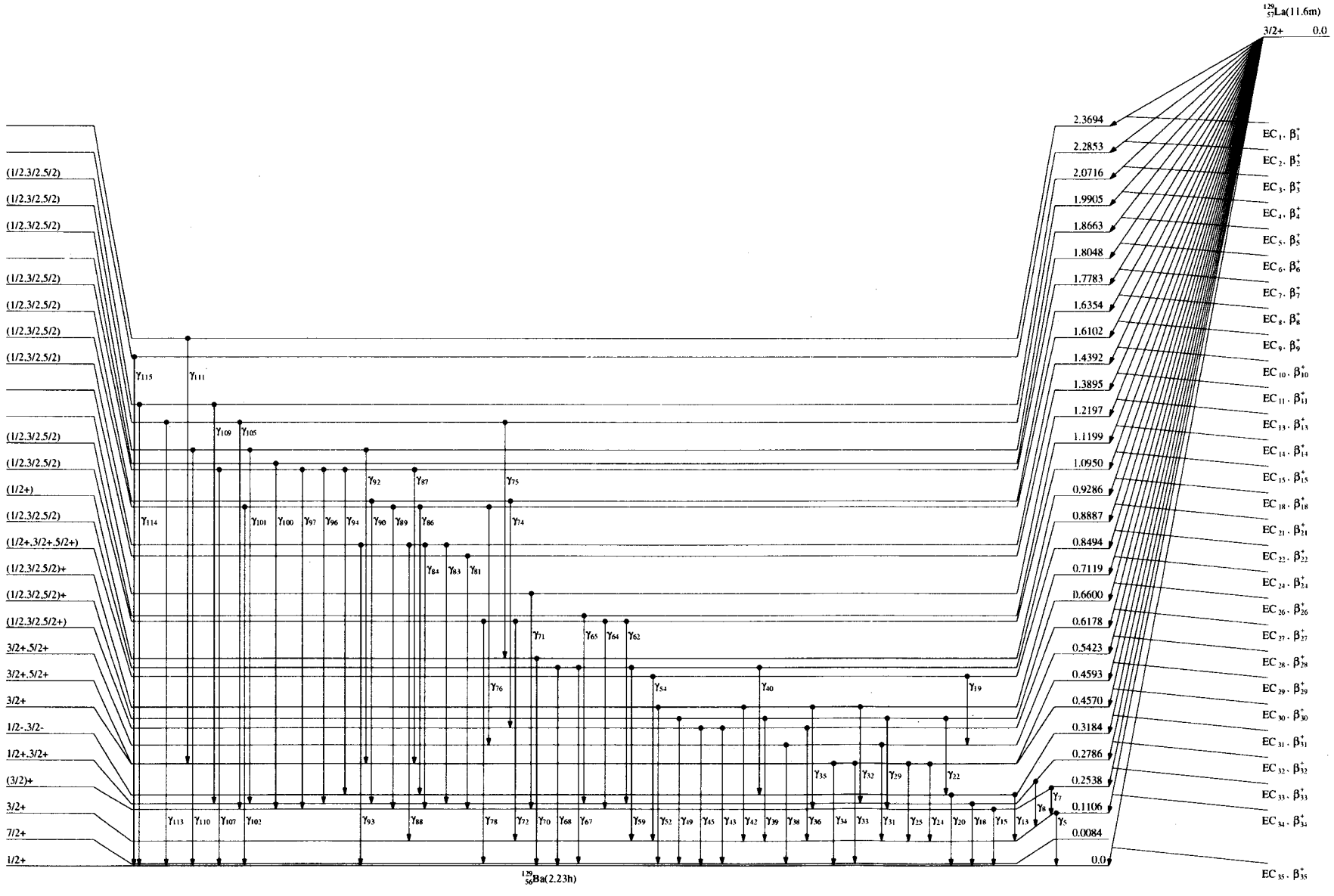
Half-life = 11.6 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 14	1.08E−03	7.090E−01*	7.68E−04
β^+ 15	2.27E−03	7.202E−01*	1.63E−03
β^+ 21	6.90E−03	8.131E−01*	5.61E−03
β^+ 22	1.18E−03	8.308E−01*	9.82E−04
β^+ 24	1.89E−02	8.931E−01*	1.69E−02
β^+ 25	9.85E−04	9.131E−01*	9.00E−04
β^+ 26	7.59E−03	9.167E−01*	6.95E−03
β^+ 27	9.36E−03	9.359E−01*	8.76E−03
β^+ 28	1.67E−03	9.703E−01*	1.63E−03
β^+ 29	9.16E−03	1.008E+00*	9.24E−03
β^+ 30	9.56E−02	1.009E+00*	9.64E−02
β^+ 31	4.14E−03	1.073E+00*	4.44E−03
β^+ 32	1.47E−01	1.091E+00*	1.60E−01
β^+ 33	3.25E−02	1.102E+00*	3.58E−02
β^+ 34	8.87E−02	1.168E+00*	1.04E−01
β^+ 35	1.08E−01	1.219E+00*	1.32E−01
$\gamma^\pm$	1.08E+00	5.110E−01	5.53E−01
γ 5	1.69E−01	1.105E−01	1.87E−02
ce-K, γ 5	1.09E−01	7.306E−02	7.96E−03
ce-L_1, γ 5	1.34E−02	1.045E−01	1.40E−03
γ 7	1.26E−02	1.433E−01	1.81E−03
γ 8	1.28E−02	1.681E−01	2.16E−03
γ 13	4.69E−03	2.079E−01	9.76E−04
γ 15	8.03E−02	2.538E−01	2.04E−02
ce-K, γ 15	5.25E−03	2.164E−01	1.14E−03
γ 18	2.47E−01	2.786E−01	6.88E−02
ce-K, γ 18	1.26E−02	2.412E−01	3.05E−03
γ 19	3.46E−03	3.072E−01	1.06E−03
γ 20	2.03E−02	3.184E−01	6.45E−03
γ 22	2.96E−03	3.415E−01	1.01E−03
γ 24	5.11E−02	3.465E−01	1.77E−02
γ 25	1.58E−02	3.487E−01	5.51E−03
γ 29	4.94E−03	4.062E−01	2.01E−03
γ 31	3.95E−03	4.318E−01	1.71E−03
γ 32	2.47E−03	4.333E−01	1.07E−03
γ 33	5.19E−02	4.486E−01	2.33E−02
γ 34	8.03E−02	4.570E−01	3.67E−02
γ 35	2.10E−02	4.582E−01	9.62E−03
γ 36	9.63E−03	5.073E−01	4.89E−03
γ 38	4.20E−03	5.339E−01	2.24E−03
γ 39	5.43E−03	5.495E−01	2.99E−03
γ 40	1.73E−03	5.702E−01	9.86E−04
γ 42	1.01E−02	6.013E−01	6.09E−03
γ 43	2.22E−03	6.093E−01	1.35E−03
γ 45	1.04E−02	6.178E−01	6.41E−03
γ 46	2.47E−03	6.220E−01	1.54E−03
γ 49	2.96E−03	6.515E−01	1.93E−03
γ 52	6.42E−03	7.035E−01	4.52E−03
γ 54	2.72E−03	7.388E−01	2.01E−03
γ 59	6.42E−03	7.781E−01	5.00E−03
γ 62	1.48E−03	8.164E−01	1.21E−03
γ 63	1.48E−03	8.318E−01	1.23E−03
γ 64	1.98E−03	8.412E−01	1.66E−03
γ 65	3.21E−03	8.413E−01	2.70E−03
γ 67	3.95E−03	8.802E−01	3.48E−03
γ 68	4.94E−03	8.887E−01	4.39E−03
γ 70	2.72E−03	9.286E−01	2.52E−03
γ 71	1.23E−03	9.660E−01	1.19E−03
γ 72	1.48E−03	9.843E−01	1.46E−03
γ 74	2.22E−03	1.018E+00	2.26E−03
γ 75	9.88E−04	1.062E+00	1.05E−03
γ 76	2.47E−03	1.068E+00	2.64E−03
γ 78	2.47E−03	1.087E+00	2.68E−03
γ 81	1.23E−03	1.136E+00	1.40E−03
γ 83	1.48E−03	1.161E+00	1.72E−03
γ 84	1.23E−03	1.186E+00	1.46E−03
γ 85	9.88E−04	1.237E+00	1.22E−03
γ 86	3.95E−03	1.292E+00	5.11E−03
γ 87	7.41E−04	1.321E+00	9.79E−04
γ 88	1.73E−03	1.328E+00	2.30E−03
γ 89	1.23E−03	1.356E+00	1.68E−03
γ 90	1.23E−03	1.357E+00	1.68E−03
γ 92	1.23E−03	1.409E+00	1.74E−03
γ 93	7.41E−04	1.439E+00	1.07E−03
γ 94	1.23E−03	1.460E+00	1.80E−03
γ 96	9.88E−04	1.500E+00	1.48E−03
γ 97	9.88E−04	1.525E+00	1.51E−03
γ 100	1.23E−03	1.551E+00	1.92E−03
γ 101	7.41E−04	1.588E+00	1.18E−03
γ 102	7.41E−04	1.610E+00	1.19E−03
γ 105	7.41E−04	1.737E+00	1.29E−03
γ 107	9.88E−04	1.778E+00	1.76E−03
γ 109	1.23E−03	1.793E+00	2.21E−03
γ 110	4.94E−04	1.866E+00	9.22E−04
γ 111	7.41E−04	1.910E+00	1.42E−03
γ 113	4.94E−04	1.990E+00	9.83E−04
γ 114	4.94E−04	2.072E+00	1.02E−03
γ 115	4.94E−04	2.285E+00	1.13E−03
K_{α_1} X-ray	2.53E−01	3.219E−02	8.13E−03
K_{α_2} X-ray	1.37E−01	3.182E−02	4.36E−03
K_{β_1} X-ray	4.90E−02	3.638E−02	1.78E−03
Auger-KLL	3.45E−02	2.618E−02*	9.02E−04
Auger-LMM	2.94E−01	3.575E−03*	1.05E−03
Auger-LMX	1.72E−01	4.529E−03*	7.78E−04
Auger-MXY	9.18E−01	9.285E−04*	8.52E−04

Listed X, γ and $\gamma^\pm$ radiations	8.95E−01
Omitted X, γ and $\gamma^\pm$ radiations**	2.58E−02
Listed β, ce and Auger radiations	6.03E−01
Omitted β, ce and Auger radiations**	1.07E−02
Listed radiations	1.50E+00
Omitted radiations**	3.64E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ba-129m daughter, yield 7.61E−02, is radioactive.
Ba-129 daughter, yield 9.239E−01, is radioactive.


$^{129}_{57}$La(11.6m)
3/2+ 0.0
2.3694
2.2853
2.0716
1.9905
1.8663
1.8048
1.7783
1.6354
1.6102
1.4392
1.3895
1.2197
1.1199
1.0950
0.9286
0.8887
0.8494
0.7119
0.6600
0.6178
0.5423
0.4593
0.4570
0.3184
0.2786
0.2538
0.1106
0.0084
0.0
(1/2.3/2.5/2)
(1/2.3/2.5/2)
(1/2.3/2.5/2)
(1/2.3/2.5/2)
(1/2.3/2.5/2)
(1/2.3/2.5/2)
(1/2.3/2.5/2)
(1/2.3/2.5/2)
(1/2.3/2.5/2)
(1/2+)
(1/2.3/2.5/2)
(1/2+.3/2+.5/2+)
(1/2.3/2.5/2)+
(1/2.3/2.5/2)+
(1/2.3/2.5/2+)
3/2+.5/2+
3/2+.5/2+
3/2+
1/2-.3/2-
1/2+.3/2+
(3/2)+
3/2+
7/2+
1/2+
$^{129}_{56}$Ba(2.23h)
EC$_1$. β^+_1
EC$_2$. β^+_2
EC$_3$. β^+_3
EC$_4$. β^+_4
EC$_5$. β^+_5
EC$_6$. β^+_6
EC$_7$. β^+_7
EC$_8$. β^+_8
EC$_9$. β^+_9
EC$_{10}$. β^+_{10}
EC$_{11}$. β^+_{11}
EC$_{13}$. β^+_{13}
EC$_{14}$. β^+_{14}
EC$_{15}$. β^+_{15}
EC$_{18}$. β^+_{18}
EC$_{21}$. β^+_{21}
EC$_{22}$. β^+_{22}
EC$_{24}$. β^+_{24}
EC$_{26}$. β^+_{26}
EC$_{27}$. β^+_{27}
EC$_{28}$. β^+_{28}
EC$_{29}$. β^+_{29}
EC$_{30}$. β^+_{30}
EC$_{31}$. β^+_{31}
EC$_{32}$. β^+_{32}
EC$_{33}$. β^+_{33}
EC$_{34}$. β^+_{34}
EC$_{35}$. β^+_{35}

57-La-130

20-FEB-90

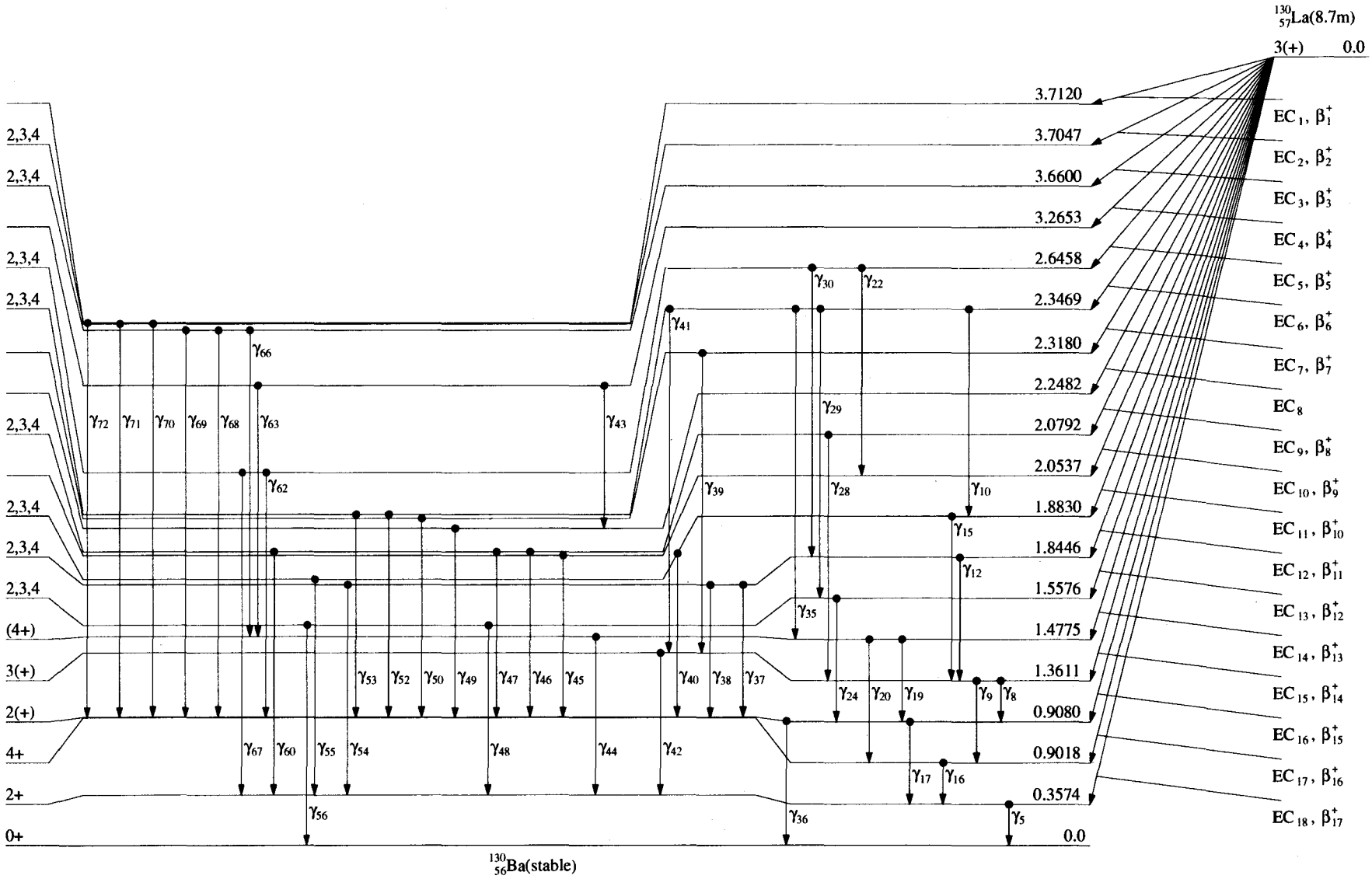
Half-life = 8.7 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 5	1.29E−02	8.687E−01*	1.12E−02
β^+ 6	3.27E−02	1.005E+00*	3.29E−02
β^+ 7	2.48E−03	1.018E+00*	2.52E−03
β^+ 8	6.45E−02	1.127E+00*	7.27E−02
β^+ 9	2.98E−03	1.139E+00*	3.39E−03
β^+ 10	6.05E−02	1.218E+00*	7.37E−02
β^+ 11	1.69E−02	1.236E+00*	2.08E−02
β^+ 12	3.27E−02	1.369E+00*	4.48E−02
β^+ 13	2.38E−02	1.406E+00*	3.35E−02
β^+ 14	5.26E−02	1.460E+00*	7.68E−02
β^+ 15	1.82E−01	1.672E+00*	3.04E−01
β^+ 16	4.46E−02	1.675E+00*	7.48E−02
β^+ 17	1.69E−01	1.932E+00*	3.26E−01
$\gamma^\pm$	1.40E+00	5.110E−01	7.16E−01
γ 5	8.10E−01	3.574E−01	2.89E−01
ce-K, γ 5	1.75E−02	3.200E−01	5.61E−03
γ 8	3.81E−02	4.532E−01	1.73E−02
γ 9	7.29E−03	4.594E−01	3.35E−03
γ 10	8.10E−03	4.642E−01	3.76E−03
γ 11	4.86E−03	4.729E−01	2.30E−03
γ 12	8.10E−03	4.837E−01	3.92E−03
γ 15	6.48E−03	5.218E−01	3.38E−03
γ 16	1.62E−01	5.445E−01	8.82E−02
γ 17	2.59E−01	5.507E−01	1.43E−01
ce-K, γ 17	2.34E−03	5.133E−01	1.20E−03
γ 19	2.83E−02	5.694E−01	1.61E−02
γ 20	2.03E−02	5.757E−01	1.17E−02
γ 22	4.05E−03	5.921E−01	2.40E−03
γ 24	1.54E−02	6.496E−01	1.00E−02
γ 27	3.40E−03	7.030E−01	2.39E−03
γ 28	2.75E−02	7.182E−01	1.98E−02
γ 29	3.48E−03	7.893E−01	2.75E−03
γ 30	8.10E−03	8.012E−01	6.49E−03
γ 32	7.78E−03	8.210E−01	6.38E−03
γ 34	4.05E−03	8.665E−01	3.51E−03
γ 35	1.62E−02	8.693E−01	1.41E−02
γ 36	1.70E−01	9.080E−01	1.54E−01
γ 37	8.10E−03	9.366E−01	7.59E−03
γ 38	9.72E−03	9.428E−01	9.16E−03
γ 39	4.05E−03	9.570E−01	3.88E−03
γ 40	3.08E−02	9.749E−01	3.00E−02
γ 41	2.43E−03	9.864E−01	2.40E−03
γ 42	7.86E−02	1.004E+00	7.89E−02
γ 43	5.67E−03	1.017E+00	5.77E−03
γ 44	1.86E−02	1.120E+00	2.09E−02
γ 45	3.48E−03	1.151E+00	4.01E−03
γ 46	3.73E−02	1.171E+00	4.36E−02
γ 47	2.19E−02	1.177E+00	2.57E−02
γ 48	2.92E−02	1.200E+00	3.50E−02
γ 49	8.91E−03	1.346E+00	1.20E−02
γ 50	4.05E−03	1.411E+00	5.71E−03
γ 52	2.27E−02	1.439E+00	3.26E−02
γ 53	8.91E−03	1.445E+00	1.29E−02
γ 54	7.53E−03	1.487E+00	1.12E−02
γ 55	6.48E−02	1.526E+00	9.89E−02
γ 56	2.43E−03	1.558E+00	3.78E−03
γ 57	4.29E−03	1.648E+00	7.07E−03
γ 58	3.00E−03	1.654E+00	4.96E−03
γ 59	4.21E−03	1.696E+00	7.14E−03
γ 60	1.86E−02	1.722E+00	3.21E−02
γ 61	3.24E−03	1.736E+00	5.62E−03
γ 62	4.86E−03	1.744E+00	8.48E−03
γ 63	4.05E−03	1.788E+00	7.24E−03
γ 64	4.86E−03	1.954E+00	9.50E−03
γ 65	4.05E−03	2.036E+00	8.24E−03
γ 66	2.43E−03	2.182E+00	5.30E−03
γ 67	5.67E−03	2.288E+00	1.30E−02
γ 68	9.72E−03	2.752E+00	2.68E−02
γ 69	4.05E−03	2.758E+00	1.12E−02
γ 70	1.30E−02	2.797E+00	3.62E−02
γ 71	2.43E−03	2.803E+00	6.81E−03
γ 72	1.38E−02	2.810E+00	3.87E−02
K_{α_1} X-ray	1.32E−01	3.219E−02	4.24E−03
K_{α_2} X-ray	7.16E−02	3.182E−02	2.28E−03

Listed X, γ and $\gamma^\pm$ radiations	2.20E+00
Omitted X, γ and $\gamma^\pm$ radiations**	2.59E−02
Listed β, ce and Auger radiations	1.08E+00
Omitted β, ce and Auger radiations**	8.74E−03
Listed radiations	3.28E+00
Omitted radiations**	3.47E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ba-130 daughter is stable.


$^{130}_{57}$La(8.7m)
3(+) 0.0
3.7120
3.7047
3.6600
3.2653
2.6458
2.3469
2.3180
2.2482
2.0792
2.0537
1.8830
1.8446
1.5576
1.4775
1.3611
0.9080
0.9018
0.3574
0.0
EC$_1$, β^+_1
EC$_2$, β^+_2
EC$_3$, β^+_3
EC$_4$, β^+_4
EC$_5$, β^+_5
EC$_6$, β^+_6
EC$_7$, β^+_7
EC$_8$
EC$_9$, β^+_8
EC$_{10}$, β^+_9
EC$_{11}$, β^+_{10}
EC$_{12}$, β^+_{11}
EC$_{13}$, β^+_{12}
EC$_{14}$, β^+_{13}
EC$_{15}$, β^+_{14}
EC$_{16}$, β^+_{15}
EC$_{17}$, β^+_{16}
EC$_{18}$, β^+_{17}
2,3,4
2,3,4
2,3,4
2,3,4
2,3,4
2,3,4
2,3,4
2,3,4
2,3,4
(4+)
3(+)
2(+)
4+
2+
0+
γ_{72} γ_{71} γ_{70} γ_{69} γ_{68} γ_{63} γ_{66} γ_{62} γ_{43} γ_{41} γ_{39} γ_{30} γ_{22} γ_{29} γ_{28} γ_{10} γ_{15} γ_{12} γ_{35} γ_{53} γ_{52} γ_{50} γ_{49} γ_{47} γ_{46} γ_{45} γ_{40} γ_{38} γ_{37} γ_{24} γ_{20} γ_{19} γ_{9} γ_{8} γ_{67} γ_{60} γ_{55} γ_{54} γ_{48} γ_{44} γ_{42} γ_{17} γ_{16} γ_{56} γ_{36} γ_{5}
$^{130}_{56}$Ba(stable)

57-La-132m

16-MAR-92

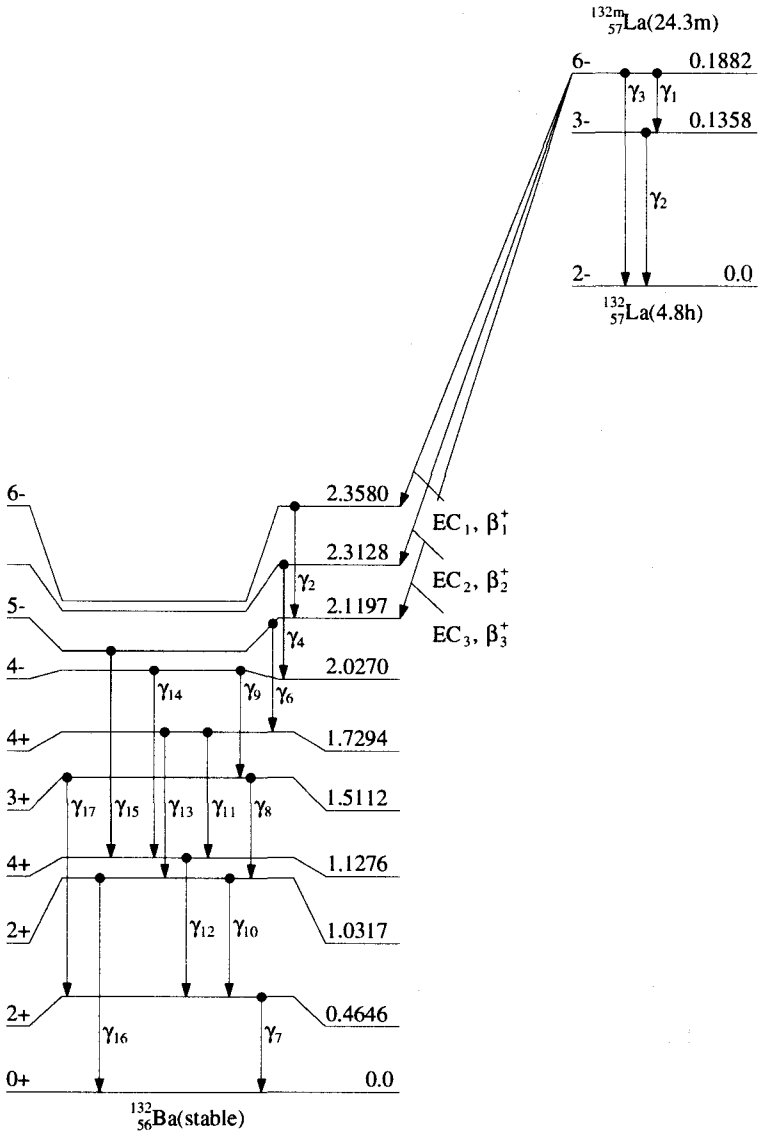
Half-life = 24.3 m
Decay mode(s): EC, β^+, IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.56E−02	6.822E−01*	1.06E−02
β^+ 2	3.12E−02	7.024E−01*	2.19E−02
β^+ 3	1.71E−02	7.892E−01*	1.35E−02
$\gamma^\pm$	1.28E−01	5.110E−01	6.53E−02
γ 2	4.02E−02	2.383E−01	9.57E−03
ce-K, γ 2	3.11E−03	2.009E−01	6.24E−04
γ 4	7.37E−02	2.858E−01	2.11E−02
ce-K, γ 4	3.52E−03	2.484E−01	8.75E−04
ce-L$_1$, γ 4	4.30E−04	2.798E−01	1.20E−04
γ 6	4.91E−02	3.907E−01	1.92E−02
γ 7	2.23E−01	4.645E−01	1.04E−01
ce-K, γ 7	2.26E−03	4.271E−01	9.67E−04
ce-L$_1$, γ 7	2.56E−04	4.586E−01	1.17E−04
γ 8	3.12E−02	4.795E−01	1.50E−02
ce-K, γ 8	3.97E−04	4.420E−01	1.76E−04
γ 9	7.14E−02	5.150E−01	3.68E−02
γ 10	4.46E−02	5.671E−01	2.53E−02
ce-K, γ 10	3.75E−04	5.297E−01	1.99E−04
γ 11	1.34E−02	6.018E−01	8.06E−03
γ 12	1.16E−01	6.631E−01	7.70E−02
ce-K, γ 12	4.64E−04	6.256E−01	2.90E−04
γ 13	4.02E−02	6.977E−01	2.80E−02
γ 14	6.70E−02	8.993E−01	6.02E−02
γ 15	2.68E−02	9.910E−01	2.65E−02
γ 16	2.68E−02	1.032E+00	2.76E−02
γ 17	5.80E−02	1.047E+00	6.07E−02
ce-K, γ 17	1.14E−04	1.009E+00	1.15E−04
K$_{\alpha_1}$ X-ray	7.58E−02	3.219E−02	2.44E−03
K$_{\alpha_2}$ X-ray	4.12E−02	3.182E−02	1.31E−03
Auger-KLL	1.03E−02	2.618E−02*	2.71E−04
Auger-KLX	4.89E−03	3.075E−02*	1.50E−04
Auger-LMM	8.84E−02	3.575E−03*	3.16E−04
Auger-LMX	5.16E−02	4.529E−03*	2.34E−04
Auger-MXY	2.76E−01	9.285E−04*	2.56E−04
ce-K, γ 1	2.29E−01	1.388E−02	3.18E−03
ce-L$_1$, γ 1	1.37E−01	4.653E−02	6.37E−03
ce-L$_2$, γ 1	2.00E−02	4.691E−02	9.40E−04
ce-L$_3$, γ 1	2.19E−01	4.732E−02	1.04E−02
ce-M, γ 1	9.21E−02	5.168E−02*	4.76E−03
ce-N$^+$, γ 1	2.86E−02	5.280E−02*	1.51E−03
γ 2	4.94E−01	1.358E−01	6.71E−02
ce-K, γ 2	1.96E−01	9.688E−02	1.90E−02
ce-L$_1$, γ 2	2.40E−02	1.295E−01	3.11E−03
ce-L$_2$, γ 2	2.85E−03	1.299E−01	3.71E−04
ce-L$_3$, γ 2	1.57E−03	1.303E−01	2.05E−04
ce-M, γ 2	5.91E−03	1.347E−01*	7.96E−04
ce-N$^+$, γ 2	1.63E−03	1.358E−01*	2.21E−04
ce-K, γ 3	7.81E−03	1.496E−01	1.17E−03
ce-L$_1$, γ 3	7.98E−04	1.822E−01	1.45E−04
ce-L$_2$, γ 3	7.50E−03	1.826E−01	1.37E−03
ce-L$_3$, γ 3	5.33E−03	1.830E−01	9.75E−04
ce-M, γ 3	3.18E−03	1.874E−01*	5.96E−04
ce-N$^+$, γ 3	8.65E−04	1.885E−01*	1.63E−04
K$_{\alpha_1}$ X-ray	2.05E−01	3.344E−02	6.85E−03
K$_{\alpha_2}$ X-ray	1.12E−01	3.303E−02	3.69E−03
K$_{\beta_1}$ X-ray	4.00E−02	3.780E−02	1.51E−03
K$_{\beta_3}$ X-ray	2.07E−02	3.772E−02	7.81E−04
Auger-KLL	2.64E−02	2.714E−02*	7.16E−04
Auger-KLX	1.26E−02	3.191E−02*	4.03E−04
Auger-LMM	4.25E−01	3.699E−03*	1.57E−03
Auger-LMX	2.51E−01	4.707E−03*	1.18E−03
Auger-LXY	3.99E−02	5.440E−03*	2.17E−04
Auger-MXY	1.35E+00	9.760E−04*	1.32E−03

Listed X, γ and $\gamma^\pm$ radiations	6.68E−01
Omitted X, γ and $\gamma^\pm$ radiations**	2.69E−03
Listed β, ce and Auger radiations	1.11E−01
Omitted β, ce and Auger radiations**	1.07E−03
Listed radiations	7.79E−01
Omitted radiations**	3.76E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ba-132 daughter, yield 2.40E−01, is stable.
La-132 daughter, yield 7.60E−01, is radioactive.


$^{132m}_{57}$La(24.3m)
6-
0.1882
3-
0.1358
2-
0.0
$^{132}_{57}$La(4.8h)
γ_3
γ_1
γ_2
6-
5-
4-
4+
3+
4+
2+
2+
0+
2.3580
2.3128
2.1197
2.0270
1.7294
1.5112
1.1276
1.0317
0.4646
0.0
EC_1, β_1^+
EC_2, β_2^+
EC_3, β_3^+
γ_2
γ_4
γ_{14}
γ_9
γ_6
γ_{17}
γ_{15}
γ_{13}
γ_{11}
γ_8
γ_{12}
γ_{10}
γ_{16}
γ_7
$^{132}_{56}$Ba(stable)

57-La-133

06-OCT-95

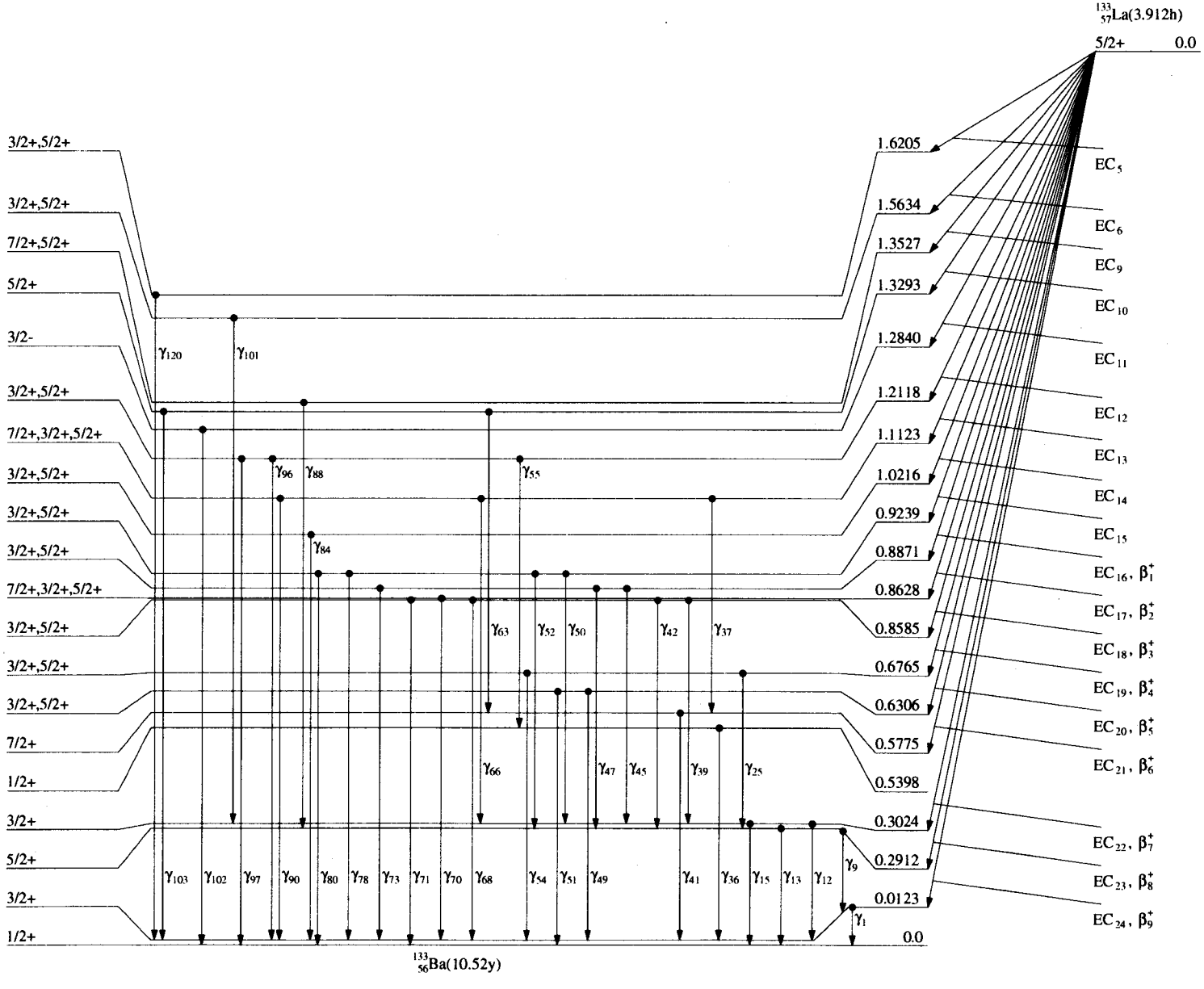
Half-life = 3.912 h
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 7	1.09E−03	4.108E−01*	4.50E−04
β^+ 8	5.97E−04	4.157E−01*	2.48E−04
β^+ 9	1.09E−01	5.386E−01*	5.89E−02
$\gamma^\pm$	2.23E−01	5.110E−01	1.14E−01
ce-L_1, γ 1	6.74E−01	6.338E−03	4.27E−03
ce-L_2, γ 1	6.08E−02	6.703E−03	4.08E−04
ce-L_3, γ 1	1.39E−02	7.080E−03	9.86E−05
ce-M, γ 1	1.53E−01	1.126E−02*	1.73E−03
ce-N^+, γ 1	5.18E−02	1.233E−02*	6.38E−04
γ 9	2.48E−02	2.788E−01	6.92E−03
ce-K, γ 9	1.27E−03	2.414E−01	3.05E−04
γ 12	1.40E−02	2.901E−01	4.06E−03
ce-K, γ 12	6.44E−04	2.526E−01	1.63E−04
γ 13	4.32E−03	2.912E−01	1.26E−03
γ 15	1.63E−02	3.024E−01	4.94E−03
ce-K, γ 15	6.74E−04	2.649E−01	1.79E−04
γ 25	7.69E−04	3.853E−01	2.96E−04
γ 36	7.99E−04	5.275E−01	4.21E−04
γ 37	4.96E−04	5.348E−01	2.65E−04
γ 39	1.41E−03	5.560E−01	7.86E−04
γ 41	5.36E−03	5.652E−01	3.03E−03
γ 42	2.08E−03	5.673E−01	1.18E−03
γ 45	1.74E−03	5.847E−01	1.02E−03
γ 47	3.94E−03	5.959E−01	2.35E−03
γ 49	8.16E−03	6.182E−01	5.04E−03
γ 50	5.33E−03	6.215E−01	3.31E−03
γ 51	1.39E−03	6.306E−01	8.76E−04
γ 52	9.67E−03	6.328E−01	6.12E−03
γ 54	9.35E−04	6.642E−01	6.21E−04
γ 55	3.47E−04	6.720E−01	2.33E−04
γ 63	4.86E−04	7.518E−01	3.65E−04
γ 66	4.19E−04	8.100E−01	3.39E−04
γ 68	4.69E−03	8.462E−01	3.97E−03
γ 70	2.41E−04	8.504E−01	2.05E−04
γ 71	3.82E−03	8.585E−01	3.28E−03
γ 73	4.12E−04	8.748E−01	3.60E−04
γ 78	9.62E−04	9.116E−01	8.77E−04
γ 80	2.23E−04	9.239E−01	2.06E−04
γ 84	6.94E−04	1.009E+00	7.01E−04
γ 88	8.38E−04	1.062E+00	8.90E−04
γ 90	1.91E−03	1.100E+00	2.10E−03
γ 96	2.06E−04	1.199E+00	2.47E−04
γ 97	4.36E−04	1.212E+00	5.29E−04
γ 101	2.43E−04	1.261E+00	3.06E−04
γ 102	6.32E−04	1.284E+00	8.12E−04
γ 103	2.28E−04	1.317E+00	3.01E−04
γ 120	4.14E−04	1.608E+00	6.66E−04
K_{α_1} X-ray	3.58E−01	3.219E−02	1.15E−02
K_{α_2} X-ray	1.94E−01	3.182E−02	6.18E−03
K_{β_1} X-ray	6.94E−02	3.638E−02	2.52E−03
K_{β_2} X-ray	2.50E−02	3.728E−02	9.33E−04
K_{β_3} X-ray	3.58E−02	3.630E−02	1.30E−03
L_α X-ray	5.65E−02	4.465E−03*	2.52E−04
L_β X-ray	8.66E−02	4.900E−03*	4.24E−04
Auger-KLL	4.88E−02	2.618E−02*	1.28E−03
Auger-KLX	2.31E−02	3.075E−02*	7.10E−04
Auger-KXY	3.19E−03	3.527E−02*	1.12E−04
Auger-LMM	8.04E−01	3.681E−03*	2.96E−03
Auger-LMX	4.84E−01	4.650E−03*	2.25E−03
Auger-LXY	7.80E−02	5.340E−03*	4.17E−04
Auger-MXY	2.54E+00	9.193E−04*	2.33E−03

Listed X, γ and $\gamma^\pm$ radiations	1.96E−01
Omitted X, γ and $\gamma^\pm$ radiations**	5.66E−03
Listed β, ce and Auger radiations	7.75E−02
Omitted β, ce and Auger radiations**	5.99E−04
Listed radiations	2.73E−01
Omitted radiations**	6.26E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ba-133 daughter is radioactive.


$^{133}_{57}$La(3.912h)
5/2+ 0.0
1.6205
1.5634
1.3527
1.3293
1.2840
1.2118
1.1123
1.0216
0.9239
0.8871
0.8628
0.8585
0.6765
0.6306
0.5775
0.5398
0.3024
0.2912
0.0123
0.0
EC5
EC6
EC9
EC10
EC11
EC12
EC13
EC14
EC15
EC16, β1+
EC17, β2+
EC18, β3+
EC19, β4+
EC20, β5+
EC21, β6+
EC22, β7+
EC23, β8+
EC24, β9+
3/2+,5/2+
3/2+,5/2+
7/2+,5/2+
5/2+
3/2-
3/2+,5/2+
7/2+,3/2+,5/2+
3/2+,5/2+
3/2+,5/2+
3/2+,5/2+
7/2+,3/2+,5/2+
3/2+,5/2+
3/2+,5/2+
3/2+,5/2+
7/2+
1/2+
3/2+
5/2+
3/2+
1/2+
γ120
γ101
γ96
γ88
γ84
γ55
γ63
γ52
γ50
γ42
γ37
γ66
γ47
γ45
γ39
γ25
γ103
γ102
γ97
γ90
γ80
γ78
γ73
γ71
γ70
γ68
γ54
γ51
γ49
γ41
γ36
γ15
γ13
γ12
γ9
γ1
$^{133}_{56}$Ba(10.52y)

58-Ce-130

14-JUN-98

Half-life = 22.9 m
Decay mode(s): EC, β^+

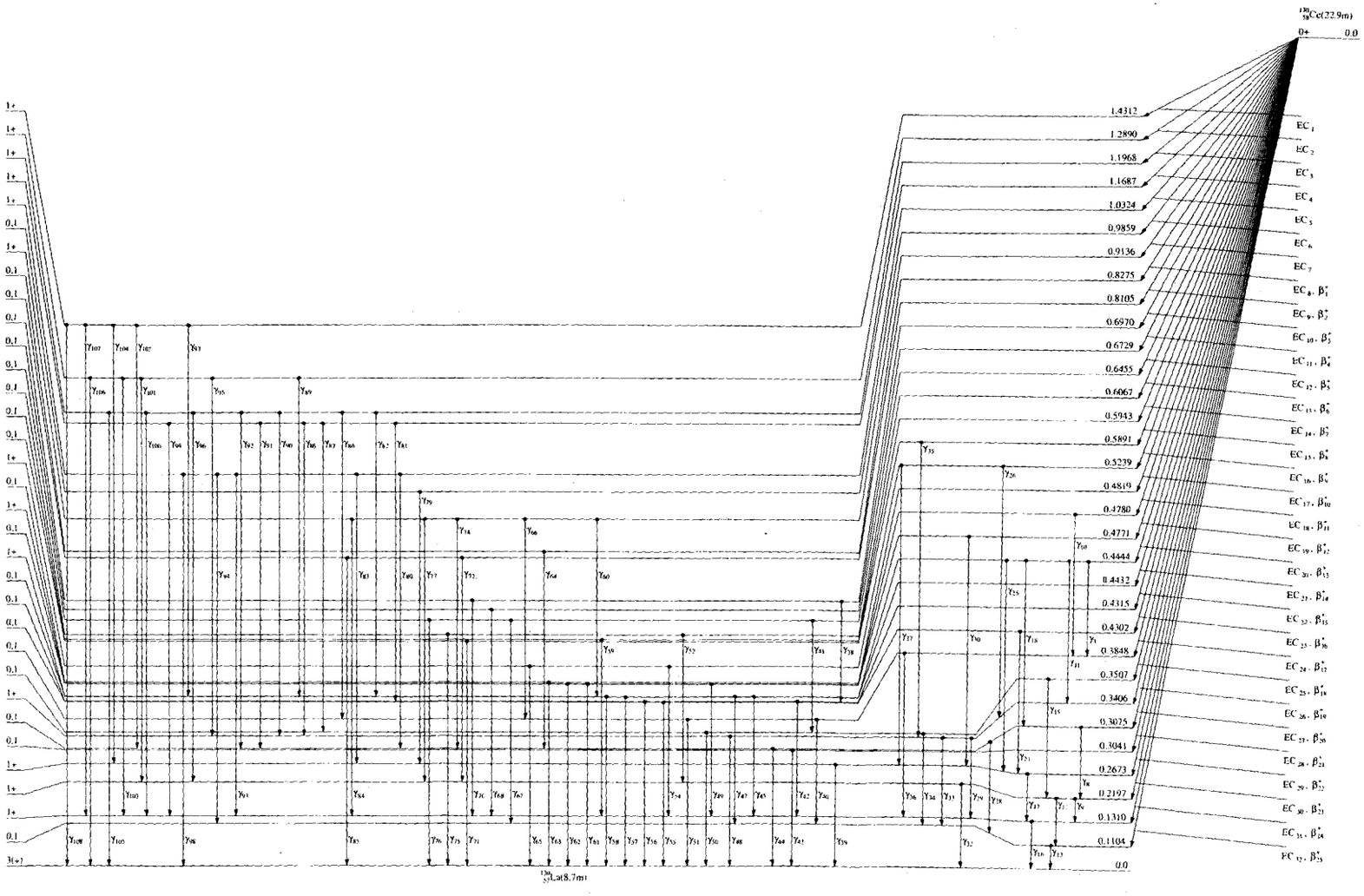
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 9	6.03E−04	3.058E−01*	1.84E−04
β^+ 11	5.02E−04	3.258E−01*	1.64E−04
β^+ 13	7.03E−04	3.405E−01*	2.40E−04
β^+ 16	3.01E−04	3.467E−01*	1.05E−04
β^+ 18	3.01E−04	3.815E−01*	1.15E−04
β^+ 19	1.00E−03	3.859E−01*	3.88E−04
β^+ 20	9.04E−04	4.005E−01*	3.62E−04
β^+ 21	4.02E−04	4.019E−01*	1.62E−04
β^+ 22	3.01E−03	4.181E−01*	1.26E−03
β^+ 23	3.01E−03	4.390E−01*	1.32E−03
β^+ 24	3.01E−02	4.780E−01*	1.44E−02
β^+ 25	5.02E−04	4.871E−01*	2.45E−04
$\gamma^{\pm}$	8.50E−02	5.110E−01	4.34E−02
ce-K, γ 3	6.13E−03	2.068E−02	1.27E−04
ce-K, γ 8	1.65E−03	4.898E−02	8.08E−05
γ 9	8.59E−03	8.890E−02	7.64E−04
ce-K, γ 9	1.13E−02	4.998E−02	5.63E−04
ce-L_1, γ 9	1.40E−03	8.263E−02	1.15E−04
ce-K, γ 10	3.68E−03	5.438E−02	2.00E−04
ce-K, γ 11	1.95E−03	6.498E−02	1.27E−04
γ 12	1.40E−02	1.093E−01	1.53E−03
ce-K, γ 12	1.01E−02	7.038E−02	7.14E−04
ce-L_1, γ 12	1.26E−03	1.030E−01	1.30E−04
γ 13	2.76E−02	1.104E−01	3.04E−03
ce-K, γ 13	2.51E−02	7.148E−02	1.79E−03
ce-L_1, γ 13	2.29E−03	1.041E−01	2.38E−04
ce-L_2, γ 13	4.13E−03	1.045E−01	4.31E−04
ce-L_3, γ 13	4.44E−03	1.049E−01	4.66E−04
ce-M, γ 13	2.38E−03	1.093E−01*	2.60E−04
ce-K, γ 15	1.36E−03	9.208E−02	1.25E−04
γ 16	3.58E−01	1.311E−01	4.69E−02
ce-K, γ 16	1.91E−01	9.218E−02	1.76E−02
ce-L_1, γ 16	1.80E−02	1.248E−01	2.25E−03
ce-L_2, γ 16	2.42E−02	1.252E−01	3.02E−03
ce-L_3, γ 16	2.48E−02	1.256E−01	3.12E−03
ce-M, γ 16	1.46E−02	1.300E−01*	1.89E−03
ce-N^+, γ 16	3.84E−03	1.311E−01*	5.04E−04
γ 17	4.90E−02	1.364E−01	6.68E−03
ce-K, γ 17	1.91E−02	9.748E−02	1.86E−03
ce-L_1, γ 17	2.36E−03	1.301E−01	3.07E−04
ce-K, γ 18	1.33E−03	9.768E−02	1.30E−04
γ 21	7.52E−03	1.630E−01	1.23E−03
ce-K, γ 21	1.78E−03	1.241E−01	2.21E−04
γ 25	1.26E−02	1.769E−01	2.23E−03
ce-K, γ 25	2.39E−03	1.380E−01	3.29E−04
γ 26	8.56E−03	1.832E−01	1.57E−03
ce-K, γ 26	1.47E−03	1.443E−01	2.13E−04
γ 28	8.77E−03	1.969E−01	1.73E−03
ce-K, γ 28	1.24E−03	1.580E−01	1.96E−04
γ 29	4.24E−02	2.096E−01	8.89E−03
ce-K, γ 29	5.07E−03	1.707E−01	8.66E−04
ce-L_1, γ 29	6.24E−04	2.033E−01	1.27E−04
γ 30	3.04E−03	2.099E−01	6.39E−04
γ 32	5.63E−02	2.198E−01	1.24E−02
ce-K, γ 32	5.72E−03	1.809E−01	1.03E−03
ce-L_1, γ 32	5.93E−04	2.135E−01	1.27E−04
ce-L_2, γ 32	3.67E−04	2.139E−01	7.85E−05
γ 33	2.94E−03	2.305E−01	6.77E−04
γ 34	2.54E−03	2.401E−01	6.10E−04
γ 35	2.08E−03	2.484E−01	5.16E−04
γ 36	1.44E−02	2.537E−01	3.66E−03
ce-K, γ 36	1.03E−03	2.148E−01	2.21E−04
γ 37	1.61E−02	2.565E−01	4.13E−03
ce-K, γ 37	1.12E−03	2.176E−01	2.43E−04
γ 38	2.94E−03	2.669E−01	7.84E−04
γ 39	4.62E−02	2.673E−01	1.24E−02
ce-K, γ 39	2.52E−03	2.284E−01	5.76E−04
γ 40	8.81E−03	2.742E−01	2.41E−03
ce-K, γ 40	5.12E−04	2.353E−01	1.20E−04
γ 41	2.40E−03	2.948E−01	7.07E−04
γ 42	7.77E−03	3.005E−01	2.33E−03
ce-K, γ 42	3.55E−04	2.616E−01	9.28E−05
γ 43	1.01E−02	3.041E−01	3.07E−03
ce-K, γ 43	3.69E−04	2.652E−01	9.78E−05
γ 44	5.14E−02	3.075E−01	1.58E−02
ce-K, γ 44	1.81E−03	2.686E−01	4.87E−04
γ 45	2.36E−03	3.133E−01	7.40E−04
γ 47	2.33E−03	3.339E−01	7.77E−04
γ 48	1.53E−02	3.406E−01	5.22E−03
ce-K, γ 48	3.96E−04	3.017E−01	1.20E−04
γ 49	1.08E−02	3.468E−01	3.75E−03
ce-K, γ 49	3.40E−04	3.079E−01	1.05E−04
γ 50	6.12E−03	3.508E−01	2.15E−03
ce-K, γ 50	2.38E−03	3.119E−01	7.43E−04
ce-L_1, γ 50	3.62E−04	3.445E−01	1.25E−04
γ 51	6.80E−03	3.848E−01	2.62E−03
ce-K, γ 51	1.89E−03	3.459E−01	6.52E−04
ce-L_1, γ 51	2.81E−04	3.785E−01	1.07E−04
γ 52	2.22E−03	3.870E−01	8.59E−04
γ 54	3.44E−03	3.930E−01	1.35E−03
γ 55	6.80E−03	4.302E−01	2.93E−03
ce-K, γ 55	1.26E−03	3.913E−01	4.94E−04
ce-L_1, γ 55	1.84E−04	4.239E−01	7.82E−05
γ 56	2.51E−03	4.315E−01	1.08E−03
ce-K, γ 56	4.60E−04	3.926E−01	1.81E−04
γ 57	6.09E−03	4.432E−01	2.70E−03
ce-K, γ 57	1.02E−03	4.043E−01	4.11E−04
γ 58	4.65E−03	4.442E−01	2.07E−03
γ 59	6.66E−03	4.633E−01	3.09E−03
γ 60	1.97E−03	4.705E−01	9.26E−04
γ 61	3.72E−03	4.770E−01	1.78E−03
ce-K, γ 61	4.80E−04	4.381E−01	2.10E−04
γ 62	3.72E−03	4.780E−01	1.78E−03
γ 63	2.36E−03	4.817E−01	1.14E−03
ce-K, γ 63	2.94E−04	4.428E−01	1.30E−04
γ 64	3.47E−03	5.200E−01	1.81E−03
γ 65	3.90E−03	5.240E−01	2.04E−03
γ 66	4.40E−03	5.288E−01	2.33E−03
γ 67	2.86E−03	5.351E−01	1.53E−03
γ 68	7.16E−03	5.417E−01	3.88E−03
γ 70	4.80E−03	5.662E−01	2.72E−03
γ 71	3.97E−03	5.892E−01	2.34E−03
ce-K, γ 71	2.48E−04	5.503E−01	1.37E−04
γ 72	1.50E−03	5.907E−01	8.88E−04
γ 74	5.37E−03	6.058E−01	3.25E−03
γ 75	5.37E−03	6.068E−01	3.26E−03
ce-K, γ 75	3.04E−04	5.679E−01	1.73E−04
γ 76	2.18E−03	6.453E−01	1.41E−03
γ 77	1.36E−03	6.942E−01	9.44E−04
γ 79	2.72E−03	7.186E−01	1.96E−03
γ 80	3.26E−03	7.249E−01	2.36E−03
γ 81	3.90E−03	7.373E−01	2.88E−03
γ 82	1.13E−02	7.522E−01	8.51E−03
γ 83	2.22E−03	7.652E−01	1.70E−03
γ 84	1.61E−03	7.825E−01	1.26E−03
γ 85	1.79E−03	8.105E−01	1.45E−03
γ 86	6.09E−03	8.120E−01	4.94E−03
γ 87	4.65E−03	8.180E−01	3.81E−03
γ 88	2.54E−03	8.283E−01	2.11E−03
γ 89	3.72E−03	8.456E−01	3.15E−03
γ 90	1.37E−02	8.563E−01	1.17E−02
γ 91	1.07E−02	8.612E−01	9.22E−03
γ 92	1.17E−02	8.894E−01	1.04E−02

γ 93	4.90E−03	9.013E−01	4.42E−03
γ 94	1.36E−03	9.220E−01	1.25E−03
γ 95	5.73E−03	9.483E−01	5.43E−03
γ 96	3.76E−02	9.772E−01	3.67E−02
ce-K, γ 96	9.33E−05	9.383E−01	8.75E−05
γ 97	2.51E−03	9.866E−01	2.47E−03
γ 98	1.93E−03	1.033E+00	2.00E−03
γ 99	7.05E−03	1.038E+00	7.32E−03
γ 100	7.20E−03	1.066E+00	7.67E−03
γ 101	2.72E−03	1.069E+00	2.91E−03
γ 102	1.32E−03	1.124E+00	1.49E−03
γ 103	9.84E−03	1.158E+00	1.14E−02
γ 104	2.00E−03	1.164E+00	2.33E−03
γ 105	1.85E−02	1.197E+00	2.21E−02
γ 106	2.01E−02	1.289E+00	2.59E−02
γ 107	2.04E−03	1.300E+00	2.65E−03
γ 108	2.04E−03	1.431E+00	2.92E−03
K_{α_1} X-ray	5.35E−01	3.344E−02	1.79E−02
K_{α_2} X-ray	2.91E−01	3.303E−02	9.62E−03
K_{β_1} X-ray	1.04E−01	3.780E−02	3.94E−03
K_{β_2} X-ray	3.90E−02	3.875E−02	1.51E−03
K_{β_3} X-ray	5.40E−02	3.772E−02	2.04E−03
Auger-KLL	6.88E−02	2.714E−02*	1.87E−03
Auger-KLX	3.30E−02	3.191E−02*	1.05E−03
Auger-KXY	4.57E−03	3.663E−02*	1.68E−04
Auger-LMM	6.42E−01	3.710E−03*	2.38E−03
Auger-LMX	3.74E−01	4.713E−03*	1.76E−03
Auger-LXY	5.96E−02	5.447E−03*	3.25E−04
Auger-MXY	2.01E+00	9.847E−04*	1.98E−03

Listed X, γ and $\gamma^{\pm}$ radiations	4.79E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	6.70E−03
Listed β, ce and Auger radiations	7.33E−02
Omitted β, ce and Auger radiations**	4.34E−03
Listed radiations	5.52E−01
Omitted radiations**	1.10E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

La-130 daughter is radioactive.


$^{130}_{55}$Cs(22.9m)
0+ 0.0
1.4312
1.2890
1.1968
1.1687
1.0324
0.9859
0.9136
0.8275
0.8105
0.6970
0.6729
0.6455
0.6067
0.5943
0.5891
0.5239
0.4819
0.4780
0.4771
0.4444
0.4432
0.4315
0.4302
0.3848
0.3507
0.3406
0.3075
0.3041
0.2673
0.2197
0.1310
0.1104
0.0
$^{130}_{57}$La(8.7m)

58-Ce-131

14-DEC-94

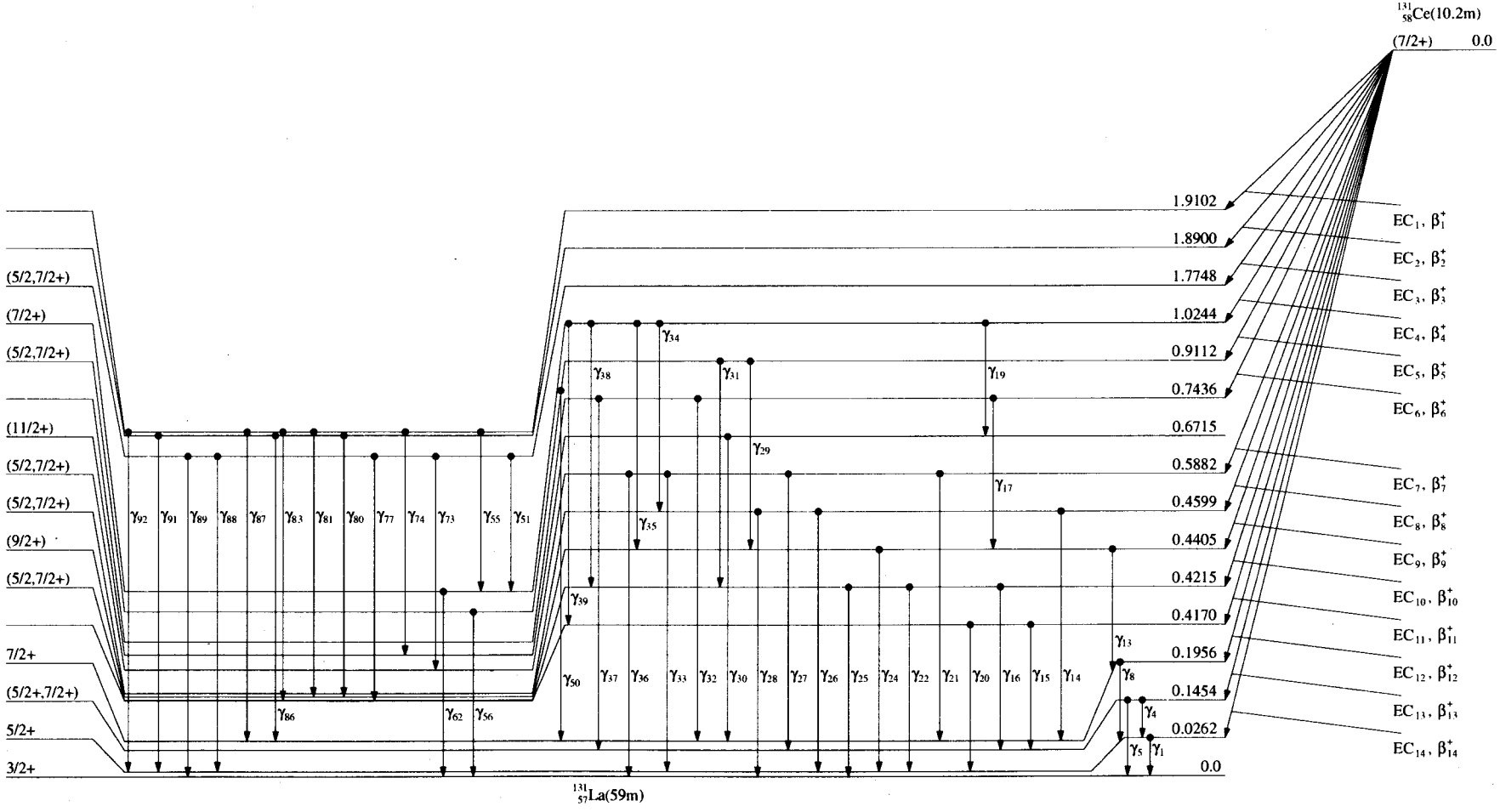
Half-life = 10.2 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.21E−02	4.916E−01*	5.96E−03
β^+ 2	3.03E−03	5.005E−01*	1.52E−03
β^+ 3	6.06E−03	5.515E−01*	3.34E−03
β^+ 4	1.62E−02	8.879E−01*	1.44E−02
β^+ 5	1.52E−02	9.393E−01*	1.42E−02
β^+ 6	3.33E−02	1.016E+00*	3.39E−02
β^+ 7	4.34E−02	1.087E+00*	4.72E−02
β^+ 8	2.93E−02	1.146E+00*	3.36E−02
β^+ 9	4.14E−02	1.155E+00*	4.78E−02
β^+ 10	3.33E−02	1.163E+00*	3.88E−02
β^+ 11	7.07E−03	1.165E+00*	8.24E−03
β^+ 12	5.76E−02	1.268E+00*	7.30E−02
β^+ 13	8.08E−02	1.291E+00*	1.04E−01
β^+ 14	9.09E−02	1.346E+00*	1.22E−01
$\gamma^{\pm}$	9.39E−01	5.110E−01	4.80E−01
γ 1	9.55E−02	2.620E−02	2.50E−03
ce-L_1, γ 1	4.98E−01	1.993E−02	9.92E−03
ce-L_2, γ 1	7.51E−02	2.031E−02	1.53E−03
ce-L_3, γ 1	5.52E−02	2.072E−02	1.14E−03
ce-M, γ 1	1.31E−01	2.508E−02*	3.27E−03
ce-N^+, γ 1	3.45E−02	2.620E−02*	9.05E−04
ce-K, γ 2	1.52E−02	3.978E−02	6.05E−04
γ 4	9.77E−02	1.192E−01	1.16E−02
ce-K, γ 4	7.26E−02	8.026E−02	5.83E−03
ce-L_1, γ 4	9.01E−03	1.129E−01	1.02E−03
γ 5	2.04E−02	1.454E−01	2.97E−03
ce-K, γ 5	8.03E−03	1.065E−01	8.55E−04
γ 8	2.22E−01	1.694E−01	3.76E−02
ce-K, γ 8	5.32E−02	1.305E−01	6.94E−03
ce-L_1, γ 8	6.57E−03	1.632E−01	1.07E−03
γ 13	5.33E−02	2.448E−01	1.30E−02
ce-K, γ 13	4.18E−03	2.059E−01	8.61E−04
γ 14	1.78E−02	2.642E−01	4.69E−03
γ 15	2.66E−02	2.716E−01	7.24E−03
γ 16	6.22E−03	2.761E−01	1.72E−03
γ 17	1.15E−02	3.030E−01	3.50E−03
γ 18	1.22E−02	3.269E−01	3.99E−03
γ 19	6.66E−03	3.532E−01	2.35E−03
γ 20	1.33E−02	3.908E−01	5.21E−03
γ 21	3.33E−02	3.925E−01	1.31E−02
γ 22	7.77E−02	3.953E−01	3.07E−02
ce-K, γ 22	1.74E−03	3.564E−01	6.21E−04
γ 23	1.86E−02	4.036E−01	7.53E−03
γ 24	1.51E−01	4.142E−01	6.25E−02
ce-K, γ 24	2.20E−03	3.753E−01	8.25E−04
γ 25	2.91E−02	4.215E−01	1.23E−02
γ 26	2.58E−02	4.337E−01	1.12E−02
γ 27	3.55E−02	4.427E−01	1.57E−02
γ 28	6.66E−03	4.598E−01	3.06E−03
γ 29	9.10E−03	4.706E−01	4.28E−03
γ 30	4.00E−02	4.759E−01	1.90E−02
γ 31	4.44E−03	4.897E−01	2.17E−03
γ 32	2.62E−02	5.479E−01	1.44E−02
γ 33	6.44E−03	5.622E−01	3.62E−03
γ 34	4.44E−03	5.642E−01	2.51E−03
γ 35	2.24E−02	5.838E−01	1.31E−02
γ 36	6.22E−03	5.884E−01	3.66E−03
γ 37	2.62E−02	5.985E−01	1.57E−02
γ 38	3.33E−02	6.029E−01	2.01E−02
γ 39	1.71E−02	6.076E−01	1.04E−02
γ 40	1.18E−02	6.146E−01	7.23E−03
γ 41	4.44E−03	6.164E−01	2.74E−03
γ 42	6.44E−03	6.259E−01	4.03E−03
γ 43	1.11E−02	6.349E−01	7.05E−03
γ 44	5.55E−03	6.380E−01	3.54E−03
γ 45	1.18E−02	6.447E−01	7.59E−03
γ 46	1.60E−02	6.572E−01	1.05E−02
γ 47	4.44E−03	6.836E−01	3.04E−03
γ 48	5.99E−03	6.948E−01	4.16E−03
γ 49	6.66E−03	7.027E−01	4.68E−03
γ 50	9.10E−03	7.157E−01	6.51E−03
γ 51	1.55E−02	7.506E−01	1.17E−02
γ 52	5.99E−03	8.007E−01	4.80E−03
γ 53	5.33E−02	8.358E−01	4.45E−02
γ 54	1.95E−02	8.664E−01	1.69E−02
γ 55	3.13E−02	8.861E−01	2.77E−02
γ 56	1.09E−02	9.113E−01	9.91E−03
γ 57	8.88E−03	9.129E−01	8.11E−03
γ 58	7.99E−03	9.302E−01	7.43E−03
γ 59	4.44E−03	9.500E−01	4.22E−03
γ 60	1.69E−02	9.649E−01	1.63E−02
γ 61	3.55E−03	9.797E−01	3.48E−03
γ 62	8.88E−03	1.024E+00	9.10E−03
γ 63	6.88E−03	1.050E+00	7.23E−03
γ 64	7.33E−03	1.058E+00	7.75E−03
γ 65	1.40E−02	1.061E+00	1.48E−02
γ 66	6.66E−03	1.071E+00	7.13E−03
γ 67	6.66E−03	1.075E+00	7.16E−03
γ 68	4.44E−03	1.115E+00	4.95E−03
γ 69	4.44E−03	1.120E+00	4.97E−03
γ 70	1.51E−02	1.131E+00	1.71E−02
γ 71	2.31E−02	1.167E+00	2.69E−02
γ 72	3.55E−03	1.174E+00	4.17E−03
γ 73	4.44E−03	1.187E+00	5.27E−03
γ 74	1.44E−02	1.239E+00	1.79E−02
γ 75	4.44E−03	1.295E+00	5.75E−03
γ 76	1.78E−02	1.302E+00	2.31E−02
γ 77	1.07E−02	1.358E+00	1.45E−02
γ 78	7.99E−03	1.382E+00	1.10E−02
γ 79	5.77E−03	1.418E+00	8.18E−03
γ 80	1.31E−02	1.449E+00	1.90E−02
γ 81	7.33E−02	1.470E+00	1.08E−01
γ 82	8.44E−03	1.481E+00	1.25E−02
γ 83	1.98E−02	1.488E+00	2.94E−02
γ 84	9.10E−03	1.530E+00	1.39E−02
γ 85	4.22E−03	1.561E+00	6.59E−03
γ 86	2.24E−02	1.694E+00	3.80E−02
γ 87	4.88E−03	1.714E+00	8.37E−03
γ 88	2.89E−03	1.749E+00	5.05E−03
γ 89	1.71E−02	1.775E+00	3.03E−02
γ 90	6.22E−03	1.807E+00	1.12E−02
γ 91	4.44E−03	1.864E+00	8.28E−03
γ 92	6.66E−03	1.884E+00	1.25E−02
γ 93	9.55E−03	2.039E+00	1.95E−02
γ 94	5.77E−03	2.147E+00	1.24E−02
K_{α_1} X-ray	2.98E−01	3.344E−02	9.96E−03
K_{α_2} X-ray	1.62E−01	3.303E−02	5.36E−03
K_{β_1} X-ray	5.81E−02	3.780E−02	2.20E−03
Auger-KLL	3.83E−02	2.714E−02*	1.04E−03
Auger-LMM	6.74E−01	3.806E−03*	2.57E−03
Auger-LMX	4.03E−01	4.822E−03*	1.94E−03
Auger-MXY	2.14E+00	9.752E−04*	2.08E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.61E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	8.21E−03
Listed β, ce and Auger radiations	5.92E−01
Omitted β, ce and Auger radiations**	1.02E−02
Listed radiations	2.20E+00
Omitted radiations**	1.84E−02

* Average energy (MeV)
** Each omitted transition contributes
<0.100 % to $\sum y(i) \times E(i)$ in its category.

La-131 daughter is radioactive.


$^{131}_{58}$Ce(10.2m)
(7/2+) 0.0
1.9102
1.8900
1.7748
1.0244
0.9112
0.7436
0.6715
0.5882
0.4599
0.4405
0.4215
0.4170
0.1956
0.1454
0.0262
0.0
(5/2,7/2+)
(7/2+)
(5/2,7/2+)
(11/2+)
(5/2,7/2+)
(5/2,7/2+)
(9/2+)
(5/2,7/2+)
7/2+
(5/2+,7/2+)
5/2+
3/2+
EC_1, β^+_1
EC_2, β^+_2
EC_3, β^+_3
EC_4, β^+_4
EC_5, β^+_5
EC_6, β^+_6
EC_7, β^+_7
EC_8, β^+_8
EC_9, β^+_9
EC_{10}, β^+_{10}
EC_{11}, β^+_{11}
EC_{12}, β^+_{12}
EC_{13}, β^+_{13}
EC_{14}, β^+_{14}
γ_{92} γ_{91} γ_{89} γ_{88} γ_{87} γ_{83} γ_{81} γ_{80} γ_{77} γ_{74} γ_{73} γ_{55} γ_{51}
γ_{86} γ_{62} γ_{56}
γ_{38} γ_{34} γ_{31} γ_{19} γ_{29} γ_{17} γ_{35} γ_{39}
γ_{50} γ_{37} γ_{36} γ_{33} γ_{32} γ_{30} γ_{28} γ_{27} γ_{26} γ_{25} γ_{24} γ_{22} γ_{21} γ_{20} γ_{16} γ_{15} γ_{14}
γ_{13} γ_8 γ_4 γ_5 γ_1
$^{131}_{57}$La(59m)

58-Ce-132

16-MAR-92

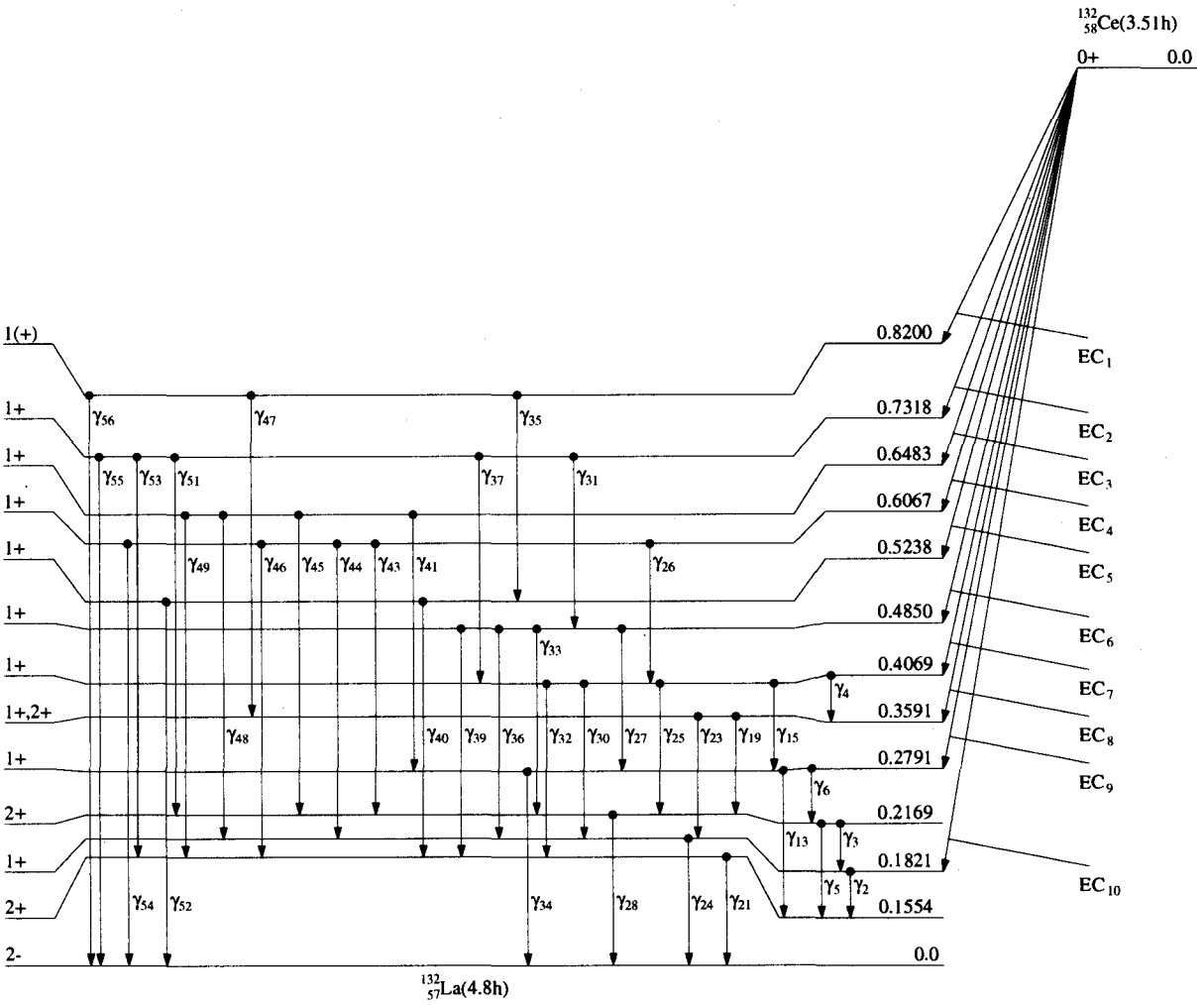
Half-life = 3.51 h
Decay mode(s): EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-L$_1$, γ 2	1.20E−02	2.038E−02	2.45E−04
ce-L$_2$, γ 2	1.20E−03	2.076E−02	2.50E−05
ce-M, γ 2	2.83E−03	2.553E−02*	7.21E−05
ce-N$^+$, γ 2	7.53E−04	2.665E−02*	2.01E−05
ce-L$_1$, γ 3	9.00E−03	2.844E−02	2.56E−04
ce-L$_2$, γ 3	8.65E−04	2.882E−02	2.49E−05
ce-M, γ 3	2.11E−03	3.359E−02*	7.07E−05
ce-N$^+$, γ 3	5.73E−04	3.471E−02*	1.99E−05
ce-K, γ 4	6.18E−03	8.805E−03	5.44E−05
ce-L$_1$, γ 4	7.64E−04	4.146E−02	3.17E−05
ce-K, γ 5	7.09E−03	2.257E−02	1.60E−04
ce-L$_1$, γ 5	8.77E−04	5.522E−02	4.84E−05
ce-K, γ 6	3.70E−03	2.335E−02	8.64E−05
ce-L$_1$, γ 6	4.58E−04	5.600E−02	2.56E−05
ce-K, γ 13	4.10E−04	8.474E−02	3.47E−05
ce-K, γ 15	4.48E−04	8.880E−02	3.98E−05
ce-K, γ 18	3.09E−04	9.874E−02	3.05E−05
γ 19	4.95E−03	1.422E−01	7.04E−04
ce-K, γ 19	1.73E−03	1.033E−01	1.79E−04
ce-L$_1$, γ 19	2.12E−04	1.359E−01	2.88E−05
γ 21	1.05E−01	1.554E−01	1.64E−02
ce-K, γ 21	6.30E−03	1.164E−01	7.33E−04
ce-L$_1$, γ 21	6.63E−04	1.491E−01	9.89E−05
ce-M, γ 21	1.72E−04	1.542E−01*	2.65E−05
γ 23	1.93E−03	1.768E−01	3.42E−04
ce-K, γ 23	3.78E−04	1.379E−01	5.21E−05
γ 24	7.74E−01	1.821E−01	1.41E−01
ce-K, γ 24	3.00E−02	1.432E−01	4.29E−03
ce-L$_1$, γ 24	3.20E−03	1.758E−01	5.63E−04
ce-L$_2$, γ 24	3.29E−04	1.762E−01	5.80E−05
ce-L$_3$, γ 24	4.15E−04	1.766E−01	7.33E−05
ce-M, γ 24	8.12E−04	1.810E−01*	1.47E−04
ce-N$^+$, γ 24	2.17E−04	1.821E−01*	3.96E−05
γ 25	2.67E−02	1.900E−01	5.07E−03
ce-K, γ 25	4.17E−03	1.511E−01	6.31E−04
ce-L$_1$, γ 25	5.07E−04	1.838E−01	9.32E−05
ce-M, γ 25	1.23E−04	1.889E−01*	2.33E−05
ce-K, γ 26	1.81E−04	1.609E−01	2.92E−05
γ 27	1.39E−03	2.058E−01	2.87E−04
ce-K, γ 27	1.75E−04	1.669E−01	2.92E−05
γ 28	4.95E−02	2.168E−01	1.07E−02
ce-K, γ 28	1.20E−03	1.779E−01	2.13E−04
ce-L$_1$, γ 28	1.30E−04	2.106E−01	2.73E−05
γ 30	1.78E−03	2.247E−01	4.00E−04
ce-K, γ 30	1.76E−04	1.858E−01	3.27E−05
γ 31	1.86E−03	2.469E−01	4.59E−04
ce-K, γ 31	1.43E−04	2.080E−01	2.97E−05
γ 32	2.24E−02	2.515E−01	5.64E−03
ce-K, γ 32	1.61E−03	2.125E−01	3.42E−04
ce-L$_1$, γ 32	1.93E−04	2.452E−01	4.74E−05
γ 33	4.72E−03	2.681E−01	1.27E−03
ce-K, γ 33	2.91E−04	2.292E−01	6.67E−05
γ 34	1.93E−02	2.791E−01	5.40E−03
ce-K, γ 34	2.40E−04	2.402E−01	5.76E−05
γ 35	9.53E−04	2.960E−01	2.82E−04
γ 36	2.09E−02	3.031E−01	6.33E−03
ce-K, γ 36	9.33E−04	2.642E−01	2.46E−04
ce-L$_1$, γ 36	1.15E−04	2.969E−01	3.40E−05
γ 37	1.24E−03	3.248E−01	4.02E−04
γ 39	2.32E−02	3.296E−01	7.65E−03
ce-K, γ 39	8.33E−04	2.907E−01	2.42E−04
ce-L$_1$, γ 39	1.02E−04	3.234E−01	3.31E−05
γ 40	1.13E−02	3.685E−01	4.16E−03
ce-K, γ 40	2.71E−04	3.296E−01	8.95E−05
γ 41	1.35E−03	3.692E−01	4.99E−04
γ 43	1.93E−03	3.898E−01	7.54E−04
γ 44	1.16E−02	4.247E−01	4.93E−03
ce-K, γ 44	1.89E−04	3.857E−01	7.30E−05
γ 45	9.67E−03	4.315E−01	4.17E−03
ce-K, γ 45	1.49E−04	3.926E−01	5.87E−05
γ 46	2.24E−02	4.514E−01	1.01E−02
ce-K, γ 46	3.60E−04	4.125E−01	1.48E−04
ce-L$_1$, γ 46	4.41E−05	4.452E−01	1.96E−05
γ 47	1.90E−03	4.609E−01	8.76E−04
γ 48	2.28E−03	4.663E−01	1.06E−03
γ 49	3.05E−03	4.929E−01	1.50E−03
γ 51	2.67E−03	5.148E−01	1.38E−03
γ 52	4.18E−03	5.238E−01	2.19E−03
γ 53	1.01E−02	5.764E−01	5.80E−03
ce-K, γ 53	7.79E−05	5.375E−01	4.19E−05
γ 54	1.55E−03	6.067E−01	9.39E−04
γ 55	6.97E−04	7.317E−01	5.10E−04
γ 56	1.16E−03	8.203E−01	9.52E−04
K$_{\alpha_1}$ X-ray	4.31E−01	3.344E−02	1.44E−02
K$_{\alpha_2}$ X-ray	2.35E−01	3.303E−02	7.76E−03
K$_{\beta_1}$ X-ray	8.41E−02	3.780E−02	3.18E−03
K$_{\beta_2}$ X-ray	3.15E−02	3.875E−02	1.22E−03
K$_{\beta_3}$ X-ray	4.36E−02	3.772E−02	1.64E−03
Auger-KLL	5.55E−02	2.714E−02*	1.51E−03
Auger-KLX	2.66E−02	3.191E−02*	8.48E−04
Auger-KXY	3.69E−03	3.663E−02*	1.35E−04
Auger-LMM	5.11E−01	3.718E−03*	1.90E−03
Auger-LMX	2.99E−01	4.723E−03*	1.41E−03
Auger-LXY	4.76E−02	5.457E−03*	2.60E−04
Auger-MXY	1.60E+00	9.852E−04*	1.58E−03
ΔE	3.71E−01	1.249E−04*	4.64E−05

Listed X, γ and $\gamma^{\pm}$ radiations	2.70E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.91E−03
Listed β, ce and Auger radiations	1.78E−02
Omitted β, ce and Auger radiations**	6.28E−04
Listed radiations	2.88E−01
Omitted radiations**	2.53E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

La-132 daughter is radioactive.


132 58 Ce(3.51h)
0+
0.0
1(+)
1+
1+
1+
1+
1+
1+
1+,2+
1+
2+
1+
2+
2-
0.8200
0.7318
0.6483
0.6067
0.5238
0.4850
0.4069
0.3591
0.2791
0.2169
0.1821
0.1554
0.0
EC1
EC2
EC3
EC4
EC5
EC6
EC7
EC8
EC9
EC10
γ56
γ47
γ35
γ55
γ53
γ51
γ37
γ31
γ49
γ46
γ45
γ44
γ43
γ41
γ26
γ33
γ4
γ48
γ40
γ39
γ36
γ32
γ30
γ27
γ25
γ23
γ19
γ15
γ6
γ13
γ3
γ5
γ2
γ54
γ52
γ34
γ28
γ24
γ21
132 57 La(4.8h)

58-Ce-133m

06-OCT-95

Half-life = 4.9 h
Decay mode(s): EC, β^+

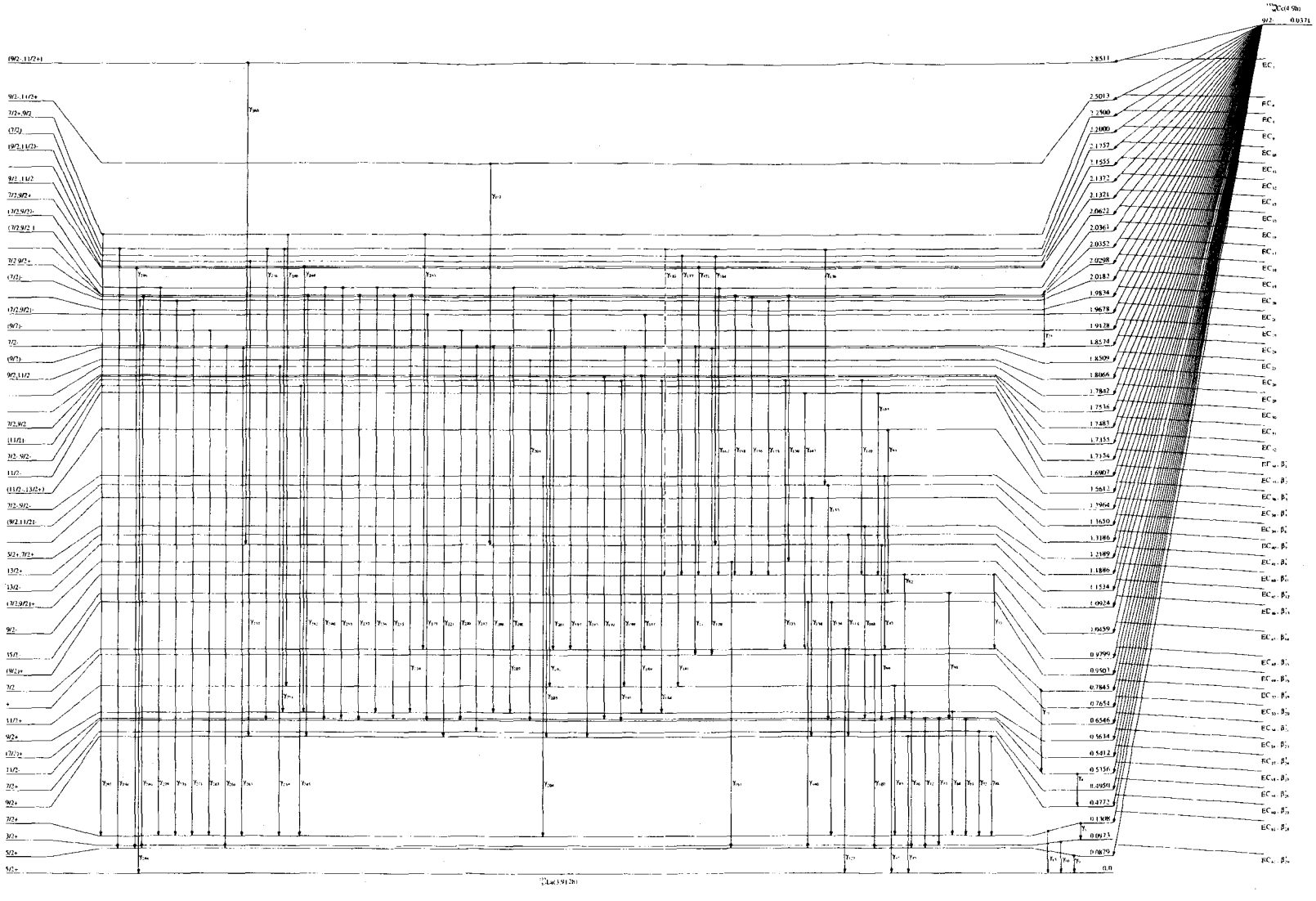
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 13	3.84E−04	3.927E−01*	1.51E−04
β^+ 14	3.84E−03	4.130E−01*	1.59E−03
β^+ 16	1.44E−03	4.550E−01*	6.56E−04
β^+ 17	4.80E−04	5.117E−01*	2.46E−04
β^+ 18	6.73E−04	5.244E−01*	3.53E−04
β^+ 19	1.35E−03	5.282E−01*	7.10E−04
β^+ 21	4.80E−04	5.858E−01*	2.81E−04
β^+ 22	2.69E−04	6.139E−01*	1.65E−04
β^+ 23	2.98E−03	6.264E−01*	1.87E−03
β^+ 24	9.61E−04	6.362E−01*	6.11E−04
β^+ 25	3.17E−03	6.387E−01*	2.02E−03
β^+ 26	2.59E−03	6.568E−01*	1.70E−03
β^+ 27	1.92E−03	6.648E−01*	1.28E−03
β^+ 28	1.35E−02	8.204E−01*	1.10E−02
β^+ 29	4.32E−03	8.537E−01*	3.69E−03
$\gamma^{\pm}$	7.86E−02	5.110E−01	4.02E−02
ce-L_2, γ 1	5.09E−03	2.765E−02	1.41E−04
ce-L_3, γ 1	6.99E−03	2.806E−02	1.96E−04
γ 4	1.92E−01	5.839E−02	1.12E−02
ce-K, γ 4	1.67E−01	1.947E−02	3.26E−03
ce-L_1, γ 4	1.57E−02	5.212E−02	8.17E−04
ce-L_2, γ 4	3.79E−03	5.250E−02	1.99E−04
ce-L_3, γ 4	5.33E−03	5.291E−02	2.82E−04
ce-M, γ 4	5.09E−03	5.727E−02*	2.92E−04
γ 9	5.14E−02	8.794E−02	4.52E−03
ce-K, γ 9	6.96E−02	4.901E−02	3.41E−03
ce-L_1, γ 9	8.61E−03	8.167E−02	7.03E−04
ce-M, γ 9	1.97E−03	8.682E−02*	1.71E−04
ce-K, γ 10	1.79E−02	5.834E−02	1.05E−03
ce-L_1, γ 10	2.20E−03	9.099E−02	2.01E−04
γ 15	1.79E−01	1.308E−01	2.34E−02
ce-K, γ 15	7.93E−02	9.188E−02	7.29E−03
ce-L_1, γ 15	9.68E−03	1.245E−01	1.21E−03
ce-L_2, γ 15	1.32E−03	1.249E−01	1.65E−04
ce-M, γ 15	2.46E−03	1.297E−01*	3.19E−04
ce-K, γ 23	2.49E−03	1.397E−01	3.47E−04
ce-K, γ 31	9.10E−04	2.100E−01	1.91E−04
γ 33	1.74E−02	2.614E−01	4.55E−03
ce-K, γ 33	1.15E−03	2.225E−01	2.55E−04
γ 48	4.16E−02	3.464E−01	1.44E−02
ce-K, γ 48	1.18E−03	3.075E−01	3.62E−04
γ 52	1.25E−02	3.642E−01	4.57E−03
γ 61	1.70E−02	4.048E−01	6.87E−03
ce-K, γ 61	1.27E−03	3.659E−01	4.66E−04
γ 68	3.53E−02	4.326E−01	1.53E−02
ce-K, γ 68	5.45E−04	3.936E−01	2.15E−04
γ 70	9.41E−03	4.442E−01	4.18E−03
γ 71	1.37E−02	4.442E−01	6.09E−03
γ 72	9.96E−03	4.533E−01	4.51E−03
γ 76	3.18E−02	4.755E−01	1.51E−02
ce-K, γ 76	3.15E−04	4.366E−01	1.37E−04
γ 77	3.92E−01	4.772E−01	1.87E−01
ce-K, γ 77	3.85E−03	4.383E−01	1.69E−03
ce-L_1, γ 77	4.39E−04	4.710E−01	2.07E−04
γ 82	2.07E−01	5.104E−01	1.06E−01
ce-K, γ 82	2.12E−03	4.714E−01	9.98E−04
γ 83	3.14E−02	5.238E−01	1.64E−02
γ 85	2.94E−02	5.411E−01	1.59E−02
γ 93	6.15E−03	5.811E−01	3.58E−03
γ 97	2.60E−02	6.118E−01	1.59E−02
γ 99	1.65E−02	6.177E−01	1.02E−02
γ 103	1.97E−02	6.447E−01	1.27E−02
γ 108	5.49E−03	6.783E−01	3.72E−03
γ 110	4.12E−02	6.895E−01	2.84E−02
ce-K, γ 110	2.34E−04	6.506E−01	1.52E−04
γ 116	4.90E−03	7.114E−01	3.49E−03
γ 127	9.64E−02	7.846E−01	7.57E−02
γ 134	8.90E−03	8.195E−01	7.29E−03
γ 135	1.01E−02	8.294E−01	8.36E−03
γ 136	4.27E−03	8.348E−01	3.57E−03
γ 138	4.98E−03	8.414E−01	4.19E−03
γ 140	6.94E−03	8.623E−01	5.98E−03
γ 147	4.35E−03	9.061E−01	3.94E−03
γ 150	5.72E−03	9.437E−01	5.40E−03
γ 151	1.27E−02	9.510E−01	1.21E−02
γ 155	9.76E−03	9.723E−01	9.49E−03
γ 156	7.53E−03	9.839E−01	7.41E−03
γ 158	2.94E−02	9.901E−01	2.91E−02
γ 161	3.53E−03	1.004E+00	3.54E−03
γ 162	4.82E−03	1.016E+00	4.90E−03
γ 164	3.88E−03	1.022E+00	3.97E−03
γ 170	4.70E−03	1.085E+00	5.11E−03
γ 171	7.45E−03	1.092E+00	8.13E−03
γ 172	4.70E−03	1.092E+00	5.14E−03
γ 177	4.82E−03	1.130E+00	5.45E−03
γ 181	4.43E−03	1.152E+00	5.10E−03
γ 182	6.62E−03	1.155E+00	7.65E−03
γ 184	5.92E−03	1.172E+00	6.94E−03
γ 187	1.10E−02	1.183E+00	1.30E−02
γ 189	4.63E−03	1.190E+00	5.51E−03
γ 190	6.31E−03	1.196E+00	7.55E−03
γ 191	1.57E−02	1.200E+00	1.88E−02
γ 192	6.12E−03	1.207E+00	7.38E−03
γ 193	7.84E−03	1.213E+00	9.51E−03
γ 197	5.02E−03	1.234E+00	6.19E−03
γ 201	3.33E−03	1.252E+00	4.17E−03
γ 202	3.92E−03	1.258E+00	4.93E−03
γ 203	4.70E−03	1.258E+00	5.92E−03
γ 204	3.61E−03	1.266E+00	4.56E−03
γ 205	3.72E−03	1.271E+00	4.73E−03
γ 206	6.27E−03	1.277E+00	8.01E−03
γ 207	8.58E−03	1.288E+00	1.11E−02
γ 208	2.98E−03	1.294E+00	3.86E−03
γ 215	2.82E−03	1.348E+00	3.80E−03
γ 217	6.04E−03	1.362E+00	8.22E−03
γ 220	1.72E−02	1.377E+00	2.38E−02
γ 221	2.51E−03	1.380E+00	3.46E−03
γ 227	1.20E−02	1.432E+00	1.72E−02
γ 233	6.66E−03	1.465E+00	9.76E−03
γ 234	2.78E−03	1.472E+00	4.10E−03
γ 235	3.21E−02	1.495E+00	4.81E−02
γ 236	2.90E−03	1.499E+00	4.35E−03
γ 237	4.74E−02	1.500E+00	7.12E−02
γ 239	5.68E−03	1.521E+00	8.65E−03
γ 240	2.47E−02	1.527E+00	3.77E−02
γ 242	3.61E−03	1.558E+00	5.62E−03
γ 244	3.18E−03	1.574E+00	5.00E−03
γ 245	2.39E−02	1.585E+00	3.79E−02
γ 246	2.70E−03	1.595E+00	4.32E−03
γ 251	4.51E−03	1.637E+00	7.38E−03
γ 254	4.82E−03	1.653E+00	7.97E−03
γ 256	7.53E−03	1.664E+00	1.25E−02
γ 257	2.59E−03	1.678E+00	4.34E−03
γ 260	2.94E−03	1.698E+00	4.99E−03
γ 263	1.28E−02	1.720E+00	2.21E−02
γ 266	1.22E−02	1.769E+00	2.16E−02
γ 267	6.90E−03	1.782E+00	1.23E−02
γ 271	5.49E−03	1.852E+00	1.02E−02
γ 275	1.02E−02	1.887E+00	1.92E−02
γ 279	2.98E−03	1.931E+00	5.75E−03
γ 280	2.86E−03	1.942E+00	5.56E−03
γ 282	2.55E−03	1.963E+00	5.00E−03
γ 284	1.36E−02	2.018E+00	2.75E−02

γ 286	6.98E−03	2.044E+00	1.43E−02
γ 294	5.96E−03	2.112E+00	1.26E−02
γ 295	1.25E−02	2.119E+00	2.66E−02
K_{α_1} X-ray	5.52E−01	3.344E−02	1.85E−02
K_{α_2} X-ray	3.01E−01	3.303E−02	9.93E−03
K_{β_1} X-ray	1.08E−01	3.780E−02	4.07E−03
Auger-KLL	7.10E−02	2.714E−02*	1.93E−03
Auger-KLX	3.40E−02	3.191E−02*	1.09E−03
Auger-KXY	4.72E−03	3.663E−02*	1.73E−04
Auger-LMM	6.45E−01	3.711E−03*	2.39E−03
Auger-LMX	3.76E−01	4.714E−03*	1.77E−03
Auger-LXY	5.99E−02	5.447E−03*	3.26E−04
Auger-MXY	2.02E+00	9.853E−04*	1.99E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.45E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.81E−01
Listed β, ce and Auger radiations	6.07E−02
Omitted β, ce and Auger radiations**	5.55E−03
Listed radiations	1.51E+00
Omitted radiations**	2.87E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

La-133 daughter is radioactive.



58-Ce-133

06-OCT-95

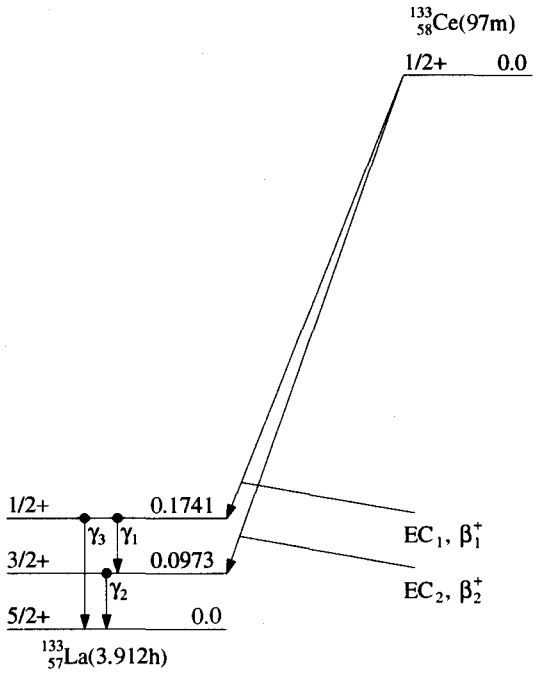
Half-life = 97 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.80E−01	7.841E−01*	1.41E−01
β^+ 2	1.70E−01	8.188E−01*	1.39E−01
$\gamma^\pm$	7.00E−01	5.110E−01	3.58E−01
γ 1	1.57E−01	7.690E−02	1.21E−02
ce-K, γ 1	3.14E−01	3.798E−02	1.19E−02
ce-L_1, γ 1	3.88E−02	7.063E−02	2.74E−03
ce-M, γ 1	8.95E−03	7.578E−02*	6.79E−04
γ 2	4.50E−01	9.726E−02	4.38E−02
ce-K, γ 2	4.61E−01	5.834E−02	2.69E−02
ce-L_1, γ 2	5.64E−02	9.099E−02	5.14E−03
ce-L_2, γ 2	7.97E−03	9.137E−02	7.28E−04
ce-L_3, γ 2	5.15E−03	9.178E−02	4.72E−04
ce-M, γ 2	1.45E−02	9.614E−02*	1.39E−03
ce-N^+, γ 2	3.98E−03	9.726E−02*	3.87E−04
γ 3	4.05E−03	1.740E−01	7.05E−04
γ 4	9.00E−03	3.767E−01	3.39E−03
γ 5	1.12E−01	5.577E−01	6.27E−02
ce-K, γ 5	7.29E−04	5.188E−01	3.78E−04
K_{α_1} X-ray	6.28E−01	3.344E−02	2.10E−02
K_{α_2} X-ray	3.42E−01	3.303E−02	1.13E−02
K_{β_1} X-ray	1.22E−01	3.780E−02	4.63E−03
K_{β_2} X-ray	4.58E−02	3.875E−02	1.78E−03
K_{β_3} X-ray	6.34E−02	3.772E−02	2.39E−03
Auger-KLL	8.08E−02	2.714E−02*	2.19E−03
Auger-KLX	3.87E−02	3.191E−02*	1.23E−03
Auger-LMM	7.25E−01	3.711E−03*	2.69E−03
Auger-LMX	4.23E−01	4.714E−03*	1.99E−03
Auger-LXY	6.73E−02	5.448E−03*	3.67E−04
Auger-MXY	2.27E+00	9.856E−04*	2.24E−03

Listed X, γ and $\gamma^\pm$ radiations	5.22E−01
Omitted X, γ and $\gamma^\pm$ radiations**	7.78E−04
Listed β, ce and Auger radiations	3.42E−01
Omitted β, ce and Auger radiations**	1.10E−03
Listed radiations	8.63E−01
Omitted radiations**	1.88E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

La-133 daughter is radioactive.



58-Ce-146

13-DEC-90

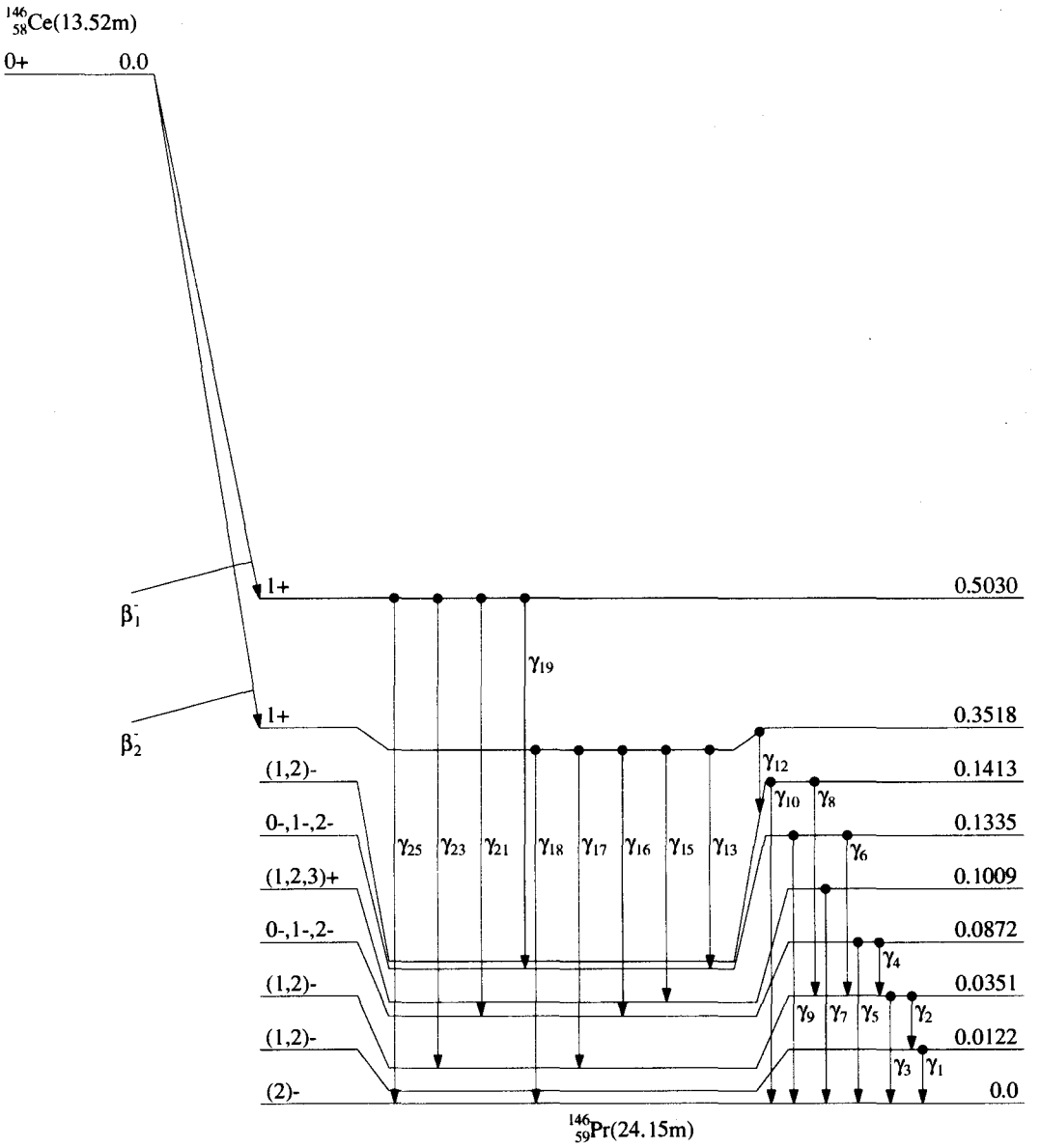
Half-life = 13.52 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	3.00E−02	1.602E−01*	4.81E−03
β^- 2	9.70E−01	2.152E−01*	2.09E−01
ce-L_1, γ 1	8.68E−02	5.395E−03	4.69E−04
ce-L_2, γ 2	4.01E−02	1.644E−02	6.59E−04
ce-L_3, γ 2	5.68E−02	1.692E−02	9.61E−04
ce-M, γ 2	2.17E−02	2.164E−02*	4.69E−04
γ 3	1.12E−02	3.505E−02	3.94E−04
ce-L_1, γ 3	2.86E−02	2.822E−02	8.06E−04
ce-L_2, γ 3	2.33E−01	2.861E−02	6.66E−03
ce-L_3, γ 3	3.09E−01	2.909E−02	9.00E−03
ce-M, γ 3	1.28E−01	3.381E−02*	4.32E−03
ce-N^+, γ 3	3.21E−02	3.505E−02*	1.13E−03
ce-L_2, γ 4	7.86E−03	4.575E−02	3.60E−04
ce-L_3, γ 4	9.70E−03	4.623E−02	4.49E−04
γ 5	7.87E−03	8.719E−02	6.86E−04
ce-K, γ 5	1.09E−02	4.520E−02	4.93E−04
ce-L_2, γ 5	3.34E−03	8.075E−02	2.70E−04
ce-L_3, γ 5	3.75E−03	8.123E−02	3.05E−04
γ 6	3.20E−02	9.855E−02	3.16E−03
ce-K, γ 6	3.27E−02	5.656E−02	1.85E−03
ce-L_1, γ 6	2.92E−03	9.172E−02	2.68E−04
ce-L_2, γ 6	7.94E−03	9.211E−02	7.32E−04
ce-L_3, γ 6	8.64E−03	9.259E−02	8.00E−04
ce-M, γ 6	4.37E−03	9.731E−02*	4.25E−04
γ 7	2.53E−02	1.009E−01	2.55E−03
γ 8	6.18E−03	1.062E−01	6.56E−04
ce-K, γ 8	5.84E−03	6.418E−02	3.75E−04
γ 9	8.15E−02	1.335E−01	1.09E−02
ce-K, γ 9	4.02E−02	9.153E−02	3.68E−03
ce-L_1, γ 9	5.07E−03	1.267E−01	6.42E−04
γ 10	3.26E−02	1.413E−01	4.61E−03
ce-K, γ 10	1.38E−02	9.930E−02	1.37E−03
γ 11	2.30E−03	1.738E−01	4.01E−04
γ 12	4.95E−02	2.105E−01	1.04E−02
γ 13	2.08E−01	2.182E−01	4.54E−02
ce-K, γ 13	5.34E−03	1.762E−01	9.41E−04
γ 14	2.70E−03	2.455E−01	6.62E−04
γ 15	2.53E−02	2.509E−01	6.35E−03
ce-K, γ 15	2.21E−03	2.089E−01	4.61E−04
γ 16	8.99E−02	2.646E−01	2.38E−02
ce-K, γ 16	1.39E−03	2.226E−01	3.09E−04
γ 17	5.62E−01	3.167E−01	1.78E−01
ce-K, γ 17	5.47E−03	2.747E−01	1.50E−03
γ 18	2.30E−02	3.515E−01	8.10E−03
γ 19	1.74E−03	3.692E−01	6.43E−04
γ 20	1.01E−03	3.756E−01	3.80E−04
γ 21	1.29E−02	4.157E−01	5.37E−03
γ 23	8.43E−03	4.680E−01	3.95E−03
γ 25	1.01E−02	5.030E−01	5.09E−03
γ 26	6.74E−04	5.268E−01	3.55E−04
K_{α_1} X-ray	6.77E−02	3.603E−02	2.44E−03
K_{α_2} X-ray	3.71E−02	3.555E−02	1.32E−03
K_{β_1} X-ray	1.34E−02	4.075E−02	5.47E−04
Auger-LMM	4.97E−01	4.020E−03*	2.00E−03
Auger-LMX	2.89E−01	5.128E−03*	1.48E−03
Auger-LXY	4.51E−02	5.944E−03*	2.68E−04
Auger-MXY	1.59E+00	1.071E−03*	1.70E−03

Listed X, γ and $\gamma^{\pm}$ radiations	3.16E−01
Omitted X, γ AND $\gamma^{\pm}$ radiations**	1.90E−03
Listed β, ce AND Auger radiations	2.59E−01
Omitted β, ce AND Auger radiations**	4.22E−03
Listed radiations	5.75E−01
Omitted radiations**	6.12E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pr-146 daughter is radioactive.


146 58 Ce(13.52m)
0+
0.0
β1-
β2-
1+
1+
(1,2)-
0-,1-,2-
(1,2,3)+
0-,1-,2-
(1,2)-
(1,2)-
(2)-
0.5030
0.3518
0.1413
0.1335
0.1009
0.0872
0.0351
0.0122
0.0
γ19
γ25
γ23
γ21
γ18
γ17
γ16
γ15
γ13
γ12
γ10
γ8
γ6
γ4
γ9
γ7
γ5
γ2
γ3
γ1
146 59 Pr(24.15m)

59-Pr-134

11-JUL-94

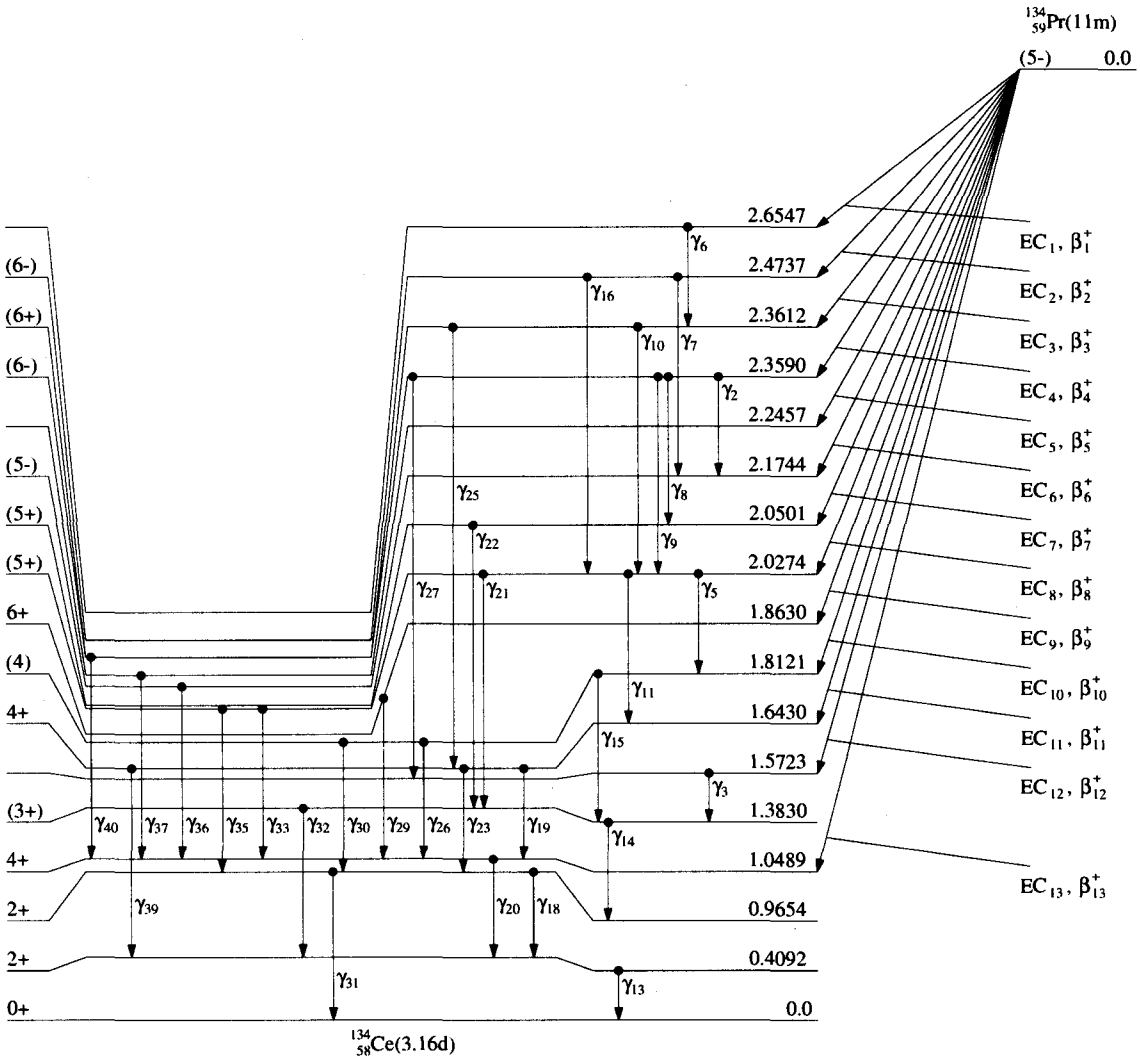
Half-life = 11 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.61E−02	1.135E+00*	1.83E−02
β^+ 2	1.33E−02	1.218E+00*	1.62E−02
β^+ 3	1.42E−01	1.270E+00*	1.81E−01
β^+ 4	2.18E−01	1.271E+00*	2.77E−01
β^+ 5	1.99E−02	1.323E+00*	2.63E−02
β^+ 6	2.94E−02	1.356E+00*	3.98E−02
β^+ 7	1.33E−02	1.414E+00*	1.88E−02
β^+ 8	6.63E−02	1.424E+00*	9.45E−02
β^+ 9	1.99E−02	1.501E+00*	2.99E−02
β^+ 10	5.69E−03	1.525E+00*	8.67E−03
β^+ 11	2.65E−02	1.604E+00*	4.26E−02
β^+ 12	7.58E−03	1.637E+00*	1.24E−02
β^+ 13	1.04E−01	1.883E+00*	1.96E−01
$\gamma^\pm$	1.36E+00	5.110E−01	6.97E−01
γ 2	4.84E−02	1.843E−01	8.93E−03
ce-K, γ 2	8.95E−03	1.439E−01	1.29E−03
γ 3	3.57E−02	1.889E−01	6.74E−03
γ 5	2.14E−01	2.153E−01	4.61E−02
ce-K, γ 5	2.59E−02	1.749E−01	4.53E−03
γ 6	3.06E−02	2.935E−01	8.98E−03
γ 7	1.27E−02	2.990E−01	3.81E−03
γ 8	9.69E−02	3.091E−01	3.00E−02
γ 9	1.89E−01	3.318E−01	6.26E−02
γ 10	1.86E−01	3.342E−01	6.22E−02
ce-K, γ 10	7.01E−03	2.938E−01	2.06E−03
γ 11	1.07E−01	3.844E−01	4.12E−02
γ 12	1.02E−02	3.920E−01	4.00E−03
γ 13	8.92E−01	4.092E−01	3.65E−01
ce-K, γ 13	1.40E−02	3.688E−01	5.15E−03
γ 14	3.82E−02	4.172E−01	1.60E−02
γ 15	5.35E−02	4.294E−01	2.30E−02
γ 16	1.02E−02	4.467E−01	4.56E−03
γ 17	3.31E−02	4.804E−01	1.59E−02
γ 18	1.07E−01	5.560E−01	5.95E−02
γ 19	3.82E−02	5.941E−01	2.27E−02
γ 20	5.97E−01	6.396E−01	3.82E−01
ce-K, γ 20	2.86E−03	5.992E−01	1.71E−03
γ 21	3.82E−02	6.444E−01	2.46E−02
γ 22	6.37E−02	6.672E−01	4.25E−02
γ 23	1.17E−01	6.776E−01	7.95E−02
γ 24	2.55E−02	6.857E−01	1.75E−02
γ 25	2.80E−02	7.180E−01	2.01E−02
γ 26	9.69E−02	7.632E−01	7.40E−02
γ 27	2.55E−02	7.862E−01	2.00E−02
γ 28	1.02E−02	7.945E−01	8.10E−03
γ 29	2.80E−02	8.141E−01	2.28E−02
γ 30	6.12E−02	8.466E−01	5.18E−02
γ 31	1.10E−01	9.655E−01	1.06E−01
γ 32	1.53E−01	9.739E−01	1.49E−01
γ 33	1.25E−01	9.787E−01	1.22E−01
γ 34	2.55E−02	1.000E+00	2.55E−02
γ 35	1.02E−02	1.062E+00	1.08E−02
γ 36	1.07E−01	1.125E+00	1.21E−01
γ 37	3.06E−02	1.197E+00	3.66E−02
γ 38	1.27E−02	1.213E+00	1.55E−02
γ 39	2.55E−02	1.234E+00	3.15E−02
γ 40	4.33E−02	1.312E+00	5.69E−02
γ 41	3.82E−02	2.233E+00	8.54E−02
γ 42	5.35E−02	2.331E+00	1.25E−01
K_{α_1} X-ray	1.67E−01	3.472E−02	5.79E−03

Listed X, γ and $\gamma^\pm$ radiations	3.11E+00
Omitted X, γ AND $\gamma^\pm$ radiations**	9.12E−03
Listed β, ce AND Auger radiations	9.76E−01
Omitted β, ce AND Auger radiations**	1.57E−02
Listed radiations	4.09E+00
Omitted radiations**	2.48E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ce-134 daughter is radioactive.


$^{134}_{59}$Pr(11m)
(5-) 0.0
2.6547
2.4737
2.3612
2.3590
2.2457
2.1744
2.0501
2.0274
1.8630
1.8121
1.6430
1.5723
1.3830
1.0489
0.9654
0.4092
0.0
(6-)
(6+)
(6-)
(5-)
(5+)
(5+)
6+
(4)
4+
(3+)
4+
2+
2+
0+
EC$_1$, β^+_1
EC$_2$, β^+_2
EC$_3$, β^+_3
EC$_4$, β^+_4
EC$_5$, β^+_5
EC$_6$, β^+_6
EC$_7$, β^+_7
EC$_8$, β^+_8
EC$_9$, β^+_9
EC$_{10}$, β^+_{10}
EC$_{11}$, β^+_{11}
EC$_{12}$, β^+_{12}
EC$_{13}$, β^+_{13}
γ_{40} γ_{37} γ_{36} γ_{35} γ_{33} γ_{32} γ_{30} γ_{29} γ_{26} γ_{23} γ_{19} γ_{14}
γ_{39} γ_{20} γ_{18}
γ_{31} γ_{13}
γ_{6} γ_{16} γ_{10} γ_{7} γ_{2} γ_{25} γ_{8} γ_{22} γ_{9} γ_{27} γ_{21} γ_{5} γ_{11} γ_{15} γ_{3}
$^{134}_{58}$Ce(3.16d)

59-Pr-134

11-JUL-94

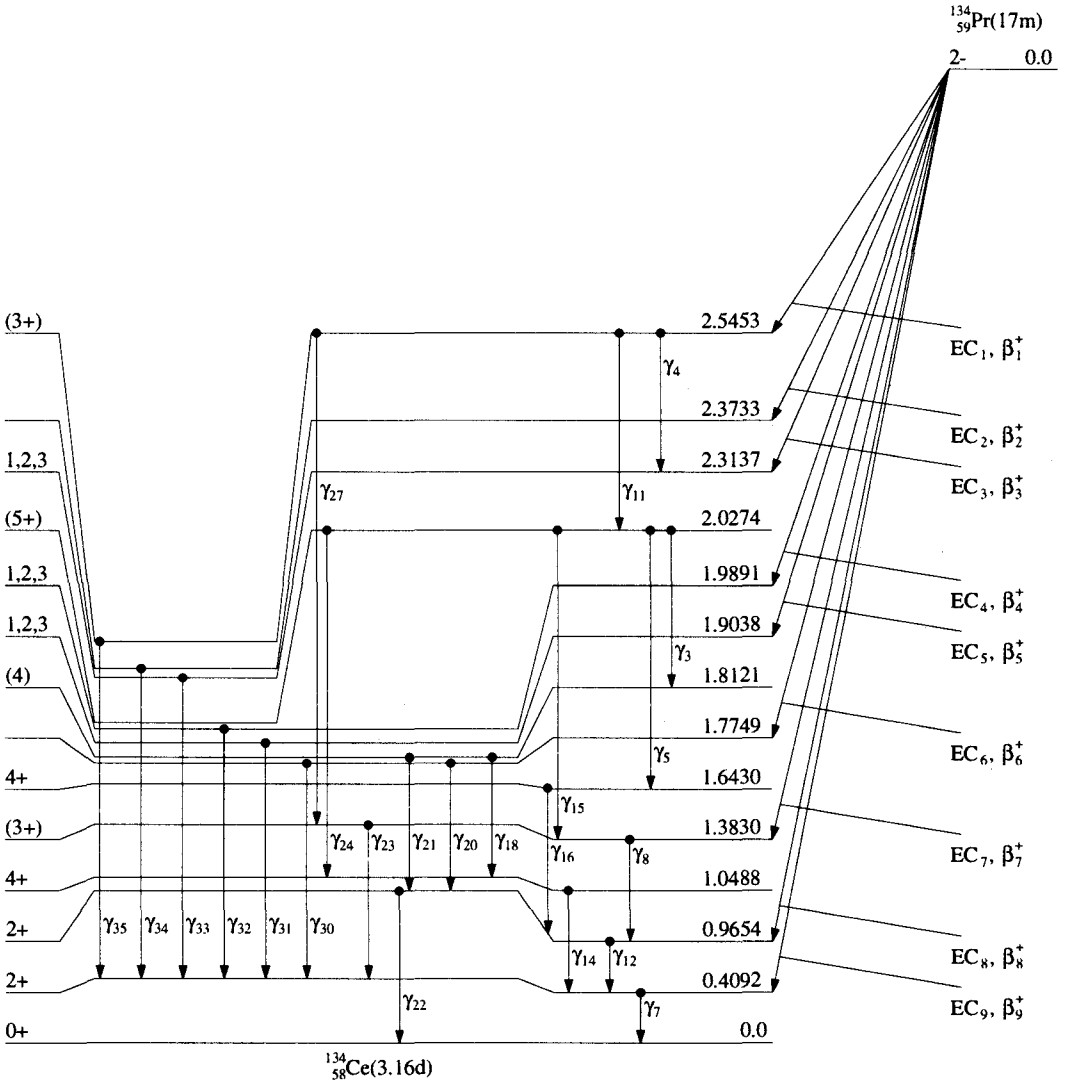
Half-life = 17 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	9.93E−02	1.185E+00*	1.18E−01
β^+ 2	9.93E−03	1.264E+00*	1.26E−02
β^+ 3	5.56E−02	1.292E+00*	7.19E−02
β^+ 4	3.38E−02	1.442E+00*	4.87E−02
β^+ 5	3.97E−02	1.482E+00*	5.89E−02
β^+ 6	1.49E−02	1.542E+00*	2.30E−02
β^+ 7	3.78E−02	1.725E+00*	6.51E−02
β^+ 8	1.99E−01	1.922E+00*	3.82E−01
β^+ 9	2.98E−01	2.185E+00*	6.51E−01
$\gamma^\pm$	1.58E+00	5.110E−01	8.05E−01
γ 3	1.74E−02	2.153E−01	3.75E−03
γ 4	1.34E−02	2.313E−01	3.10E−03
γ 5	9.38E−03	3.843E−01	3.60E−03
γ 7	8.71E−01	4.092E−01	3.56E−01
ce-K, γ 7	1.36E−02	3.688E−01	5.03E−03
γ 8	1.34E−02	4.172E−01	5.59E−03
γ 10	1.74E−02	4.804E−01	8.37E−03
γ 11	4.15E−02	5.181E−01	2.15E−02
γ 12	1.31E−01	5.560E−01	7.30E−02
γ 14	2.14E−02	6.396E−01	1.37E−02
γ 15	4.02E−03	6.444E−01	2.59E−03
γ 16	6.70E−03	6.776E−01	4.54E−03
γ 17	1.34E−02	6.857E−01	9.19E−03
γ 18	8.04E−03	7.632E−01	6.14E−03
γ 19	5.36E−03	7.945E−01	4.26E−03
γ 20	5.36E−03	8.095E−01	4.34E−03
γ 21	5.36E−03	8.466E−01	4.54E−03
γ 22	1.31E−01	9.655E−01	1.27E−01
γ 23	4.82E−02	9.739E−01	4.70E−02
γ 24	1.07E−02	9.787E−01	1.05E−02
γ 25	1.34E−02	1.000E+00	1.34E−02
γ 27	6.70E−03	1.163E+00	7.79E−03
γ 28	6.70E−03	1.213E+00	8.13E−03
γ 30	1.47E−02	1.366E+00	2.01E−02
γ 31	5.36E−02	1.495E+00	8.01E−02
γ 32	4.69E−02	1.580E+00	7.41E−02
γ 33	9.92E−02	1.904E+00	1.89E−01
γ 34	1.47E−02	1.964E+00	2.90E−02
γ 35	1.07E−01	2.136E+00	2.29E−01
γ 36	2.01E−02	2.233E+00	4.49E−02
γ 37	2.81E−02	2.331E+00	6.56E−02
K_{α_1} X-ray	9.53E−02	3.472E−02	3.31E−03

Listed X, γ and $\gamma^\pm$ radiations	2.28E+00
Omitted X, γ and $\gamma^\pm$ radiations**	1.24E−02
Listed β, ce and Auger radiations	1.44E+00
Omitted β, ce and Auger radiations**	6.41E−03
Listed radiations	3.71E+00
Omitted radiations**	1.88E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ce-134 daughter is radioactive.


$^{134}_{59}$Pr(17m)
2- 0.0
(3+)
1,2,3
(5+)
1,2,3
1,2,3
(4)
4+
(3+)
4+
2+
2+
0+
2.5453
2.3733
2.3137
2.0274
1.9891
1.9038
1.8121
1.7749
1.6430
1.3830
1.0488
0.9654
0.4092
0.0
γ_4
γ_{27}
γ_{11}
γ_3
γ_5
γ_{15}
γ_{24} γ_{23} γ_{21} γ_{20} γ_{18} γ_{16} γ_8
γ_{35} γ_{34} γ_{33} γ_{32} γ_{31} γ_{30}
γ_{14} γ_{12}
γ_{22}
γ_7
EC_1, β_1^+
EC_2, β_2^+
EC_3, β_3^+
EC_4, β_4^+
EC_5, β_5^+
EC_6, β_6^+
EC_7, β_7^+
EC_8, β_8^+
EC_9, β_9^+
$^{134}_{58}$Ce(3.16d)

59-Pr-135

03-FEB-88

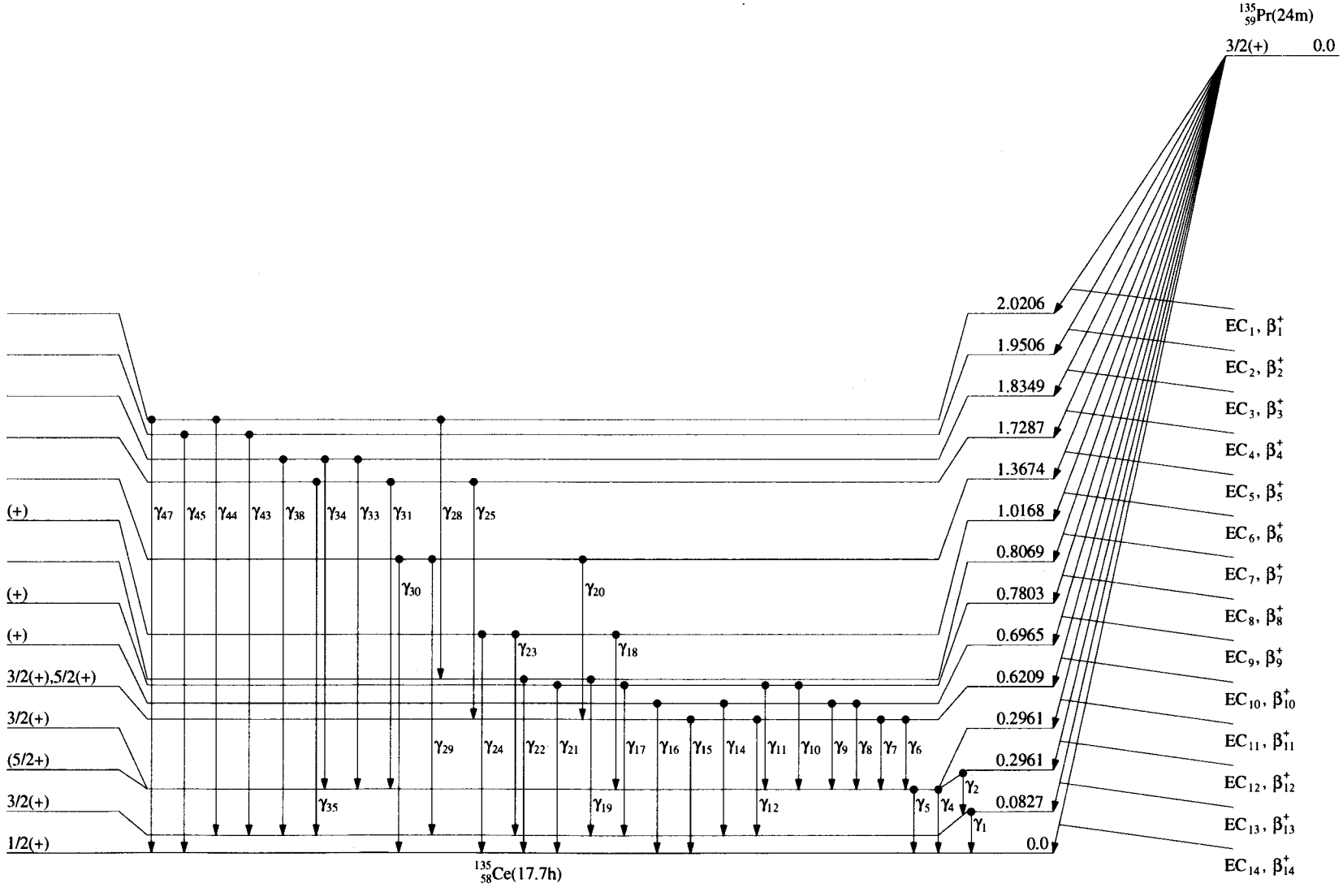
Half-life = 24 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 6	5.26E−03	7.564E−01*	3.98E−03
β^+ 7	4.96E−03	8.510E−01*	4.22E−03
β^+ 8	1.19E−02	8.631E−01*	1.03E−02
β^+ 9	7.15E−03	9.010E−01*	6.44E−03
β^+ 10	4.17E−02	9.353E−01*	3.90E−02
β^+ 11	1.29E−01	1.083E+00*	1.40E−01
β^+ 12	8.54E−02	1.083E+00*	9.25E−02
β^+ 13	1.69E−01	1.181E+00*	1.99E−01
β^+ 14	6.95E−02	1.219E+00*	8.47E−02
$\gamma^\pm$	1.05E+00	5.110E−01	5.37E−01
γ 1	1.36E−01	8.264E−02	1.13E−02
ce-K, γ 1	3.61E−01	4.220E−02	1.52E−02
ce-L_1, γ 1	4.52E−02	7.609E−02	3.44E−03
ce-M, γ 1	1.03E−02	8.145E−02*	8.40E−04
γ 2	1.30E−01	2.134E−01	2.77E−02
ce-K, γ 2	1.61E−02	1.730E−01	2.79E−03
γ 4	3.25E−02	2.961E−01	9.62E−03
γ 5	2.40E−01	2.961E−01	7.12E−02
ce-K, γ 5	1.24E−02	2.557E−01	3.18E−03
γ 6	3.90E−03	3.249E−01	1.27E−03
γ 7	3.90E−03	3.249E−01	1.27E−03
γ 8	3.90E−03	4.007E−01	1.56E−03
γ 9	3.90E−03	4.007E−01	1.56E−03
γ 10	5.20E−03	4.843E−01	2.52E−03
γ 11	1.04E−02	4.843E−01	5.04E−03
γ 12	8.06E−02	5.382E−01	4.34E−02
γ 13	3.25E−03	5.931E−01	1.93E−03
γ 14	1.78E−02	6.138E−01	1.09E−02
γ 15	1.56E−02	6.209E−01	9.69E−03
γ 16	1.37E−02	6.975E−01	9.52E−03
γ 17	1.37E−02	6.975E−01	9.52E−03
γ 18	4.55E−03	7.206E−01	3.28E−03
γ 19	3.90E−03	7.244E−01	2.83E−03
γ 20	1.30E−03	7.470E−01	9.71E−04
γ 21	3.90E−03	7.806E−01	3.04E−03
γ 22	1.17E−02	8.069E−01	9.44E−03
γ 23	7.80E−03	9.341E−01	7.29E−03
γ 24	6.63E−03	1.017E+00	6.74E−03
γ 25	9.10E−04	1.107E+00	1.01E−03
γ 26	1.69E−03	1.131E+00	1.91E−03
γ 28	1.30E−03	1.214E+00	1.58E−03
γ 29	1.30E−03	1.285E+00	1.67E−03
γ 30	2.08E−03	1.367E+00	2.84E−03
γ 31	2.86E−03	1.433E+00	4.10E−03
γ 32	1.69E−03	1.461E+00	2.47E−03
γ 33	4.94E−03	1.539E+00	7.60E−03
γ 34	4.94E−03	1.539E+00	7.60E−03
γ 35	1.82E−03	1.646E+00	3.00E−03
γ 36	4.29E−03	1.679E+00	7.20E−03
γ 37	7.80E−04	1.707E+00	1.33E−03
γ 38	4.68E−03	1.752E+00	8.20E−03
γ 39	9.10E−04	1.755E+00	1.60E−03
γ 40	9.10E−04	1.784E+00	1.62E−03
γ 41	7.80E−04	1.845E+00	1.44E−03
γ 42	1.04E−03	1.860E+00	1.93E−03
γ 43	1.69E−03	1.867E+00	3.16E−03
γ 44	7.80E−04	1.937E+00	1.51E−03
γ 45	1.82E−03	1.951E+00	3.55E−03
γ 46	2.21E−03	1.973E+00	4.36E−03
γ 47	9.10E−04	2.020E+00	1.84E−03
γ 48	1.30E−03	2.084E+00	2.71E−03
γ 49	1.82E−03	2.107E+00	3.83E−03
γ 50	2.86E−03	2.322E+00	6.64E−03
γ 51	7.80E−04	2.356E+00	1.84E−03
K_{α_1} X-ray	3.76E−01	3.472E−02	1.31E−02
K_{α_2} X-ray	2.06E−01	3.428E−02	7.04E−03
K_{β_1} X-ray	7.41E−02	3.926E−02	2.91E−03
K_{β_2} X-ray	2.86E−02	4.026E−02	1.15E−03
K_{β_3} X-ray	3.84E−02	3.917E−02	1.50E−03
Auger-KLL	4.56E−02	2.813E−02*	1.28E−03
Auger-KLX	2.20E−02	3.311E−02*	7.30E−04
Auger-LMM	4.26E−01	3.856E−03*	1.64E−03
Auger-LMX	2.48E−01	4.913E−03*	1.22E−03
Auger-MXY	1.34E+00	1.042E−03*	1.40E−03

Listed X, γ and $\gamma^\pm$ radiations	9.01E−01
Omitted X, γ and $\gamma^\pm$ radiations**	9.61E−04
Listed β, ce and Auger radiations	6.12E−01
Omitted β, ce and Auger radiations**	4.80E−03
Listed radiations	1.51E+00
Omitted radiations**	5.76E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ce-135 daughter is radioactive.


$^{135}_{59}$Pr(24m)
3/2(+) 0.0
2.0206
1.9506
1.8349
1.7287
1.3674
1.0168
0.8069
0.7803
0.6965
0.6209
0.2961
0.2961
0.0827
0.0
(+)
(+)
(+)
3/2(+),5/2(+)
3/2(+)
(5/2+)
3/2(+)
1/2(+)
EC_1, β^+_1
EC_2, β^+_2
EC_3, β^+_3
EC_4, β^+_4
EC_5, β^+_5
EC_6, β^+_6
EC_7, β^+_7
EC_8, β^+_8
EC_9, β^+_9
EC_{10}, β^+_{10}
EC_{11}, β^+_{11}
EC_{12}, β^+_{12}
EC_{13}, β^+_{13}
EC_{14}, β^+_{14}
γ_{47} γ_{45} γ_{44} γ_{43} γ_{38} γ_{34} γ_{33} γ_{31} γ_{28} γ_{25}
γ_{30} γ_{20}
γ_{23} γ_{18}
γ_{29} γ_{24} γ_{22} γ_{21} γ_{17} γ_{16} γ_{15} γ_{14} γ_{11} γ_{10} γ_9 γ_8 γ_7 γ_6
γ_{35} γ_{19} γ_{12} γ_5 γ_4 γ_2 γ_1
$^{135}_{58}$Ce(17.7h)

59-Pr-140

26-JAN-95

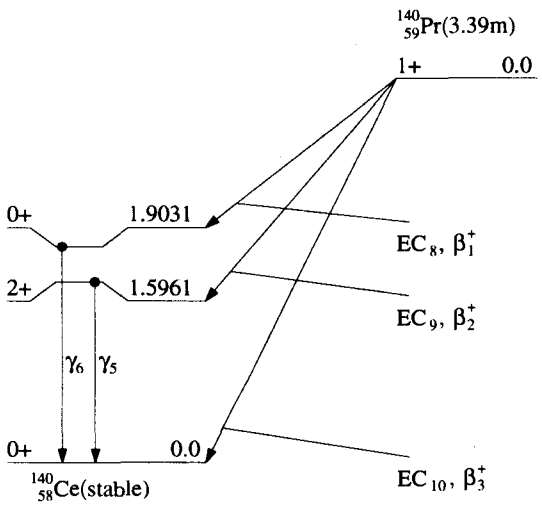
Half-life = 3.39 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 3	5.12E−01	1.067E+00*	5.46E−01
$\gamma^{\pm}$	1.02E+00	5.110E−01	5.23E−01
γ 5	5.00E−03	1.596E+00	7.98E−03
ce-K, γ 6	9.14E−04	1.863E+00	1.70E−03
K_{α_1} X-ray	1.96E−01	3.472E−02	6.82E−03
K_{α_2} X-ray	1.07E−01	3.428E−02	3.68E−03
K_{β_1} X-ray	3.87E−02	3.926E−02	1.52E−03
K_{β_2} X-ray	1.49E−02	4.026E−02	6.01E−04
K_{β_3} X-ray	2.00E−02	3.917E−02	7.85E−04
Auger-KLL	2.38E−02	2.813E−02*	6.70E−04
Auger-LMM	2.22E−01	3.857E−03*	8.58E−04
Auger-LMX	1.30E−01	4.914E−03*	6.38E−04
Auger-MXY	7.02E−01	1.043E−03*	7.32E−04

Listed X, γ and $\gamma^{\pm}$ radiations	5.45E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.84E−03
Listed β, ce and Auger radiations	5.51E−01
Omitted β, ce and Auger radiations**	8.91E−04
Listed radiations	1.10E+00
Omitted radiations**	2.73E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ce-140 daughter is stable.



59-Pr-146

13-DEC-90

Half-life = 24.15 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 9	4.96E−03	2.927E−01*	1.45E−03
β^- 10	6.94E−03	4.228E−01*	2.94E−03
β^- 11	3.27E−02	5.348E−01*	1.75E−02
β^- 12	8.93E−03	5.453E−01*	4.87E−03
β^- 13	1.19E−02	6.013E−01*	7.16E−03
β^- 15	7.94E−03	6.414E−01*	5.09E−03
β^- 16	2.98E−03	6.510E−01*	1.94E−03
β^- 17	9.92E−03	6.869E−01*	6.81E−03
β^- 18	1.98E−03	7.266E−01*	1.44E−03
β^- 20	2.98E−03	7.813E−01*	2.33E−03
β^- 21	2.48E−01	8.551E−01*	2.12E−01
β^- 22	2.28E−02	8.879E−01*	2.03E−02
β^- 23	4.96E−03	9.413E−01*	4.67E−03
β^- 25	4.96E−03	9.707E−01*	4.82E−03
β^- 26	6.94E−03	1.085E+00*	7.54E−03
β^- 27	2.48E−02	1.128E+00*	2.80E−02
β^- 28	1.98E−03	1.162E+00*	2.31E−03
β^- 29	4.96E−03	1.214E+00*	6.02E−03
β^- 32	1.29E−01	1.554E+00*	2.00E−01
β^- 33	4.37E−01	1.741E+00*	7.60E−01
γ 4	4.80E−01	4.539E−01	2.18E−01
ce-K, γ 4	6.08E−03	4.103E−01	2.50E−03
γ 7	4.61E−03	5.080E−01	2.34E−03
γ 8	3.70E−03	5.621E−01	2.08E−03
γ 10	3.46E−03	5.894E−01	2.04E−03
γ 12	2.98E−02	6.017E−01	1.79E−02
γ 14	5.66E−03	7.273E−01	4.12E−03
γ 15	7.49E−02	7.357E−01	5.51E−02
γ 18	2.59E−03	7.744E−01	2.01E−03
γ 19	6.29E−02	7.889E−01	4.96E−02
γ 23	2.33E−02	9.229E−01	2.15E−02
γ 24	1.68E−03	9.281E−01	1.56E−03
γ 26	1.34E−03	1.013E+00	1.36E−03
γ 27	1.23E−02	1.017E+00	1.25E−02
γ 28	7.92E−03	1.081E+00	8.56E−03
γ 29	2.26E−03	1.149E+00	2.59E−03
γ 30	1.26E−03	1.165E+00	1.46E−03
γ 31	9.31E−04	1.183E+00	1.10E−03
γ 33	3.65E−03	1.235E+00	4.51E−03
γ 34	6.43E−03	1.243E+00	8.00E−03
γ 37	5.57E−03	1.324E+00	7.37E−03
γ 38	5.76E−03	1.329E+00	7.65E−03
γ 39	6.91E−03	1.334E+00	9.22E−03
γ 40	1.30E−03	1.339E+00	1.73E−03
γ 41	4.37E−02	1.377E+00	6.01E−02
γ 42	8.11E−04	1.411E+00	1.14E−03
γ 43	1.59E−03	1.436E+00	2.29E−03
γ 44	2.28E−02	1.452E+00	3.31E−02
γ 46	1.19E−02	1.471E+00	1.75E−02
γ 47	8.64E−04	1.500E+00	1.30E−03
γ 49	7.78E−04	1.509E+00	1.17E−03
γ 50	2.59E−03	1.516E+00	3.93E−03
γ 51	1.56E−01	1.525E+00	2.38E−01
γ 52	1.25E−03	1.530E+00	1.91E−03
γ 53	7.97E−04	1.556E+00	1.24E−03
γ 54	1.37E−03	1.594E+00	2.19E−03
γ 57	6.19E−03	1.690E+00	1.05E−02
γ 58	1.10E−03	1.741E+00	1.92E−03
γ 59	1.07E−03	1.744E+00	1.87E−03
γ 60	7.20E−04	1.766E+00	1.27E−03
γ 61	7.63E−04	1.781E+00	1.36E−03
γ 62	8.54E−04	1.788E+00	1.53E−03
γ 63	1.05E−03	1.813E+00	1.90E−03
γ 64	2.39E−03	1.831E+00	4.38E−03
γ 65	6.29E−04	1.883E+00	1.18E−03
γ 66	1.30E−03	1.902E+00	2.47E−03
γ 68	8.50E−04	1.915E+00	1.63E−03
γ 69	5.42E−04	1.921E+00	1.04E−03
γ 70	7.49E−04	1.940E+00	1.45E−03
γ 71	1.84E−03	1.958E+00	3.60E−03
γ 73	2.16E−03	1.978E+00	4.27E−03
γ 74	2.47E−03	1.984E+00	4.90E−03
γ 75	6.05E−04	1.992E+00	1.20E−03
γ 76	2.44E−03	2.006E+00	4.89E−03
γ 77	9.74E−04	2.098E+00	2.04E−03
γ 78	8.88E−04	2.121E+00	1.88E−03
γ 79	8.98E−04	2.127E+00	1.91E−03
γ 80	1.74E−03	2.144E+00	3.74E−03
γ 82	5.52E−04	2.157E+00	1.19E−03
γ 83	2.12E−03	2.179E+00	4.62E−03
γ 84	5.76E−04	2.208E+00	1.27E−03
γ 85	8.16E−04	2.218E+00	1.81E−03
γ 86	4.56E−03	2.227E+00	1.02E−02
γ 88	1.03E−02	2.252E+00	2.31E−02
γ 89	6.24E−04	2.267E+00	1.41E−03
γ 91	8.26E−03	2.357E+00	1.95E−02
γ 92	4.99E−03	2.460E+00	1.23E−02
γ 93	4.22E−04	2.478E+00	1.05E−03
γ 94	3.31E−03	2.517E+00	8.34E−03
γ 95	4.32E−03	2.682E+00	1.16E−02
γ 96	2.16E−03	2.776E+00	6.00E−03
γ 98	2.26E−03	2.830E+00	6.39E−03
γ 99	7.58E−04	2.882E+00	2.19E−03
γ 101	4.37E−04	2.916E+00	1.27E−03
γ 102	8.02E−04	2.938E+00	2.36E−03
γ 103	8.74E−04	3.081E+00	2.69E−03
γ 104	8.02E−04	3.141E+00	2.52E−03
γ 107	1.51E−03	3.293E+00	4.96E−03
γ 109	6.43E−04	3.709E+00	2.39E−03

Listed X, γ and $\gamma^{\pm}$ radiations	9.94E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.66E−02
Listed β, ce and Auger radiations	1.30E+00
Omitted β, ce and Auger radiations**	1.12E−02
Listed radiations	2.29E+00
Omitted radiations**	2.78E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Nd-146 daughter is stable.

60-Nd-135

03-FEB-88

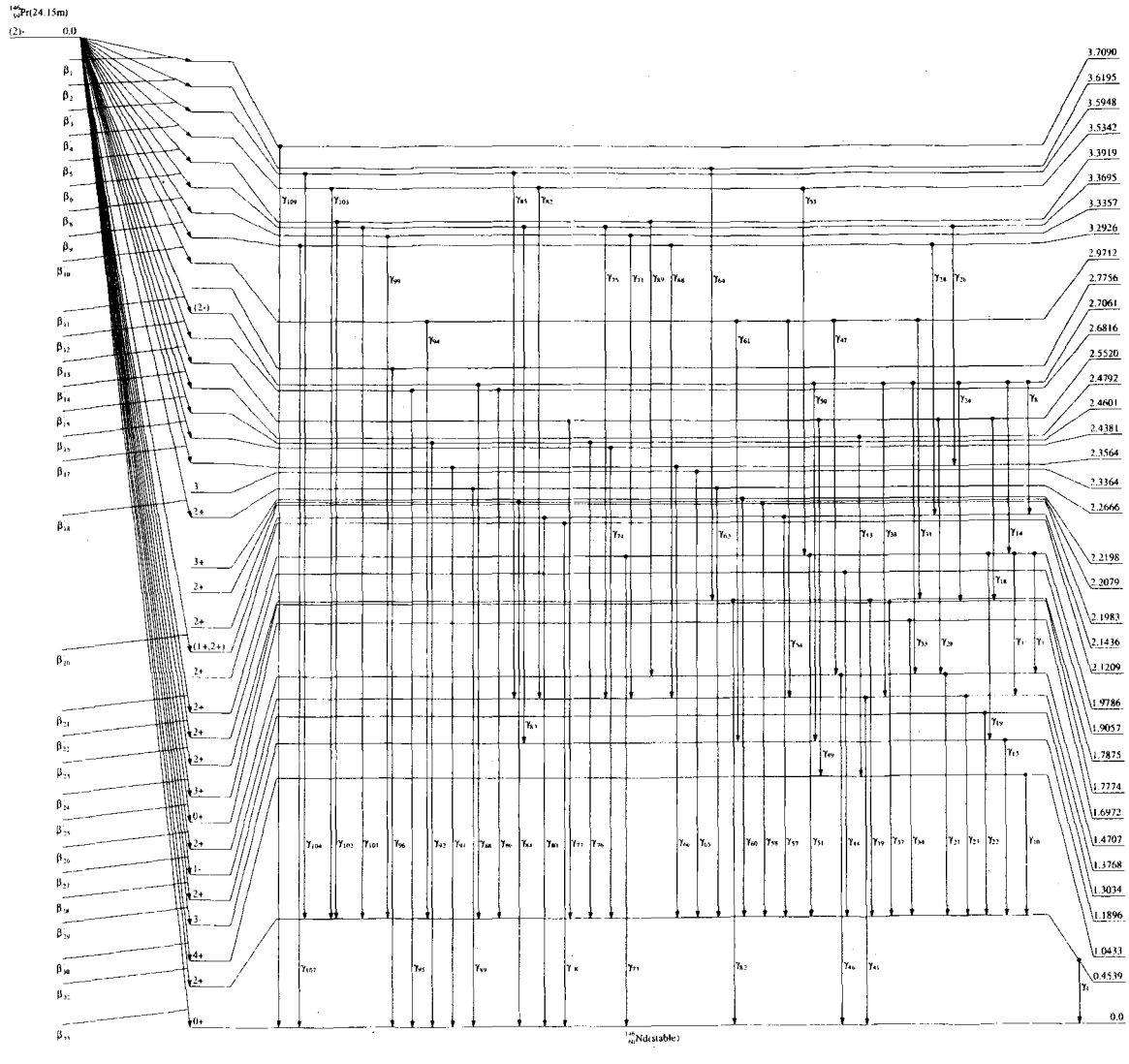
Half-life = 12.4 m
Decay mode(s): EC, β^+

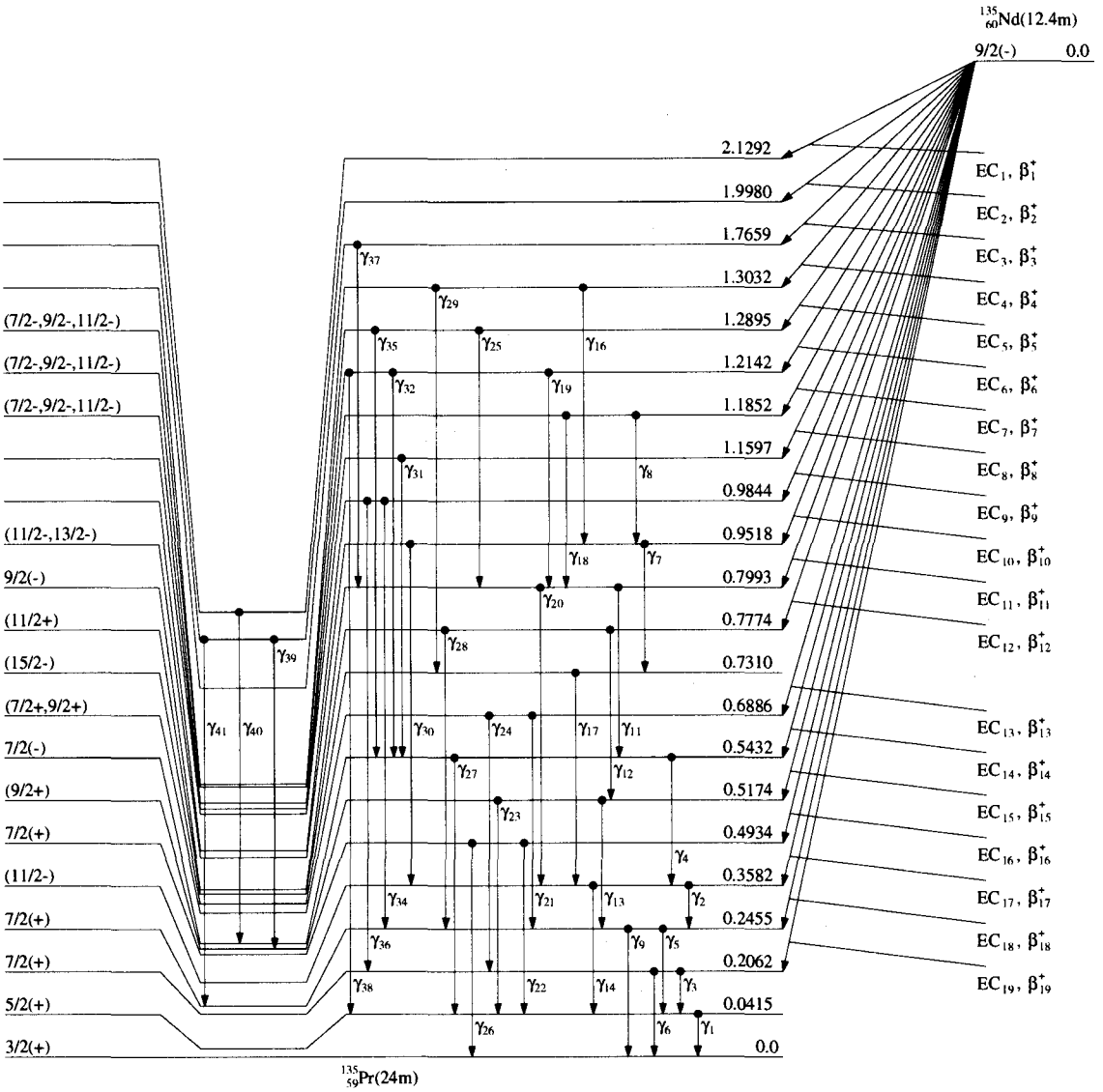
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	2.02E−03	7.201E−01*	1.45E−03
β^+ 2	8.07E−03	7.789E−01*	6.29E−03
β^+ 3	9.08E−03	8.836E−01*	8.02E−03
β^+ 4	7.97E−03	1.094E+00*	8.72E−03
β^+ 5	8.07E−03	1.100E+00*	8.88E−03
β^+ 6	9.08E−03	1.135E+00*	1.03E−02
β^+ 7	1.51E−02	1.148E+00*	1.74E−02
β^+ 8	1.11E−02	1.160E+00*	1.29E−02
β^+ 9	9.08E−03	1.241E+00*	1.13E−02
β^+ 10	1.41E−02	1.256E+00*	1.77E−02
β^+ 11	7.67E−02	1.326E+00*	1.02E−01
β^+ 12	1.31E−02	1.336E+00*	1.75E−02
β^+ 13	1.92E−02	1.377E+00*	2.64E−02
β^+ 14	4.54E−02	1.445E+00*	6.56E−02
β^+ 15	7.16E−02	1.457E+00*	1.04E−01
β^+ 16	4.34E−02	1.468E+00*	6.37E−02
β^+ 17	1.51E−01	1.531E+00*	2.32E−01
β^+ 18	9.08E−02	1.583E+00*	1.44E−01
β^+ 19	5.14E−02	1.602E+00*	8.24E−02
$\gamma^\pm$	1.31E+00	5.110E−01	6.71E−01
γ 1	2.33E−01	4.148E−02	9.65E−03
ce-L_1, γ 1	4.83E−01	3.465E−02	1.68E−02
ce-L_2, γ 1	4.08E−02	3.504E−02	1.43E−03
ce-M, γ 1	1.12E−01	4.024E−02*	4.49E−03
ce-N^+, γ 1	3.05E−02	4.148E−02*	1.26E−03
γ 2	4.65E−02	1.126E−01	5.24E−03
ce-K, γ 2	3.06E−01	7.063E−02	2.16E−02
ce-L_1, γ 2	5.22E−02	1.058E−01	5.52E−03
ce-M, γ 2	1.47E−02	1.114E−01*	1.63E−03
γ 3	4.14E−02	1.647E−01	6.81E−03
ce-K, γ 3	1.13E−02	1.227E−01	1.39E−03
γ 4	2.84E−02	1.851E−01	5.26E−03
γ 5	5.17E−01	2.041E−01	1.06E−01
ce-K, γ 5	7.87E−02	1.621E−01	1.28E−02
ce-L_1, γ 5	9.89E−03	1.973E−01	1.95E−03
γ 6	3.10E−02	2.060E−01	6.39E−03
γ 7	7.24E−03	2.210E−01	1.60E−03
γ 8	1.29E−02	2.334E−01	3.02E−03
γ 9	3.52E−02	2.454E−01	8.63E−03
γ 11	2.74E−02	2.561E−01	7.02E−03
γ 12	7.76E−03	2.598E−01	2.01E−03
γ 13	2.53E−02	2.719E−01	6.89E−03
γ 14	1.14E−02	3.167E−01	3.60E−03
γ 15	6.20E−03	3.226E−01	2.00E−03
γ 16	1.03E−02	3.516E−01	3.64E−03
γ 17	2.33E−02	3.728E−01	8.67E−03
γ 18	1.50E−02	3.859E−01	5.79E−03
γ 19	1.14E−02	4.150E−01	4.72E−03
γ 20	1.49E−01	4.411E−01	6.57E−02
ce-K, γ 20	2.99E−03	3.991E−01	1.19E−03
γ 21	1.03E−02	4.427E−01	4.58E−03
γ 22	4.39E−02	4.519E−01	1.99E−02
γ 23	8.53E−02	4.758E−01	4.06E−02
γ 24	1.76E−02	4.826E−01	8.48E−03
γ 25	8.79E−03	4.903E−01	4.31E−03
γ 26	1.50E−02	4.934E−01	7.40E−03
γ 27	1.00E−01	5.016E−01	5.03E−02
γ 28	2.02E−02	5.319E−01	1.07E−02
γ 29	5.69E−03	5.720E−01	3.25E−03
γ 30	3.93E−02	5.937E−01	2.33E−02
γ 31	1.96E−02	6.165E−01	1.21E−02
γ 32	5.17E−03	6.706E−01	3.47E−03
γ 33	8.27E−03	7.084E−01	5.86E−03
γ 34	8.27E−03	7.394E−01	6.12E−03
γ 35	7.76E−03	7.461E−01	5.79E−03
γ 36	6.20E−03	7.777E−01	4.82E−03
γ 37	2.69E−02	9.666E−01	2.60E−02
γ 38	1.14E−02	1.172E+00	1.33E−02
γ 39	1.19E−02	1.481E+00	1.76E−02
γ 40	7.76E−03	1.586E+00	1.23E−02
γ 41	2.07E−02	1.752E+00	3.62E−02
K_{α_1} X-ray	3.39E−01	3.603E−02	1.22E−02
K_{α_2} X-ray	1.86E−01	3.555E−02	6.60E−03
K_{β_1} X-ray	6.71E−02	4.075E−02	2.73E−03
K_{β_3} X-ray	3.46E−02	4.065E−02	1.41E−03
Auger-KLL	3.90E−02	2.914E−02*	1.14E−03
Auger-LMM	6.61E−01	4.114E−03*	2.72E−03
Auger-LMX	3.94E−01	5.235E−03*	2.06E−03
Auger-MXY	2.12E+00	1.086E−03*	2.30E−03

Listed X, γ and $\gamma^\pm$ radiations	1.27E+00
Omitted X, γ and $\gamma^\pm$ radiations**	2.56E−03
Listed β, ce and Auger radiations	1.02E+00
Omitted β, ce and Auger radiations**	1.25E−02
Listed radiations	2.29E+00
Omitted radiations**	1.51E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pr-135 daughter is radioactive.


$^{146}_{59}$Pr(24.15m)
(2)- 0.0
3.7090
3.6195
3.5948
3.5342
3.3919
3.3695
3.3357
3.2926
2.9712
2.7756
2.7061
2.6816
2.5520
2.4792
2.4601
2.4381
2.3564
2.3364
2.2666
2.2198
2.2079
2.1983
2.1436
2.1209
1.9786
1.9057
1.7875
1.7774
1.6972
1.4707
1.3768
1.3034
1.1896
1.0433
0.4539
0.0
$^{146}_{60}$Nd(stable)


$^{135}_{60}$Nd(12.4m)
9/2(-) 0.0
2.1292
1.9980
1.7659
1.3032
1.2895
1.2142
1.1852
1.1597
0.9844
0.9518
0.7993
0.7774
0.7310
0.6886
0.5432
0.5174
0.4934
0.3582
0.2455
0.2062
0.0415
0.0
(7/2-,9/2-,11/2-)
(7/2-,9/2-,11/2-)
(7/2-,9/2-,11/2-)
(11/2-,13/2-)
9/2(-)
(11/2+)
(15/2-)
(7/2+,9/2+)
7/2(-)
(9/2+)
7/2(+)
(11/2-)
7/2(+)
7/2(+)
5/2(+)
3/2(+)
EC_1, β^+_1
EC_2, β^+_2
EC_3, β^+_3
EC_4, β^+_4
EC_5, β^+_5
EC_6, β^+_6
EC_7, β^+_7
EC_8, β^+_8
EC_9, β^+_9
EC_{10}, β^+_{10}
EC_{11}, β^+_{11}
EC_{12}, β^+_{12}
EC_{13}, β^+_{13}
EC_{14}, β^+_{14}
EC_{15}, β^+_{15}
EC_{16}, β^+_{16}
EC_{17}, β^+_{17}
EC_{18}, β^+_{18}
EC_{19}, β^+_{19}
γ_{37} γ_{29} γ_{35} γ_{25} γ_{16} γ_{32} γ_{19} γ_{31} γ_8 γ_{18} γ_7 γ_{20} γ_{39} γ_{28} γ_{41} γ_{40} γ_{30} γ_{24} γ_{17} γ_{11} γ_{27} γ_{12} γ_{23} γ_4 γ_{34} γ_{21} γ_{13} γ_2 γ_{36} γ_9 γ_5 γ_{38} γ_{22} γ_{14} γ_3 γ_{26} γ_6 γ_1
$^{135}_{59}$Pr(24m)

60-Nd-137

04-NOV-94

Half-life = 38.5 m
Decay mode(s): EC, β^+

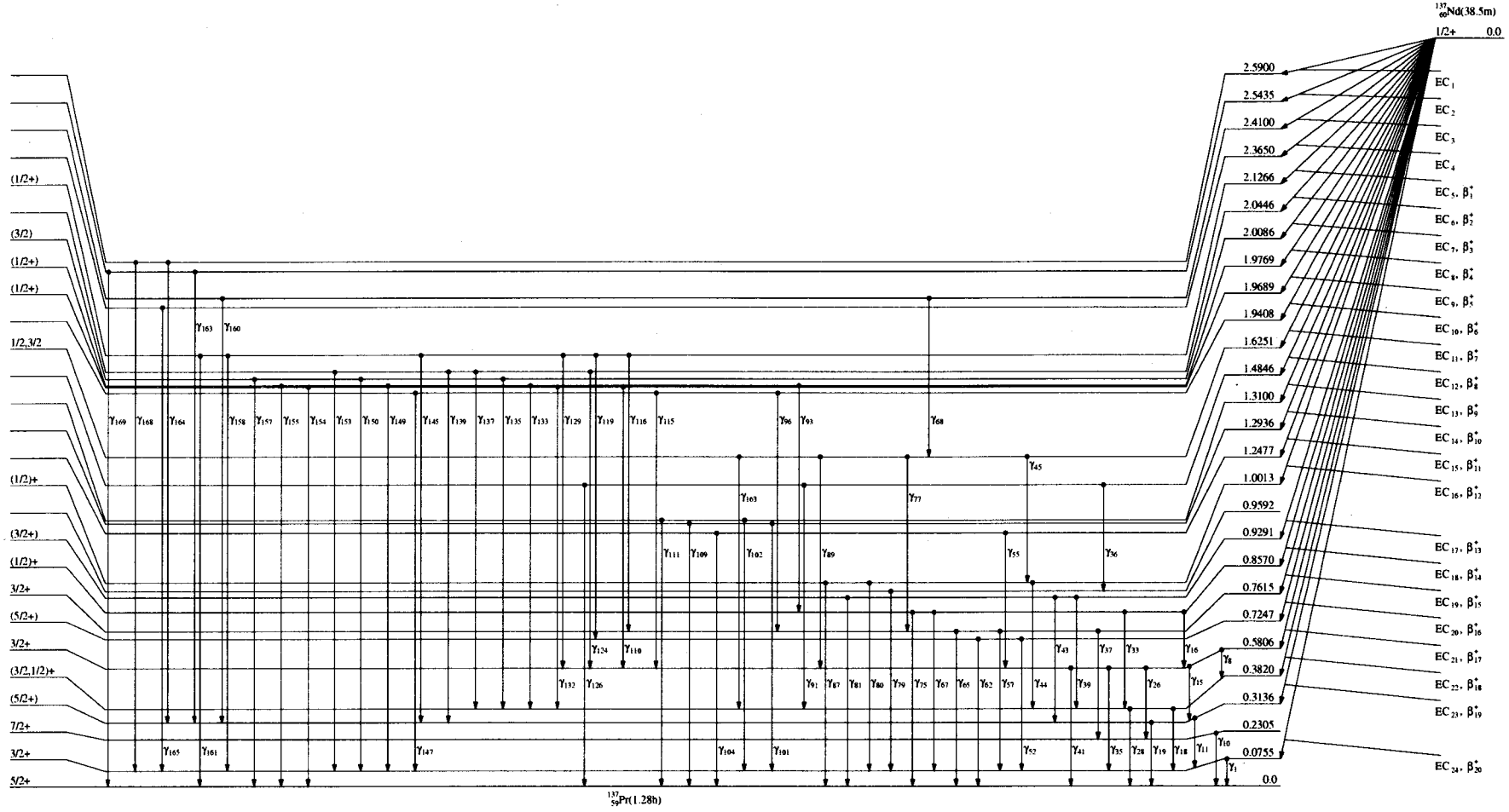
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 7	1.99E−03	4.732E−01*	9.41E−04
β^+ 8	1.39E−03	5.352E−01*	7.45E−04
β^+ 9	9.94E−04	6.126E−01*	6.09E−04
β^+ 10	6.96E−04	6.199E−01*	4.31E−04
β^+ 11	9.94E−04	6.403E−01*	6.37E−04
β^+ 12	1.99E−02	7.505E−01*	1.49E−02
β^+ 13	9.94E−03	7.829E−01*	7.78E−03
β^+ 14	3.28E−02	8.154E−01*	2.68E−02
β^+ 15	3.58E−02	8.585E−01*	3.07E−02
β^+ 16	9.94E−04	8.869E−01*	8.82E−04
β^+ 17	7.85E−02	9.404E−01*	7.39E−02
β^+ 18	1.99E−02	1.031E+00*	2.05E−02
β^+ 19	4.97E−03	1.069E+00*	5.31E−03
β^+ 20	1.19E−01	1.171E+00*	1.40E−01
$\gamma^{\pm}$	6.59E−01	5.110E−01	3.37E−01
γ 1	1.70E−01	7.550E−02	1.29E−02
ce-K, γ 1	4.29E−01	3.351E−02	1.44E−02
ce-L_1, γ 1	5.34E−02	6.867E−02	3.66E−03
ce-L_2, γ 1	1.13E−02	6.906E−02	7.82E−04
ce-L_3, γ 1	9.16E−03	6.954E−02	6.37E−04
ce-M, γ 1	1.57E−02	7.426E−02*	1.17E−03
γ 8	6.40E−03	1.985E−01	1.27E−03
γ 10	1.28E−02	2.305E−01	2.95E−03
γ 11	3.52E−02	2.382E−01	8.38E−03
ce-K, γ 11	3.53E−03	1.962E−01	6.93E−04
γ 15	9.60E−03	2.670E−01	2.56E−03
γ 16	6.40E−03	2.763E−01	1.77E−03
γ 18	9.98E−02	3.066E−01	3.06E−02
ce-K, γ 18	4.61E−03	2.646E−01	1.22E−03
γ 19	7.68E−03	3.135E−01	2.41E−03
γ 26	3.84E−03	3.500E−01	1.34E−03
γ 28	1.02E−02	3.820E−01	3.91E−03
γ 33	1.15E−02	4.749E−01	5.47E−03
γ 35	8.96E−02	5.051E−01	4.53E−02
ce-K, γ 35	1.07E−03	4.631E−01	4.98E−04
γ 36	3.84E−03	5.253E−01	2.02E−03
γ 37	7.68E−03	5.310E−01	4.08E−03
γ 38	2.56E−03	5.407E−01	1.38E−03
γ 39	3.84E−03	5.469E−01	2.10E−03
γ 40	3.20E−03	5.764E−01	1.84E−03
γ 41	1.28E−01	5.806E−01	7.43E−02
ce-K, γ 41	1.08E−03	5.386E−01	5.79E−04
γ 42	2.94E−03	5.981E−01	1.76E−03
γ 43	1.04E−02	6.156E−01	6.38E−03
γ 44	5.76E−03	6.192E−01	3.57E−03
γ 45	3.07E−03	6.238E−01	1.92E−03
γ 52	1.92E−03	6.494E−01	1.25E−03
γ 55	2.56E−03	6.672E−01	1.71E−03
γ 57	1.79E−02	6.861E−01	1.23E−02
γ 62	2.56E−03	7.248E−01	1.86E−03
γ 65	8.96E−02	7.616E−01	6.82E−02
γ 67	9.34E−02	7.816E−01	7.30E−02
γ 68	1.92E−03	7.853E−01	1.51E−03
γ 72	1.66E−03	8.145E−01	1.36E−03
γ 75	2.30E−03	8.570E−01	1.97E−03
γ 76	2.05E−03	8.602E−01	1.76E−03
γ 77	3.33E−03	8.634E−01	2.87E−03
γ 79	3.20E−03	8.837E−01	2.83E−03
γ 80	7.30E−02	9.259E−01	6.76E−02
γ 81	2.94E−02	9.292E−01	2.74E−02
γ 87	2.56E−03	1.001E+00	2.56E−03
γ 88	1.54E−03	1.030E+00	1.58E−03
γ 89	9.60E−03	1.044E+00	1.00E−02
γ 91	2.94E−03	1.103E+00	3.25E−03
γ 93	5.76E−03	1.120E+00	6.45E−03
γ 94	1.28E−03	1.167E+00	1.49E−03
γ 95	1.28E−03	1.176E+00	1.51E−03
γ 96	1.28E−03	1.180E+00	1.51E−03
γ 97	1.02E−03	1.182E+00	1.21E−03
γ 100	1.28E−03	1.213E+00	1.55E−03
γ 101	1.92E−03	1.218E+00	2.34E−03
γ 102	5.12E−03	1.235E+00	6.32E−03
γ 103	1.41E−02	1.243E+00	1.75E−02
γ 104	1.28E−03	1.247E+00	1.60E−03
γ 106	1.79E−03	1.257E+00	2.25E−03
γ 109	3.84E−03	1.294E+00	4.97E−03
γ 111	4.48E−03	1.310E+00	5.87E−03
γ 114	1.02E−03	1.351E+00	1.38E−03
γ 115	6.40E−03	1.360E+00	8.70E−03
γ 116	2.56E−03	1.365E+00	3.49E−03
γ 117	8.96E−04	1.372E+00	1.23E−03
γ 118	3.20E−03	1.388E+00	4.44E−03
γ 119	3.20E−03	1.401E+00	4.48E−03
γ 120	1.15E−03	1.410E+00	1.62E−03
γ 122	1.66E−03	1.434E+00	2.39E−03
γ 123	1.09E−03	1.444E+00	1.57E−03
γ 124	7.42E−03	1.464E+00	1.09E−02
γ 125	8.96E−04	1.472E+00	1.32E−03
γ 126	6.14E−03	1.485E+00	9.12E−03
γ 127	1.15E−03	1.493E+00	1.72E−03
γ 128	8.96E−04	1.543E+00	1.38E−03
γ 129	3.84E−03	1.546E+00	5.94E−03
γ 131	1.02E−03	1.574E+00	1.61E−03
γ 132	3.20E−03	1.587E+00	5.08E−03
γ 133	4.48E−03	1.594E+00	7.14E−03
γ 134	1.66E−03	1.608E+00	2.68E−03
γ 135	8.96E−03	1.626E+00	1.46E−02
γ 136	1.66E−03	1.646E+00	2.74E−03
γ 137	1.28E−03	1.663E+00	2.13E−03
γ 138	1.02E−03	1.701E+00	1.74E−03
γ 139	2.56E−03	1.731E+00	4.43E−03
γ 141	2.94E−03	1.765E+00	5.20E−03
γ 142	3.20E−03	1.770E+00	5.66E−03
γ 143	1.15E−03	1.780E+00	2.05E−03
γ 145	8.32E−03	1.813E+00	1.51E−02
γ 146	7.68E−04	1.846E+00	1.42E−03
γ 147	3.58E−03	1.865E+00	6.69E−03
γ 148	3.20E−03	1.894E+00	6.06E−03
γ 149	7.68E−03	1.901E+00	1.46E−02
γ 150	3.84E−03	1.934E+00	7.42E−03
γ 152	1.02E−03	1.965E+00	2.01E−03
γ 153	3.20E−03	1.969E+00	6.30E−03
γ 154	3.20E−03	1.969E+00	6.30E−03
γ 155	8.96E−04	1.977E+00	1.77E−03
γ 156	7.68E−04	2.000E+00	1.54E−03
γ 157	3.20E−03	2.009E+00	6.43E−03
γ 158	9.60E−03	2.051E+00	1.97E−02
γ 159	6.40E−04	2.091E+00	1.34E−03
γ 160	8.96E−04	2.096E+00	1.88E−03
γ 161	1.66E−03	2.126E+00	3.54E−03
γ 163	6.40E−04	2.231E+00	1.43E−03
γ 164	6.40E−04	2.276E+00	1.46E−03
γ 165	1.92E−03	2.289E+00	4.39E−03
γ 168	8.96E−04	2.515E+00	2.25E−03
γ 169	7.68E−04	2.543E+00	1.95E−03
K_{α_1} X-ray	4.82E−01	3.603E−02	1.74E−02
K_{α_2} X-ray	2.64E−01	3.555E−02	9.39E−03
K_{β_1} X-ray	9.55E−02	4.075E−02	3.89E−03
K_{β_2} X-ray	3.84E−02	4.179E−02	1.60E−03
K_{β_3} X-ray	4.92E−02	4.065E−02	2.00E−03
Auger-KLL	5.56E−02	2.914E−02*	1.62E−03
Auger-KLX	2.71E−02	3.434E−02*	9.31E−04
Auger-LMM	5.47E−01	4.008E−03*	2.19E−03

Auger-LMX	3.19E−01	5.116E−03*	1.63E−03
Auger-MXY	1.74E+00	1.096E−03*	1.90E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.15E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.77E−02
Listed β, ce and Auger radiations	3.56E−01
Omitted β, ce and Auger radiations**	5.77E−03
Listed radiations	1.51E+00
Omitted radiations**	5.35E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Pr-137 daughter is radioactive.


$^{137}_{60}$Nd(38.5m)
1/2+ 0.0
2.5900
2.5435
2.4100
2.3650
2.1266
2.0446
2.0086
1.9769
1.9689
1.9408
1.6251
1.4846
1.3100
1.2936
1.2477
1.0013
0.9592
0.9291
0.8570
0.7615
0.7247
0.5806
0.3820
0.3136
0.2305
0.0755
0.0
(1/2+)
(3/2)
(1/2+)
(1/2+)
1/2,3/2
(1/2)+
(3/2+)
(1/2)+
3/2+
(5/2+)
3/2+
(3/2,1/2)+
(5/2+)
7/2+
3/2+
5/2+
$^{137}_{59}$Pr(1.28h)

60-Nd-140

26-JAN-95

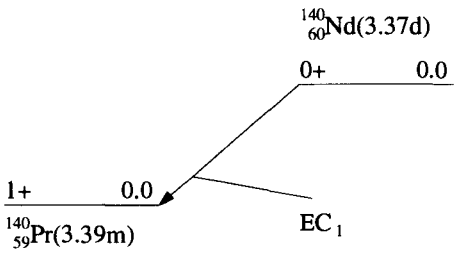
Half-life = 3.37 d
Decay mode(s): EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
K_{α_1} X-ray	3.76E−01	3.603E−02	1.36E−02
K_{α_2} X-ray	2.06E−01	3.555E−02	7.32E−03
K_{β_1} X-ray	7.45E−02	4.075E−02	3.04E−03
K_{β_2} X-ray	2.99E−02	4.179E−02	1.25E−03
K_{β_3} X-ray	3.84E−02	4.065E−02	1.56E−03
K_{β_5} X-ray	1.07E−03	4.105E−02	4.40E−05
L_α X-ray	4.81E−02	5.031E−03*	2.42E−04
L_β X-ray	4.72E−02	5.577E−03*	2.63E−04
L_γ X-ray	6.93E−03	6.435E−03*	4.46E−05
Auger-KLL	4.33E−02	2.914E−02*	1.26E−03
Auger-KLX	2.11E−02	3.434E−02*	7.26E−04
Auger-KXY	2.98E−03	3.946E−02*	1.18E−04
Auger-LMM	4.44E−01	4.023E−03*	1.79E−03
Auger-LMX	2.60E−01	5.134E−03*	1.33E−03
Auger-LXY	4.05E−02	5.951E−03*	2.41E−04
Auger-MXY	1.41E+00	1.095E−03*	1.55E−03
ΔE	3.27E−01	1.355E−04*	4.43E−05

Listed X, γ and $\gamma^{\pm}$ radiations	2.73E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.12E−05
Listed β, ce and Auger radiations	7.06E−03
Listed radiations	3.44E−02
Omitted radiations**	1.12E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pr-140 daughter is radioactive.



60-Nd-144

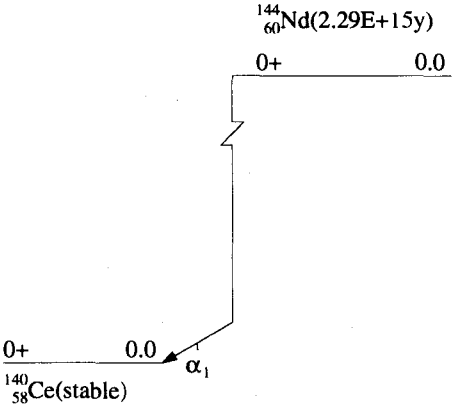
15-FEB-95

Half-life = 2.29E+15 y
Decay mode(s): α

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E+00	1.852E+00	1.85E+00
α recoil	1.00E+00	5.296E−02	5.30E−02

Listed α and α recoil radiations	1.91E+00
Listed radiations	1.91E+00

Ce-140 daughter is stable.



60-Nd-152

16-JAN-97

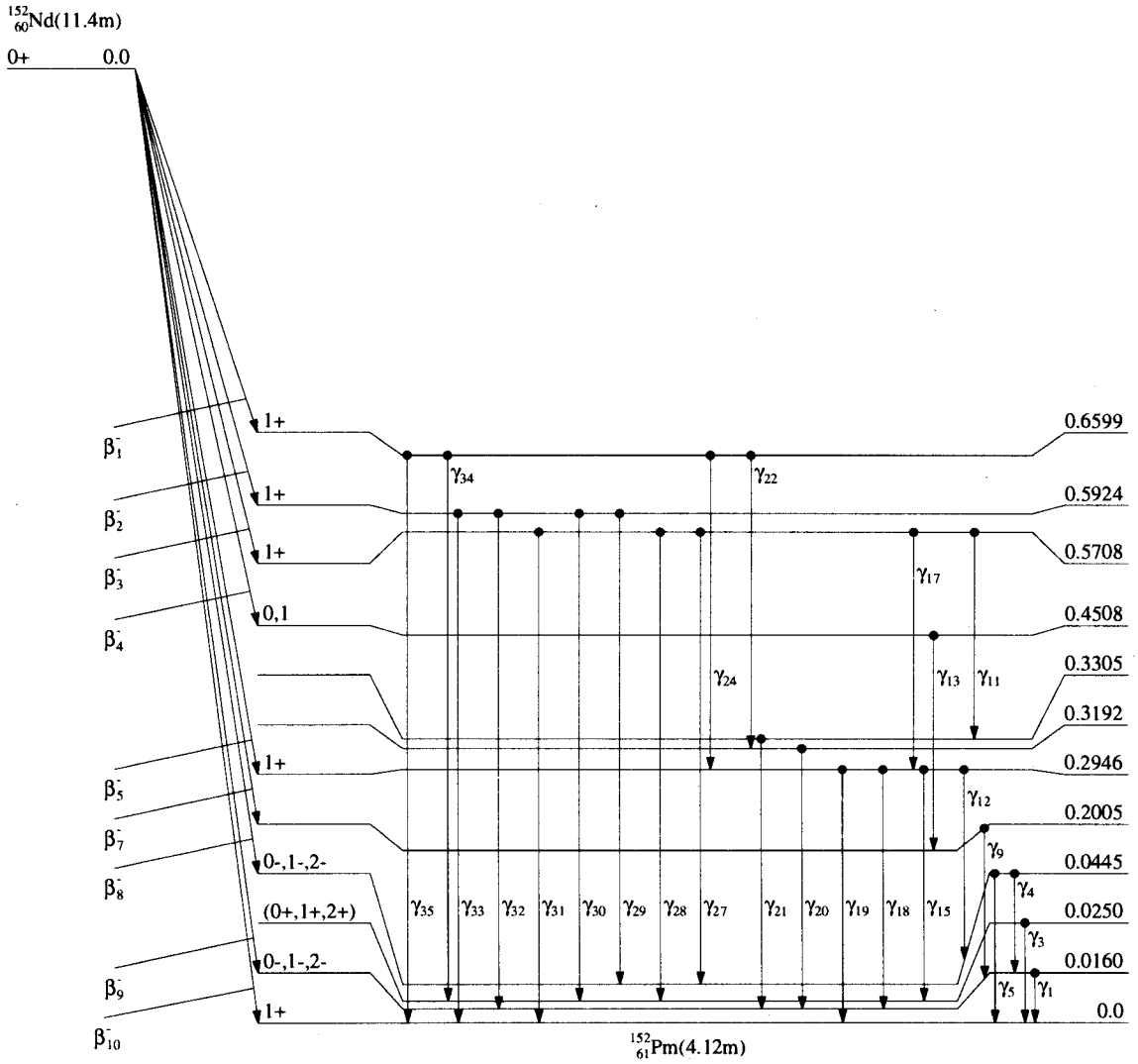
Half-life = 11.4 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	4.80E−03	1.346E−01*	6.45E−04
β^- 2	1.73E−02	1.579E−01*	2.73E−03
β^- 3	1.51E−02	1.656E−01*	2.51E−03
β^- 5	4.89E−01	2.681E−01*	1.31E−01
β^- 8	1.98E−02	3.673E−01*	7.25E−03
β^- 9	3.76E−02	3.789E−01*	1.43E−02
β^- 10	4.14E−01	3.854E−01*	1.60E−01
γ 1	4.84E−02	1.609E−02	7.79E−04
ce-L_1, γ 1	8.14E−02	8.662E−03	7.05E−04
ce-L_2, γ 1	7.39E−02	9.077E−03	6.71E−04
ce-L_3, γ 1	1.18E−01	9.631E−03	1.13E−03
ce-M, γ 1	5.89E−02	1.473E−02*	8.68E−04
ce-N^+, γ 1	3.19E−02	1.609E−02*	5.14E−04
γ 4	9.28E−03	2.850E−02	2.64E−04
ce-L_1, γ 4	6.24E−02	2.107E−02	1.32E−03
ce-M, γ 4	1.46E−02	2.714E−02*	3.98E−04
γ 5	6.18E−02	4.444E−02	2.75E−03
ce-L_1, γ 5	1.09E−02	3.701E−02	4.03E−04
γ 9	1.19E−03	1.845E−01	2.19E−04
γ 11	9.28E−04	2.405E−01	2.23E−04
γ 12	1.83E−01	2.501E−01	4.57E−02
ce-K, γ 12	3.53E−03	2.050E−01	7.24E−04
γ 13	9.57E−04	2.503E−01	2.40E−04
γ 15	2.76E−03	2.694E−01	7.42E−04
γ 17	6.96E−04	2.761E−01	1.92E−04
γ 18	2.90E−01	2.786E−01	8.08E−02
ce-K, γ 18	4.25E−03	2.334E−01	9.91E−04
γ 19	3.28E−02	2.945E−01	9.65E−03
ce-K, γ 19	2.21E−03	2.493E−01	5.51E−04
γ 20	1.04E−03	3.029E−01	3.16E−04
γ 21	8.99E−04	3.144E−01	2.83E−04
γ 22	1.04E−03	3.405E−01	3.55E−04
γ 24	4.64E−04	3.654E−01	1.70E−04
γ 27	8.12E−04	5.263E−01	4.27E−04
γ 28	9.28E−03	5.457E−01	5.06E−03
γ 29	1.22E−03	5.477E−01	6.67E−04
γ 30	1.01E−03	5.675E−01	5.76E−04
γ 31	3.94E−03	5.707E−01	2.25E−03
γ 32	3.80E−03	5.767E−01	2.19E−03
γ 33	1.10E−02	5.925E−01	6.53E−03
γ 34	2.12E−03	6.350E−01	1.34E−03
γ 35	1.39E−03	6.600E−01	9.19E−04
K_{α_1} X-ray	5.77E−03	3.872E−02	2.23E−04
L_β X-ray	2.85E−02	6.042E−03*	1.72E−04
Auger-LMM	1.99E−01	4.419E−03*	8.78E−04
Auger-LMX	1.19E−01	5.646E−03*	6.70E−04
Auger-MXY	6.47E−01	1.175E−03*	7.60E−04

Listed X, γ and $\gamma^\pm$ radiations	1.63E−01
Omitted X, γ and $\gamma^\pm$ radiations**	1.24E−03
Listed β, ce and Auger radiations	3.29E−01
Omitted β, ce and Auger radiations**	3.01E−03
Listed radiations	4.92E−01
Omitted radiations**	4.25E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pm-152 daughter is radioactive.


$^{152}_{60}$Nd(11.4m)
0+
0.0
1+
0,1
0-,1-,2-
(0+,1+,2+)
0-,1-,2-
1+
β_1^-
β_2^-
β_3^-
β_4^-
β_5^-
β_7^-
β_8^-
β_9^-
β_{10}^-
0.6599
0.5924
0.5708
0.4508
0.3305
0.3192
0.2946
0.2005
0.0445
0.0250
0.0160
0.0
γ_{34}
γ_{22}
γ_{17}
γ_{24}
γ_{13}
γ_{11}
γ_{12}
γ_9
γ_4
γ_3
γ_5
γ_1
γ_{35}
γ_{33}
γ_{32}
γ_{31}
γ_{30}
γ_{29}
γ_{28}
γ_{27}
γ_{21}
γ_{20}
γ_{19}
γ_{18}
γ_{15}
$^{152}_{61}$Pm(4.12m)

61-Pm-140

26-JAN-95

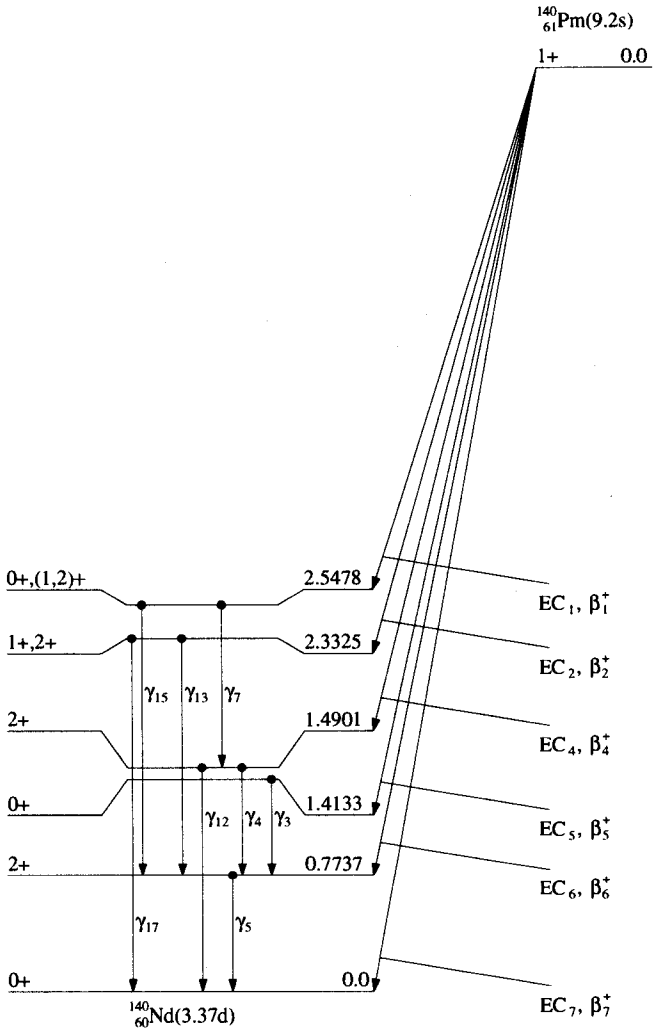
Half-life = 9.2 s
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 4	1.30E−02	1.608E+00*	2.09E−02
β^+ 5	5.00E−03	1.643E+00*	8.22E−03
β^+ 6	2.80E−02	1.944E+00*	5.44E−02
β^+ 7	8.36E−01	2.310E+00*	1.93E+00
$\gamma^\pm$	1.77E+00	5.110E−01	9.05E−01
γ 1	9.54E−03	1.598E−01	1.52E−03
γ 2	2.56E−02	4.771E−01	1.22E−02
γ 3	6.17E−03	6.396E−01	3.95E−03
γ 4	9.39E−03	7.166E−01	6.73E−03
γ 5	5.02E−02	7.738E−01	3.88E−02
γ 6	7.03E−03	1.014E+00	7.12E−03
γ 7	1.61E−03	1.058E+00	1.70E−03
γ 8	1.51E−02	1.139E+00	1.71E−02
γ 9	1.86E−02	1.205E+00	2.24E−02
γ 12	9.19E−03	1.490E+00	1.37E−02
γ 13	7.53E−04	1.559E+00	1.17E−03
γ 14	1.41E−03	1.585E+00	2.23E−03
γ 15	1.41E−03	1.774E+00	2.49E−03
γ 16	1.20E−03	1.942E+00	2.34E−03
γ 17	1.41E−03	2.333E+00	3.28E−03
γ 18	6.53E−04	2.467E+00	1.61E−03
K_{α_1} X-ray	4.77E−02	3.736E−02	1.78E−03

Listed X, γ and $\gamma^\pm$ radiations	1.05E+00
Omitted X, γ and $\gamma^\pm$ radiations**	2.79E−03
Listed β, ce and Auger radiations	2.01E+00
Omitted β, ce and Auger radiations**	5.75E−03
Listed radiations	3.06E+00
Omitted radiations**	8.53E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Nd-140 daughter is radioactive.



61-Pm-152

16-JAN-97

Half-life = 4.12 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 9	1.07E−02	4.280E−01*	4.58E−03
β^- 12	3.60E−03	4.531E−01*	1.63E−03
β^- 13	4.60E−03	4.629E−01*	2.13E−03
β^- 15	4.20E−03	4.749E−01*	2.00E−03
β^- 17	3.90E−03	4.939E−01*	1.93E−03
β^- 18	3.50E−03	5.093E−01*	1.78E−03
β^- 19	6.01E−03	5.298E−01*	3.18E−03
β^- 21	4.40E−03	5.722E−01*	2.52E−03
β^- 23	9.91E−03	6.450E−01*	6.39E−03
β^- 25	2.20E−03	6.870E−01*	1.51E−03
β^- 26	2.80E−02	6.966E−01*	1.95E−02
β^- 30	1.04E−02	8.590E−01*	8.94E−03
β^- 32	1.70E−03	9.516E−01*	1.62E−03
β^- 33	4.50E−02	9.533E−01*	4.29E−02
β^- 35	1.40E−02	1.007E+00*	1.41E−02
β^- 36	2.90E−03	1.077E+00*	3.13E−03
β^- 37	3.20E−03	1.134E+00*	3.63E−03
β^- 38	2.10E−01	1.392E+00*	2.93E−01
β^- 39	6.11E−01	1.448E+00*	8.84E−01
γ 1	4.40E−03	1.195E−01	5.25E−04
γ 2	1.57E−01	1.218E−01	1.91E−02
ce-K, γ 2	1.07E−01	7.497E−02	8.06E−03
ce-L_2, γ 2	2.44E−02	1.145E−01	2.79E−03
ce-L_3, γ 2	2.42E−02	1.151E−01	2.78E−03
ce-M, γ 2	1.34E−02	1.204E−01*	1.62E−03
γ 4	9.73E−03	2.447E−01	2.38E−03
γ 5	1.41E−03	2.514E−01	3.55E−04
γ 6	3.30E−03	2.725E−01	8.98E−04
γ 7	2.35E−03	3.292E−01	7.75E−04
γ 9	2.04E−03	4.436E−01	9.05E−04
γ 11	4.40E−03	5.630E−01	2.47E−03
γ 12	1.57E−03	5.641E−01	8.86E−04
γ 13	1.73E−03	5.719E−01	9.88E−04
γ 15	1.57E−03	6.428E−01	1.01E−03
γ 16	2.35E−03	6.617E−01	1.56E−03
γ 17	3.30E−03	6.742E−01	2.22E−03
γ 18	5.81E−03	6.883E−01	4.00E−03
γ 19	2.61E−02	6.959E−01	1.81E−02
γ 21	5.18E−03	7.351E−01	3.81E−03
γ 22	2.51E−03	8.102E−01	2.04E−03
γ 23	4.71E−03	8.129E−01	3.83E−03
γ 24	4.05E−02	8.414E−01	3.41E−02
γ 25	6.28E−04	8.475E−01	5.32E−04
γ 27	6.28E−04	8.672E−01	5.45E−04
γ 28	1.10E−03	8.702E−01	9.56E−04
γ 29	1.10E−03	9.033E−01	9.93E−04
γ 30	8.32E−03	9.190E−01	7.65E−03
γ 31	4.87E−03	9.260E−01	4.51E−03
γ 32	2.04E−03	9.291E−01	1.90E−03
γ 33	4.71E−04	9.582E−01	4.51E−04
γ 34	3.67E−02	9.609E−01	3.53E−02
γ 35	3.56E−02	9.633E−01	3.43E−02
γ 36	2.20E−03	9.810E−01	2.16E−03
γ 37	9.42E−04	9.957E−01	9.38E−04
γ 38	1.57E−03	1.050E+00	1.65E−03
γ 39	5.81E−03	1.079E+00	6.27E−03
γ 40	2.51E−03	1.087E+00	2.73E−03
γ 41	7.85E−04	1.112E+00	8.73E−04
γ 42	1.41E−03	1.127E+00	1.59E−03
γ 43	6.28E−04	1.253E+00	7.87E−04
γ 44	4.71E−04	1.274E+00	6.00E−04
γ 45	2.04E−03	1.293E+00	2.64E−03
γ 46	2.04E−03	1.317E+00	2.69E−03
γ 47	1.07E−02	1.322E+00	1.41E−02
γ 48	4.71E−04	1.326E+00	6.25E−04
γ 49	4.71E−04	1.332E+00	6.27E−04
γ 50	3.92E−03	1.389E+00	5.45E−03
γ 51	7.85E−04	1.403E+00	1.10E−03
γ 52	1.88E−03	1.408E+00	2.65E−03
γ 53	3.14E−04	1.488E+00	4.67E−04
γ 54	3.14E−04	1.535E+00	4.82E−04
γ 56	3.14E−04	1.770E+00	5.56E−04
γ 57	9.42E−04	1.822E+00	1.72E−03
γ 58	1.57E−04	1.843E+00	2.89E−04
γ 59	1.57E−04	1.873E+00	2.94E−04
γ 60	1.57E−04	1.922E+00	3.02E−04
γ 61	4.71E−04	1.971E+00	9.28E−04
γ 62	1.73E−03	2.007E+00	3.47E−03
γ 63	1.26E−03	2.045E+00	2.57E−03
γ 64	3.14E−04	2.054E+00	6.45E−04
γ 65	4.55E−03	2.079E+00	9.47E−03
γ 66	3.14E−04	2.114E+00	6.64E−04
γ 67	2.04E−03	2.118E+00	4.32E−03
γ 68	3.14E−04	2.166E+00	6.80E−04
γ 69	6.28E−04	2.175E+00	1.37E−03
γ 70	7.85E−04	2.187E+00	1.72E−03
γ 71	3.61E−03	2.225E+00	8.03E−03
γ 72	6.28E−04	2.240E+00	1.41E−03
γ 73	1.57E−04	2.255E+00	3.54E−04
γ 74	6.28E−04	2.309E+00	1.45E−03
γ 75	6.28E−04	2.388E+00	1.50E−03
γ 76	6.28E−04	2.566E+00	1.61E−03
γ 77	7.85E−04	2.804E+00	2.20E−03
K_{α_1} X-ray	5.26E−02	4.012E−02	2.11E−03
K_{α_2} X-ray	2.90E−02	3.952E−02	1.15E−03
K_{β_1} X-ray	1.03E−02	4.541E−02	4.68E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.85E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.73E−03
Listed β, ce and Auger radiations	1.31E+00
Omitted β, ce and Auger radiations**	1.51E−02
Listed radiations	1.60E+00
Omitted radiations**	1.69E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Sm-152 daughter is stable.

62-Sm-140

26-JAN-95

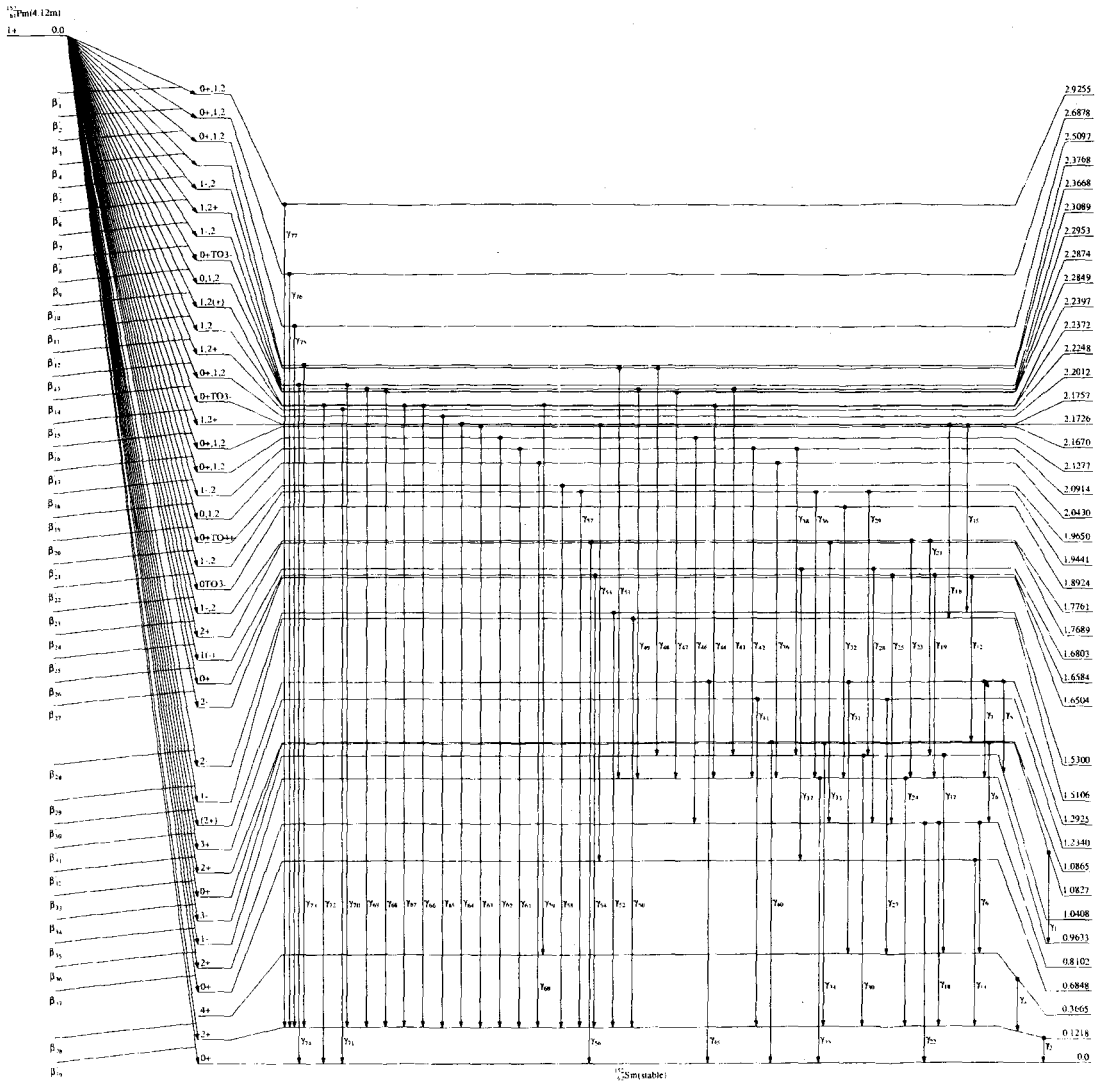
Half-life = 14.82 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 4	3.88E−03	6.921E−01*	2.68E−03
β^+ 5	2.48E−01	8.785E−01*	2.18E−01
$\gamma^{\pm}$	5.03E−01	5.110E−01	2.57E−01
ce-L_1, γ 1	3.60E−02	2.777E−02	1.00E−03
ce-M, γ 1	8.45E−03	3.384E−02*	2.86E−04
ce-K, γ 2	1.18E−02	3.012E−02	3.55E−04
γ 3	1.30E−02	8.440E−02	1.10E−03
ce-K, γ 3	2.83E−02	3.922E−02	1.11E−03
ce-L_1, γ 3	3.63E−03	7.697E−02	2.79E−04
ce-K, γ 4	4.99E−03	6.472E−02	3.23E−04
γ 5	9.60E−03	1.146E−01	1.10E−03
ce-K, γ 5	8.69E−03	6.942E−02	6.03E−04
γ 7	1.70E−02	1.208E−01	2.05E−03
γ 9	5.00E−02	1.400E−01	7.00E−03
ce-K, γ 9	4.55E−03	9.482E−02	4.32E−04
γ 13	6.30E−03	1.585E−01	9.99E−04
ce-K, γ 13	2.29E−03	1.133E−01	2.59E−04
γ 17	7.00E−03	1.999E−01	1.40E−03
γ 19	5.00E−03	2.206E−01	1.10E−03
γ 20	8.00E−03	2.207E−01	1.77E−03
γ 21	1.00E−01	2.254E−01	2.25E−02
ce-K, γ 21	1.38E−02	1.802E−01	2.49E−03
ce-L_1, γ 21	1.76E−03	2.180E−01	3.84E−04
γ 25	2.70E−03	2.675E−01	7.22E−04
γ 26	4.90E−03	2.790E−01	1.37E−03
γ 29	2.50E−03	3.114E−01	7.78E−04
γ 32	1.80E−02	3.398E−01	6.12E−03
γ 34	2.10E−02	3.413E−01	7.17E−03
γ 35	9.60E−03	3.449E−01	3.31E−03
γ 36	2.10E−03	3.703E−01	7.78E−04
γ 37	1.60E−03	4.095E−01	6.55E−04
γ 38	1.50E−03	4.153E−01	6.23E−04
γ 44	1.40E−03	4.452E−01	6.23E−04
γ 47	5.70E−03	5.033E−01	2.87E−03
γ 48	1.50E−03	5.205E−01	7.81E−04
γ 49	1.50E−03	5.339E−01	8.01E−04
γ 50	3.30E−03	5.656E−01	1.87E−03
γ 51	3.00E−03	5.722E−01	1.72E−03
γ 52	4.00E−03	5.763E−01	2.31E−03
γ 53	1.70E−03	5.863E−01	9.97E−04
γ 54	2.20E−03	6.042E−01	1.33E−03
γ 55	1.40E−03	6.083E−01	8.52E−04
γ 57	2.50E−03	6.489E−01	1.62E−03
γ 58	1.70E−03	6.525E−01	1.11E−03
γ 59	3.30E−03	6.682E−01	2.21E−03
γ 61	2.80E−03	7.010E−01	1.96E−03
γ 62	2.30E−03	7.258E−01	1.67E−03
γ 63	5.60E−03	7.615E−01	4.26E−03
γ 64	4.10E−03	7.747E−01	3.18E−03
γ 66	2.60E−03	8.110E−01	2.11E−03
γ 67	3.10E−03	8.145E−01	2.52E−03
γ 68	7.50E−03	8.255E−01	6.19E−03
γ 69	6.20E−03	8.448E−01	5.24E−03
γ 70	1.00E−03	8.558E−01	8.56E−04
γ 72	2.00E−03	8.620E−01	1.72E−03
γ 73	1.80E−03	8.635E−01	1.55E−03
γ 74	4.80E−03	8.742E−01	4.20E−03
γ 75	9.00E−04	9.263E−01	8.34E−04
γ 76	2.90E−03	9.511E−01	2.76E−03
γ 77	1.80E−03	9.670E−01	1.74E−03
γ 78	1.20E−03	9.999E−01	1.20E−03
γ 79	1.50E−03	1.018E+00	1.53E−03
γ 80	1.50E−03	1.018E+00	1.53E−03
γ 81	2.30E−03	1.023E+00	2.35E−03
γ 82	1.80E−03	1.047E+00	1.88E−03
γ 83	9.00E−04	1.054E+00	9.48E−04
γ 85	3.90E−03	1.089E+00	4.25E−03
γ 86	1.20E−03	1.094E+00	1.31E−03
γ 87	5.20E−03	1.098E+00	5.71E−03
γ 88	2.30E−03	1.116E+00	2.57E−03
γ 89	2.40E−03	1.120E+00	2.69E−03
γ 90	1.80E−02	1.138E+00	2.05E−02
γ 91	6.90E−03	1.167E+00	8.05E−03
γ 92	2.90E−03	1.173E+00	3.40E−03
γ 93	1.40E−03	1.189E+00	1.66E−03
γ 94	4.20E−03	1.250E+00	5.25E−03
γ 95	2.60E−03	1.255E+00	3.26E−03
γ 96	1.60E−02	1.274E+00	2.04E−02
γ 97	5.60E−03	1.278E+00	7.16E−03
γ 98	5.60E−03	1.278E+00	7.16E−03
γ 99	5.30E−03	1.283E+00	6.80E−03
γ 100	5.30E−03	1.283E+00	6.80E−03
γ 101	4.40E−03	1.325E+00	5.83E−03
γ 102	3.10E−03	1.330E+00	4.12E−03
γ 103	1.20E−02	1.393E+00	1.67E−02
γ 104	1.50E−03	1.398E+00	2.10E−03
γ 105	1.10E−03	1.427E+00	1.57E−03
γ 106	1.40E−03	1.444E+00	2.02E−03
γ 107	1.10E−03	1.480E+00	1.63E−03
γ 108	1.30E−02	1.530E+00	1.99E−02
γ 109	4.40E−03	1.578E+00	6.94E−03
γ 110	5.00E−04	1.595E+00	7.97E−04
γ 111	1.40E−03	1.596E+00	2.23E−03
γ 112	6.00E−04	1.619E+00	9.71E−04
γ 114	1.60E−03	1.642E+00	2.63E−03
γ 115	4.40E−03	1.670E+00	7.35E−03
γ 116	9.00E−04	1.672E+00	1.50E−03
γ 117	1.80E−03	1.678E+00	3.02E−03
γ 118	1.40E−03	1.786E+00	2.50E−03
γ 119	1.10E−03	1.816E+00	2.00E−03
γ 120	2.10E−03	1.959E+00	4.11E−03
γ 121	1.30E−03	2.017E+00	2.62E−03
K_{α_1} X-ray	3.44E−01	3.872E−02	1.33E−02
K_{α_2} X-ray	1.89E−01	3.817E−02	7.22E−03
K_{β_1} X-ray	6.77E−02	4.383E−02	2.97E−03
K_{β_2} X-ray	2.91E−02	4.497E−02	1.31E−03
K_{β_3} X-ray	3.51E−02	4.371E−02	1.53E−03
Auger-KLL	3.49E−02	3.122E−02*	1.09E−03
Auger-KLX	1.74E−02	3.686E−02*	6.40E−04
Auger-LMM	3.91E−01	4.333E−03*	1.70E−03
Auger-LMX	2.31E−01	5.552E−03*	1.28E−03
Auger-MXY	1.26E+00	1.205E−03*	1.52E−03

Listed X, γ and $\gamma^{\pm}$ radiations	6.11E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.15E−02
Listed β, ce and Auger radiations	2.34E−01
Omitted β, ce and Auger radiations**	4.65E−03
Listed radiations	8.45E−01
Omitted radiations**	1.61E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pm-140 daughter is radioactive.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1,2
0+TO3-
0,1,2
1,2(+)
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1,2+
0+,1,2
0+TO3-
1,2+
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0+,1,2
1-,2
0,1,2
0+TO4+
1-,2
0TO3
1-,2
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0+
2-
2
1-
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3+
2+
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3-
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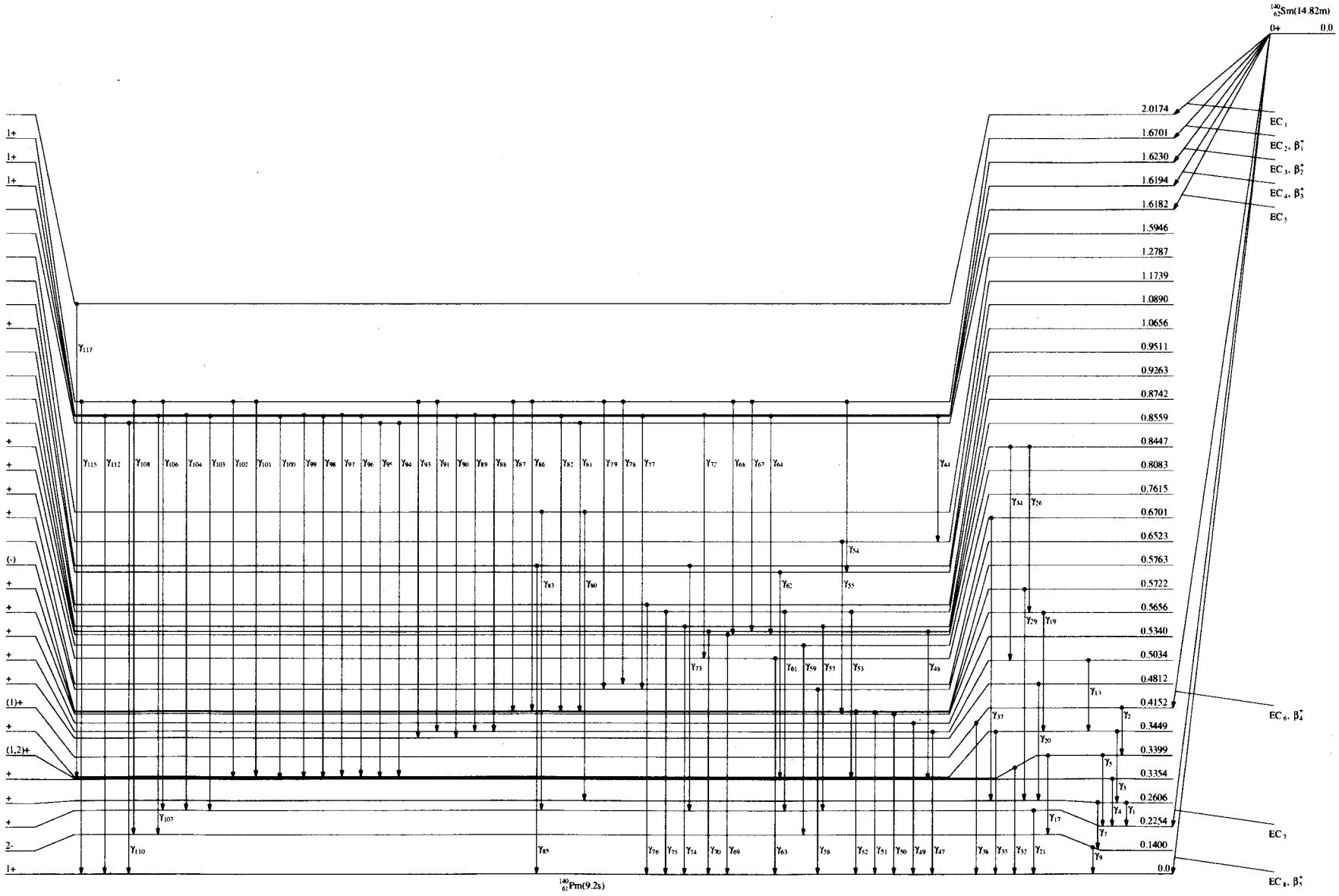
1.0827
1.0408
0.9633
0.8102
0.6848
0.3665
0.1218
0.0


$^{140}_{62}$Sm(14.82m)
0+ 0.0
2.0174
1.6701
1.6230
1.6194
1.6182
1.5946
1.2787
1.1739
1.0890
1.0656
0.9511
0.9263
0.8742
0.8559
0.8447
0.8083
0.7615
0.6701
0.6523
0.5763
0.5722
0.5656
0.5340
0.5034
0.4812
0.4152
0.3449
0.3399
0.3354
0.2606
0.2254
0.1400
0.0
EC$_1$
EC$_2$, β^+_1
EC$_3$, β^+_2
EC$_4$, β^+_3
EC$_5$
EC$_6$, β^+_4
EC$_7$
EC$_8$, β^+_5
1+
1+
1+
+
+
+
+
+
(-)
+
+
+
+
+
+
(1)+
+
(1,2)+
+
+
+
2-
1+
γ_{117}
γ_{115} γ_{112} γ_{108} γ_{106} γ_{104} γ_{103} γ_{102} γ_{101} γ_{100} γ_{99} γ_{98} γ_{97} γ_{96} γ_{95} γ_{94} γ_{93} γ_{91} γ_{90} γ_{89} γ_{88} γ_{87} γ_{86} γ_{82} γ_{81} γ_{79} γ_{78} γ_{77} γ_{72} γ_{68} γ_{67} γ_{64} γ_{44}
γ_{54} γ_{26}
γ_{54}
γ_{83} γ_{80} γ_{62} γ_{55}
γ_{29} γ_{19}
γ_{73} γ_{61} γ_{59} γ_{57} γ_{53} γ_{48}
γ_{13}
γ_{37} γ_{2}
γ_{20}
γ_{5}
γ_{3}
γ_{4} γ_{1}
γ_{17}
γ_{7}
γ_{9}
γ_{107}
γ_{110} γ_{85} γ_{76} γ_{75} γ_{74} γ_{70} γ_{69} γ_{63} γ_{58} γ_{52} γ_{51} γ_{50} γ_{49} γ_{47} γ_{38} γ_{35} γ_{32} γ_{21}
$^{140}_{61}$Pm(9.2s)

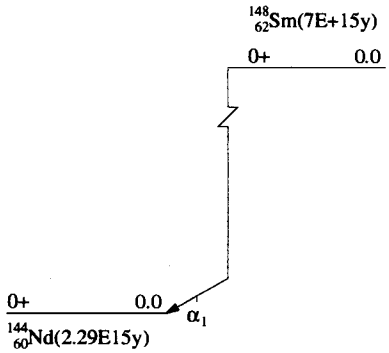
62-Sm-148

22-AUG-89

Half-life = 7.0E+15 y
Decay mode(s): α

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E+00	1.932E+00	1.93E+00
α recoil	1.00E+00	5.372E−02	5.37E−02
Listed α and α recoil radiations			1.99E+00
Listed radiations			1.99E+00

Nd-144 daughter is radioactive.



63-Eu-152m

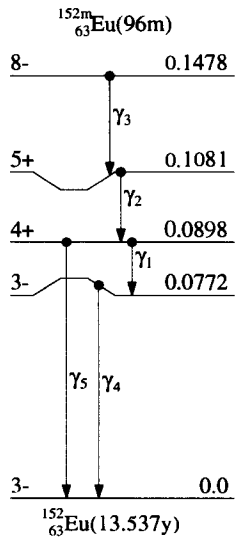
16-JAN-97

Half-life = 96 m
Decay mode(s): IT

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-L_3, γ 1	1.59E−02	5.621E−03	8.95E−05
ce-M, γ 1	7.46E−03	1.112E−02*	8.29E−05
ce-N^+, γ 1	5.58E−03	1.260E−02*	7.03E−05
γ 2	1.26E−02	1.821E−02	2.29E−04
ce-L_1, γ 2	3.88E−01	1.016E−02	3.94E−03
ce-L_2, γ 2	6.78E−02	1.059E−02	7.18E−04
ce-L_3, γ 2	5.17E−02	1.123E−02	5.81E−04
ce-M, γ 2	1.10E−01	1.673E−02*	1.85E−03
ce-N^+, γ 2	5.49E−02	1.821E−02*	1.00E−03
ce-L_1, γ 3	3.64E−03	3.170E−02	1.15E−04
ce-L_2, γ 3	3.38E−01	3.213E−02	1.09E−02
ce-L_3, γ 3	4.06E−01	3.277E−02	1.33E−02
ce-M, γ 3	1.95E−01	3.827E−02*	7.46E−03
ce-N^+, γ 3	5.70E−02	3.975E−02*	2.27E−03
γ 4	6.85E−03	7.723E−02	5.29E−04
ce-K, γ 4	2.29E−02	2.871E−02	6.57E−04
ce-L_1, γ 4	2.97E−03	6.918E−02	2.06E−04
γ 5	6.99E−01	8.985E−02	6.28E−02
ce-K, γ 5	2.24E−01	4.133E−02	9.24E−03
ce-L_1, γ 5	2.25E−02	8.180E−02	1.84E−03
ce-L_2, γ 5	4.95E−03	8.223E−02	4.07E−04
ce-L_3, γ 5	6.28E−03	8.287E−02	5.20E−04
ce-M, γ 5	7.21E−03	8.837E−02*	6.37E−04
ce-N^+, γ 5	2.00E−03	8.985E−02*	1.79E−04
K_{α_1} X-ray	1.18E−01	4.154E−02	4.92E−03
K_{α_2} X-ray	6.56E−02	4.090E−02	2.68E−03
K_{β_1} X-ray	2.30E−02	4.704E−02	1.08E−03
K_{β_2} X-ray	1.04E−02	4.828E−02	5.00E−04
K_{β_3} X-ray	1.18E−02	4.691E−02	5.55E−04
L_α X-ray	9.78E−02	5.843E−03*	5.72E−04
L_β X-ray	1.21E−01	6.533E−03*	7.90E−04
L_γ X-ray	2.04E−02	7.608E−03*	1.55E−04
Auger-KLL	1.08E−02	3.338E−02*	3.60E−04
Auger-KLX	5.44E−03	3.950E−02*	2.15E−04
Auger-LMM	7.61E−01	4.718E−03*	3.59E−03
Auger-LMX	4.57E−01	6.051E−03*	2.77E−03
Auger-LXY	7.49E−02	7.047E−03*	5.28E−04
Auger-MXY	2.55E+00	1.293E−03*	3.29E−03
ΔE	6.92E−01	1.764E−04*	1.22E−04
Listed X, γ and $\gamma^\pm$ radiations			7.48E−02
Omitted X, γ and $\gamma^\pm$ radiations**			8.44E−05
Listed β, ce and Auger radiations			6.69E−02
Omitted β, ce and Auger radiations**			2.28E−04
Listed radiations			1.42E−01
Omitted radiations**			3.13E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Eu-152 daughter is radioactive.



63-Eu-154m

06-OCT-93

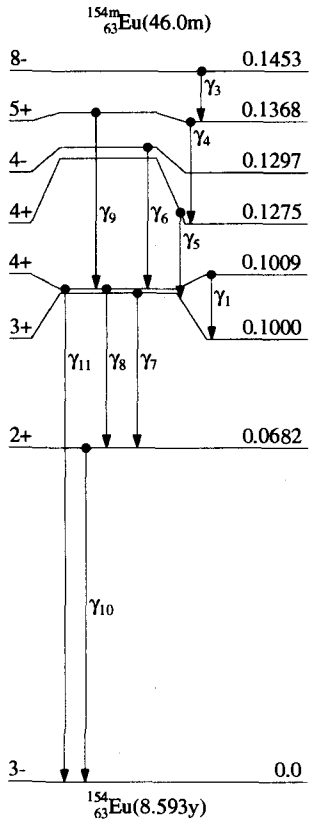
Half-life = 46 m
Decay mode(s): IT

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-N+, γ 1	4.22E−01	9.100E−04*	3.84E−04
ce-L2, γ 3	1.99E−01	9.829E−04	1.95E−04
ce-L3, γ 3	3.13E−01	1.623E−03	5.09E−04
ce-M, γ 3	2.00E−01	7.119E−03*	1.42E−03
ce-N+, γ 3	4.71E−01	8.600E−03*	4.05E−03
ce-L1, γ 4	7.60E−02	1.248E−03	9.48E−05
ce-M, γ 4	1.82E−02	7.819E−03*	1.42E−04
ce-N+, γ 4	2.63E−02	9.300E−03*	2.45E−04
γ 5	8.88E−03	2.751E−02	2.44E−04
ce-L1, γ 5	8.05E−02	1.946E−02	1.57E−03
ce-L2, γ 5	9.11E−03	1.989E−02	1.81E−04
ce-M, γ 5	2.02E−02	2.603E−02*	5.26E−04
ce-N+, γ 5	7.01E−03	2.751E−02*	1.93E−04
γ 6	1.07E−02	2.878E−02	3.09E−04
ce-L1, γ 6	5.34E−03	2.073E−02	1.11E−04
ce-L3, γ 6	4.43E−03	2.180E−02	9.67E−05
γ 7	5.55E−02	3.178E−02	1.76E−03
ce-L1, γ 7	3.28E−01	2.373E−02	7.78E−03
ce-L2, γ 7	3.43E−02	2.416E−02	8.29E−04
ce-L3, γ 7	1.21E−02	2.480E−02	3.01E−04
ce-M, γ 7	8.08E−02	3.030E−02*	2.45E−03
ce-N+, γ 7	2.60E−02	3.178E−02*	8.28E−04
ce-L2, γ 8	7.39E−02	2.499E−02	1.85E−03
ce-L3, γ 8	9.67E−02	2.563E−02	2.48E−03
ce-M, γ 8	3.97E−02	3.113E−02*	1.24E−03
ce-N+, γ 8	1.24E−02	3.261E−02*	4.05E−04
γ 9	1.26E−01	3.580E−02	4.50E−03
ce-L1, γ 9	5.19E−01	2.775E−02	1.44E−02
ce-L2, γ 9	1.04E−01	2.818E−02	2.93E−03
ce-L3, γ 9	8.34E−02	2.883E−02	2.41E−03
ce-M, γ 9	1.54E−01	3.432E−02*	5.30E−03
ce-N+, γ 9	4.73E−02	3.580E−02*	1.69E−03
γ 10	3.70E−01	6.817E−02	2.52E−02
ce-K, γ 10	2.46E−01	1.965E−02	4.84E−03
ce-L1, γ 10	2.39E−02	6.012E−02	1.44E−03
ce-L2, γ 10	6.51E−03	6.055E−02	3.94E−04
ce-L3, γ 10	8.56E−03	6.119E−02	5.24E−04
ce-M, γ 10	8.33E−03	6.669E−02*	5.56E−04
ce-N+, γ 10	2.26E−03	6.817E−02*	1.54E−04
γ 11	2.66E−01	1.009E−01	2.69E−02
ce-K, γ 11	6.26E−02	5.236E−02	3.28E−03
ce-L1, γ 11	6.38E−03	9.283E−02	5.92E−04
ce-L2, γ 11	1.29E−03	9.326E−02	1.20E−04
ce-L3, γ 11	1.61E−03	9.390E−02	1.51E−04
ce-M, γ 11	1.98E−03	9.940E−02*	1.97E−04
K_{α_1} X-ray	1.48E−01	4.154E−02	6.16E−03
K_{α_2} X-ray	8.22E−02	4.090E−02	3.36E−03
K_{β_1} X-ray	2.88E−02	4.704E−02	1.35E−03
K_{β_2} X-ray	1.30E−02	4.828E−02	6.27E−04
K_{β_3} X-ray	1.48E−02	4.691E−02	6.96E−04
L_α X-ray	1.34E−01	5.843E−03*	7.86E−04
L_β X-ray	1.91E−01	6.534E−03*	1.25E−03
L_γ X-ray	3.57E−02	7.655E−03*	2.73E−04
Auger-KLL	1.35E−02	3.338E−02*	4.51E−04
Auger-KLX	6.82E−03	3.950E−02*	2.69E−04
Auger-LMM	1.12E+00	4.776E−03*	5.35E−03
Auger-LMX	6.81E−01	6.115E−03*	4.16E−03
Auger-LXY	1.11E−01	7.110E−03*	7.90E−04
Auger-MXY	3.81E+00	1.297E−03*	4.94E−03
ΔE	1.88E+00	2.131E−04*	4.01E−04

Listed X, γ and $\gamma^{\pm}$ radiations	7.34E−02
Omitted X, γ AND $\gamma^{\pm}$ radiations**	8.82E−05
Listed β, ce AND Auger radiations	8.32E−02
Omitted β, ce AND Auger radiations**	4.81E−04
Listed radiations	1.57E−01
Omitted radiations**	5.69E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Eu-154 daughter is radioactive.



63-Eu-159

16-AUG-94

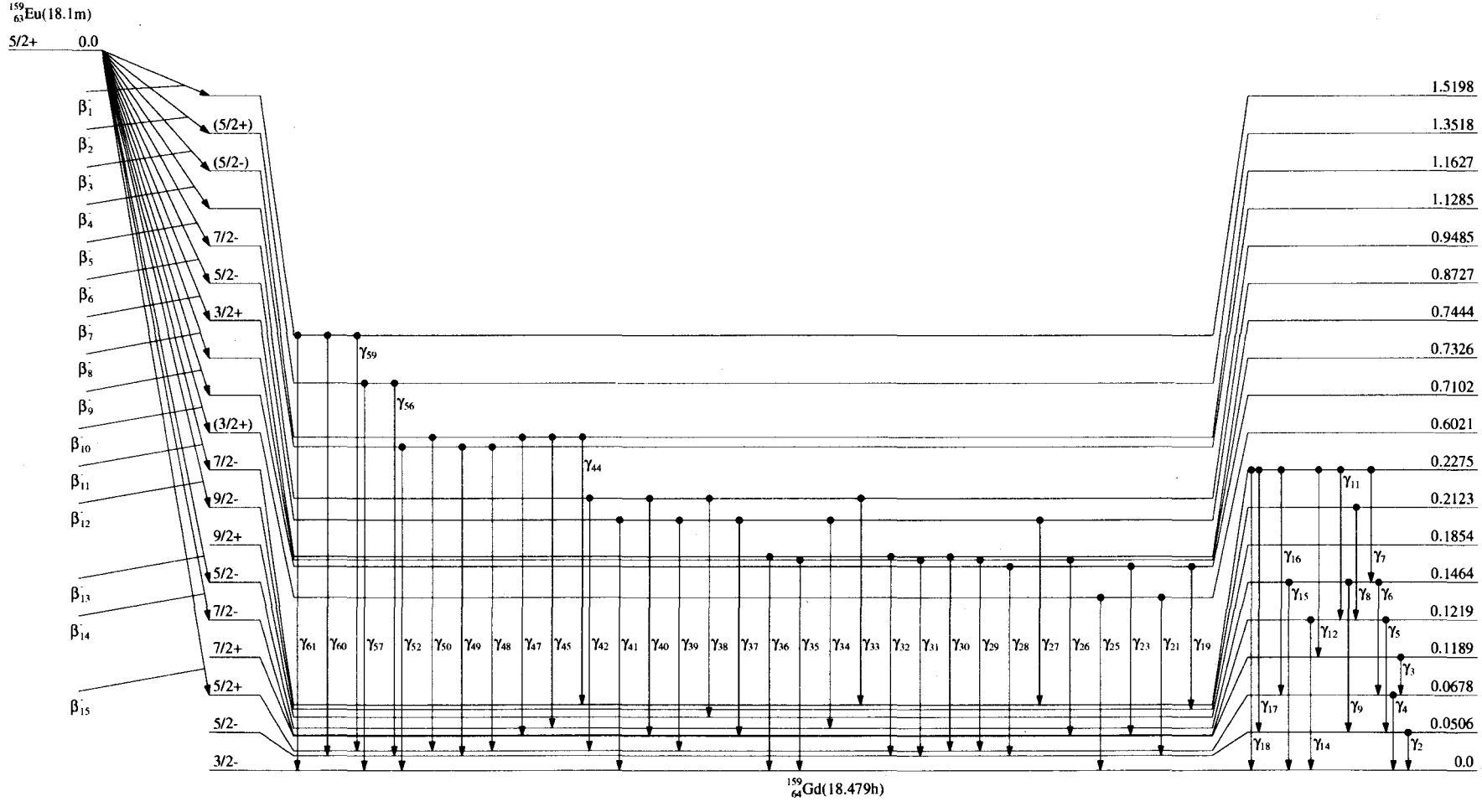
Half-life = 18.1 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.08E−02	3.368E−01*	3.64E−03
β^- 2	3.93E−03	4.047E−01*	1.59E−03
β^- 3	2.46E−02	4.832E−01*	1.19E−02
β^- 4	1.08E−02	4.976E−01*	5.38E−03
β^- 5	1.38E−02	5.741E−01*	7.90E−03
β^- 6	4.62E−02	6.067E−01*	2.80E−02
β^- 7	3.24E−02	6.624E−01*	2.15E−02
β^- 8	6.48E−02	6.675E−01*	4.33E−02
β^- 9	2.06E−02	6.773E−01*	1.40E−02
β^- 10	1.28E−02	7.246E−01*	9.25E−03
β^- 11	1.38E−01	8.908E−01*	1.23E−01
β^- 12	2.26E−02	8.853E−01*	2.00E−02
β^- 13	3.63E−01	9.271E−01*	3.37E−01
β^- 14	4.91E−02	9.381E−01*	4.61E−02
β^- 15	1.87E−01	9.624E−01*	1.80E−01
γ 2	3.44E−02	5.070E−02	1.74E−03
ce-L_1, γ 2	5.65E−02	4.232E−02	2.39E−03
γ 4	1.92E−01	6.780E−02	1.30E−02
ce-K, γ 4	1.32E−01	1.756E−02	2.32E−03
γ 5	1.07E−02	7.140E−02	7.66E−04
ce-K, γ 5	6.52E−02	2.116E−02	1.38E−03
γ 6	9.10E−02	7.860E−02	7.15E−03
ce-K, γ 6	4.26E−02	2.836E−02	1.21E−03
γ 7	1.23E−02	8.040E−02	9.93E−04
ce-K, γ 7	5.00E−02	3.016E−02	1.51E−03
γ 8	6.17E−03	9.040E−02	5.58E−04
γ 9	6.99E−02	9.570E−02	6.69E−03
ce-K, γ 9	1.59E−01	4.546E−02	7.24E−03
ce-L_1, γ 9	2.10E−02	8.732E−02	1.83E−03
γ 10	6.50E−03	1.025E−01	6.66E−04
γ 11	7.15E−03	1.055E−01	7.54E−04
γ 12	2.83E−03	1.088E−01	3.08E−04
γ 14	3.90E−03	1.219E−01	4.75E−04
γ 15	3.25E−02	1.464E−01	4.76E−03
ce-K, γ 15	1.91E−02	9.616E−02	1.83E−03
γ 16	1.37E−02	1.598E−01	2.18E−03
γ 17	1.30E−02	1.769E−01	2.30E−03
γ 18	1.62E−02	2.275E−01	3.70E−03
γ 19	3.25E−03	4.982E−01	1.62E−03
γ 20	1.62E−03	5.214E−01	8.47E−04
γ 21	3.90E−03	5.513E−01	2.15E−03
γ 22	2.60E−03	5.755E−01	1.50E−03
γ 23	3.90E−03	5.886E−01	2.30E−03
γ 24	3.25E−03	5.960E−01	1.94E−03
γ 25	8.77E−03	6.022E−01	5.28E−03
γ 26	1.27E−02	6.134E−01	7.77E−03
γ 27	3.57E−03	6.457E−01	2.31E−03
γ 28	1.33E−02	6.595E−01	8.79E−03
γ 29	3.05E−02	6.649E−01	2.03E−02
γ 30	1.88E−02	6.766E−01	1.28E−02
γ 31	2.31E−02	6.819E−01	1.57E−02
γ 32	4.88E−03	6.938E−01	3.38E−03
γ 33	1.62E−03	7.204E−01	1.17E−03
γ 34	6.50E−03	7.265E−01	4.72E−03
γ 35	2.44E−03	7.331E−01	1.79E−03
γ 36	9.10E−03	7.443E−01	6.77E−03
γ 37	9.10E−03	7.539E−01	6.86E−03
γ 38	3.25E−03	7.631E−01	2.48E−03
γ 39	2.57E−02	8.047E−01	2.07E−02
γ 40	5.52E−03	8.297E−01	4.58E−03
γ 41	2.11E−03	8.714E−01	1.84E−03
γ 42	3.25E−03	8.808E−01	2.86E−03
γ 43	1.62E−03	9.157E−01	1.49E−03
γ 44	2.92E−03	9.361E−01	2.74E−03
γ 45	4.88E−03	1.015E+00	4.95E−03
γ 46	1.95E−03	1.038E+00	2.02E−03
γ 47	5.20E−03	1.044E+00	5.43E−03
γ 48	2.92E−03	1.060E+00	3.10E−03
γ 49	2.60E−03	1.078E+00	2.80E−03
γ 50	1.20E−02	1.095E+00	1.32E−02
γ 51	2.60E−03	1.109E+00	2.88E−03
γ 52	5.20E−03	1.128E+00	5.87E−03
γ 53	6.17E−04	1.159E+00	7.16E−04
γ 54	1.14E−03	1.182E+00	1.34E−03
γ 55	1.95E−03	1.221E+00	2.38E−03
γ 56	3.25E−03	1.301E+00	4.23E−03
γ 57	1.20E−03	1.351E+00	1.62E−03
γ 58	2.44E−03	1.434E+00	3.49E−03
γ 59	1.95E−03	1.452E+00	2.83E−03
γ 60	2.92E−03	1.469E+00	4.30E−03
γ 61	6.50E−03	1.520E+00	9.88E−03
K_{α_1} X-ray	4.68E−01	4.300E−02	2.01E−02
K_{α_2} X-ray	2.60E−01	4.231E−02	1.10E−02
K_{β_1} X-ray	8.98E−02	4.870E−02	4.37E−03
K_{β_2} X-ray	4.16E−02	5.000E−02	2.08E−03
K_{β_3} X-ray	4.64E−02	4.855E−02	2.26E−03
L_α X-ray	8.23E−02	6.054E−03*	4.98E−04
L_β X-ray	7.66E−02	6.805E−03*	5.21E−04
Auger-KLL	4.05E−02	3.450E−02*	1.40E−03
Auger-LMM	5.22E−01	4.809E−03*	2.51E−03
Auger-LMX	3.14E−01	6.196E−03*	1.95E−03
Auger-MXY	1.72E+00	1.378E−03*	2.37E−03

Listed X, γ and $\gamma^{\pm}$ radiations	3.03E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	5.76E−04
Listed β, ce and Auger radiations	8.79E−01
Omitted β, ce and Auger radiations**	1.48E−02
Listed radiations	1.18E+00
Omitted radiations**	1.53E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Gd-159 daughter is radioactive.


159 63 Eu(18.1m)
5/2+ 0.0
β-1
β-2
β-3
β-4
β-5
β-6
β-7
β-8
β-9
β-10
β-11
β-12
β-13
β-14
β-15
(5/2+)
(5/2-)
7/2-
5/2-
3/2+
(3/2+)
7/2-
9/2-
9/2+
5/2-
7/2-
7/2+
5/2+
5/2-
3/2-
1.5198
1.3518
1.1627
1.1285
0.9485
0.8727
0.7444
0.7326
0.7102
0.6021
0.2275
0.2123
0.1854
0.1464
0.1219
0.1189
0.0678
0.0506
0.0
159 64 Gd(18.479h)

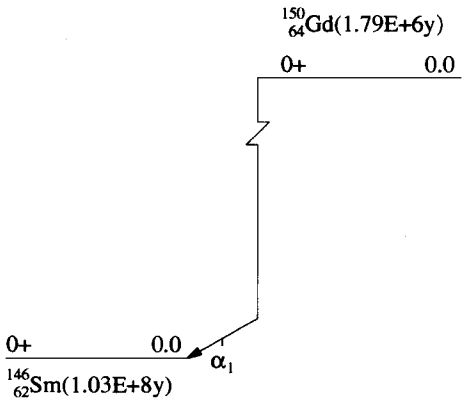
64-Gd-150

29-APR-94

Half-life = 1.79E+6 y
Decay mode(s): α

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E+00	2.733E+00	2.73E+00
α recoil	1.00E+00	7.493E−02	7.49E−02
Listed α and α recoil radiations			2.81E+00
Listed radiations			2.81E+00

Sm-146 daughter is radioactive.



65-Tb-148

23-AUG-90

Half-life = 60 m
Decay mode(s): EC, β^+

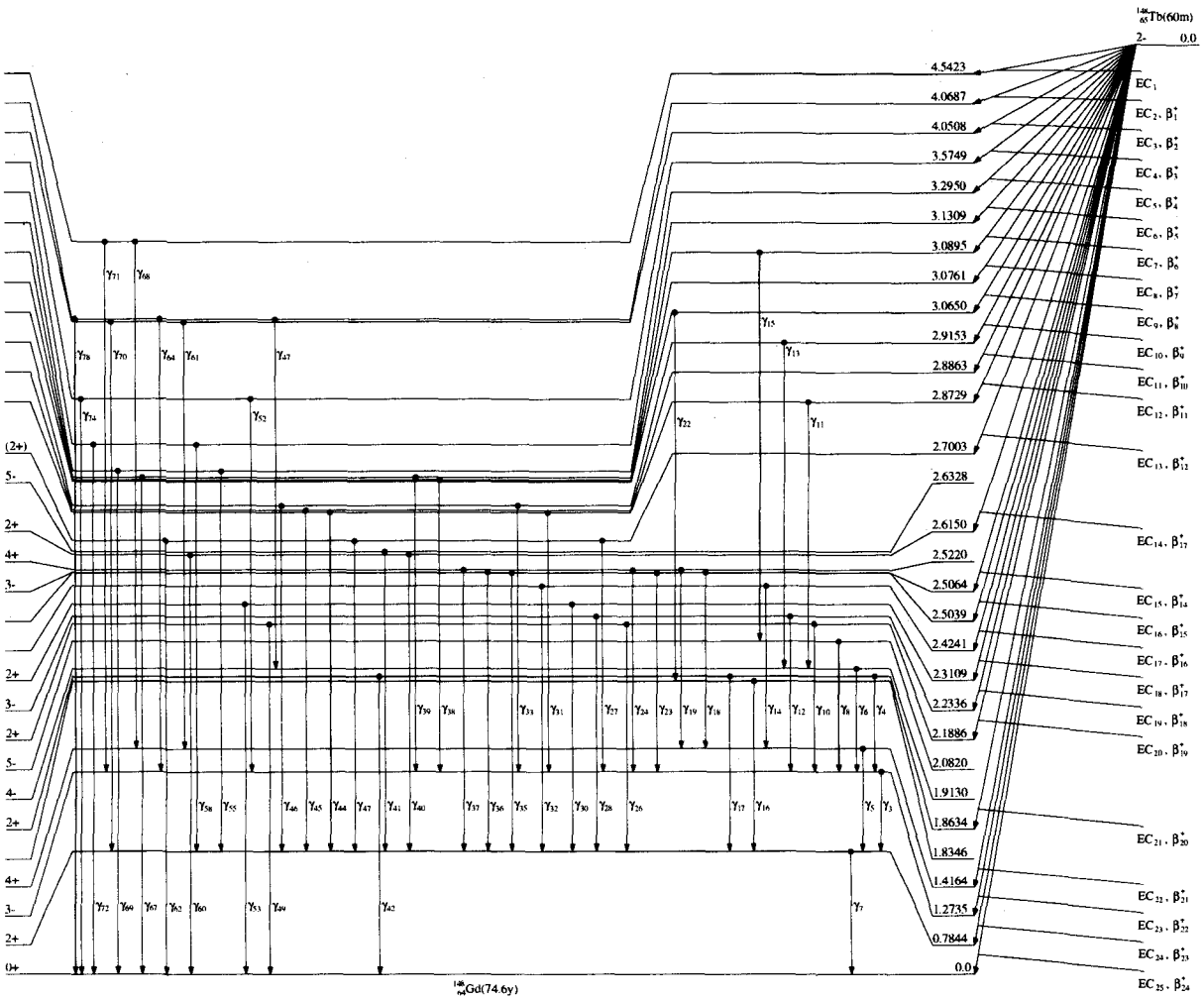
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 5	1.88E−03	7.287E−01*	1.37E−03
β^+ 6	2.24E−03	7.472E−01*	1.67E−03
β^+ 9	4.56E−03	8.252E−01*	3.77E−03
β^+ 10	2.18E−03	8.382E−01*	1.83E−03
β^+ 11	3.70E−03	8.442E−01*	3.13E−03
β^+ 12	3.97E−03	9.219E−01*	3.66E−03
β^+ 13	8.82E−03	9.604E−01*	8.47E−03
β^+ 14	9.44E−03	1.010E+00*	9.53E−03
β^+ 15	7.78E−03	1.011E+00*	7.86E−03
β^+ 16	4.15E−03	1.047E+00*	4.34E−03
β^+ 17	7.67E−03	1.098E+00*	8.43E−03
β^+ 18	8.92E−03	1.134E+00*	1.01E−02
β^+ 19	1.97E−02	1.154E+00*	2.27E−02
β^+ 20	9.96E−02	1.303E+00*	1.30E−01
β^+ 21	3.01E−02	1.497E+00*	4.50E−02
β^+ 22	6.53E−02	1.575E+00*	1.03E−01
β^+ 23	2.29E−01	1.803E+00*	4.13E−01
β^+ 24	2.80E−02	2.140E+00*	5.99E−02
$\gamma^{\pm}$	1.08E+00	5.110E−01	5.52E−01
γ 3	1.98E−01	4.890E−01	9.70E−02
γ 4	5.99E−03	5.899E−01	3.53E−03
γ 5	1.07E−01	6.319E−01	6.75E−02
γ 6	2.65E−02	6.395E−01	1.69E−02
γ 7	8.44E−01	7.844E−01	6.62E−01
ce-K, γ 7	3.29E−03	7.342E−01	2.42E−03
γ 8	4.42E−03	8.086E−01	3.58E−03
γ 10	3.04E−03	9.153E−01	2.78E−03
γ 11	1.08E−02	9.601E−01	1.04E−02
γ 12	1.08E−02	9.601E−01	1.04E−02
γ 13	3.37E−03	1.002E+00	3.38E−03
γ 14	6.50E−03	1.008E+00	6.55E−03
γ 15	6.50E−03	1.008E+00	6.55E−03
γ 16	8.14E−03	1.050E+00	8.55E−03
γ 17	1.15E−01	1.079E+00	1.24E−01
γ 18	2.26E−02	1.089E+00	2.46E−02
γ 19	6.16E−03	1.106E+00	6.81E−03
γ 22	3.29E−03	1.230E+00	4.05E−03
γ 23	8.27E−03	1.230E+00	1.02E−02
γ 24	2.03E−03	1.248E+00	2.53E−03
γ 26	2.14E−02	1.404E+00	3.01E−02
γ 27	2.79E−03	1.426E+00	3.97E−03
γ 28	9.12E−03	1.449E+00	1.32E−02
γ 30	6.41E−03	1.526E+00	9.79E−03
γ 31	1.08E−02	1.599E+00	1.73E−02
γ 32	4.22E−03	1.640E+00	6.92E−03
γ 33	4.47E−03	1.642E+00	7.34E−03
γ 34	2.79E−03	1.679E+00	4.68E−03
γ 35	1.46E−02	1.720E+00	2.51E−02
γ 36	3.46E−03	1.722E+00	5.96E−03
γ 37	1.69E−03	1.738E+00	2.93E−03
γ 38	5.06E−03	1.803E+00	9.13E−03
γ 39	4.47E−03	1.816E+00	8.12E−03
γ 40	1.83E−02	1.830E+00	3.35E−02
γ 41	5.82E−03	1.848E+00	1.08E−02
γ 42	5.65E−02	1.863E+00	1.05E−01
γ 43	4.05E−03	1.916E+00	7.76E−03
γ 44	4.39E−03	2.089E+00	9.17E−03
γ 45	6.33E−03	2.102E+00	1.33E−02
γ 46	1.22E−02	2.131E+00	2.59E−02
γ 47	3.12E−03	2.155E+00	6.73E−03
γ 48	3.12E−03	2.168E+00	6.77E−03
γ 49	1.72E−02	2.189E+00	3.77E−02
γ 50	3.29E−03	2.247E+00	7.40E−03
γ 51	4.05E−03	2.288E+00	9.27E−03
γ 52	2.53E−03	2.301E+00	5.83E−03
γ 53	1.16E−02	2.311E+00	2.69E−02
γ 54	5.19E−03	2.332E+00	1.21E−02
γ 55	4.39E−03	2.345E+00	1.03E−02
γ 56	5.74E−03	2.363E+00	1.36E−02
γ 57	5.32E−03	2.486E+00	1.32E−02
γ 58	3.04E−03	2.511E+00	7.63E−03
γ 59	2.62E−03	2.593E+00	6.79E−03
γ 60	6.92E−03	2.614E+00	1.81E−02
γ 61	1.35E−03	2.635E+00	3.56E−03
γ 62	6.41E−03	2.701E+00	1.73E−02
γ 64	1.60E−03	2.795E+00	4.48E−03
γ 65	2.79E−03	2.859E+00	7.96E−03
γ 66	3.80E−03	2.872E+00	1.09E−02
γ 67	1.60E−03	3.091E+00	4.96E−03
γ 68	2.62E−03	3.125E+00	8.18E−03
γ 69	6.92E−03	3.131E+00	2.17E−02
γ 70	3.46E−03	3.266E+00	1.13E−02
γ 71	5.57E−03	3.269E+00	1.82E−02
γ 72	1.01E−03	3.296E+00	3.34E−03
γ 73	2.95E−03	3.553E+00	1.05E−02
γ 74	2.28E−03	3.575E+00	8.15E−03
γ 75	3.71E−03	3.645E+00	1.35E−02

γ 76	5.06E−03	3.686E+00	1.87E−02
γ 77	2.95E−03	3.984E+00	1.18E−02
γ 78	1.35E−03	4.067E+00	5.49E−03
K_{α_1} X-ray	1.89E−01	4.300E−02	8.12E−03
K_{α_2} X-ray	1.05E−01	4.231E−02	4.44E−03
Auger-LMM	1.93E−01	4.810E−03*	9.29E−04
Auger-MXY	6.36E−01	1.382E−03*	8.79E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.35E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.66E−02
Listed β, ce and Auger radiations	8.42E−01
Omitted β, ce and Auger radiations**	6.24E−03
Listed radiations	3.19E+00
Omitted radiations**	2.28E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Gd-148 daughter is radioactive.



65-Tb-152

16-JAN-97

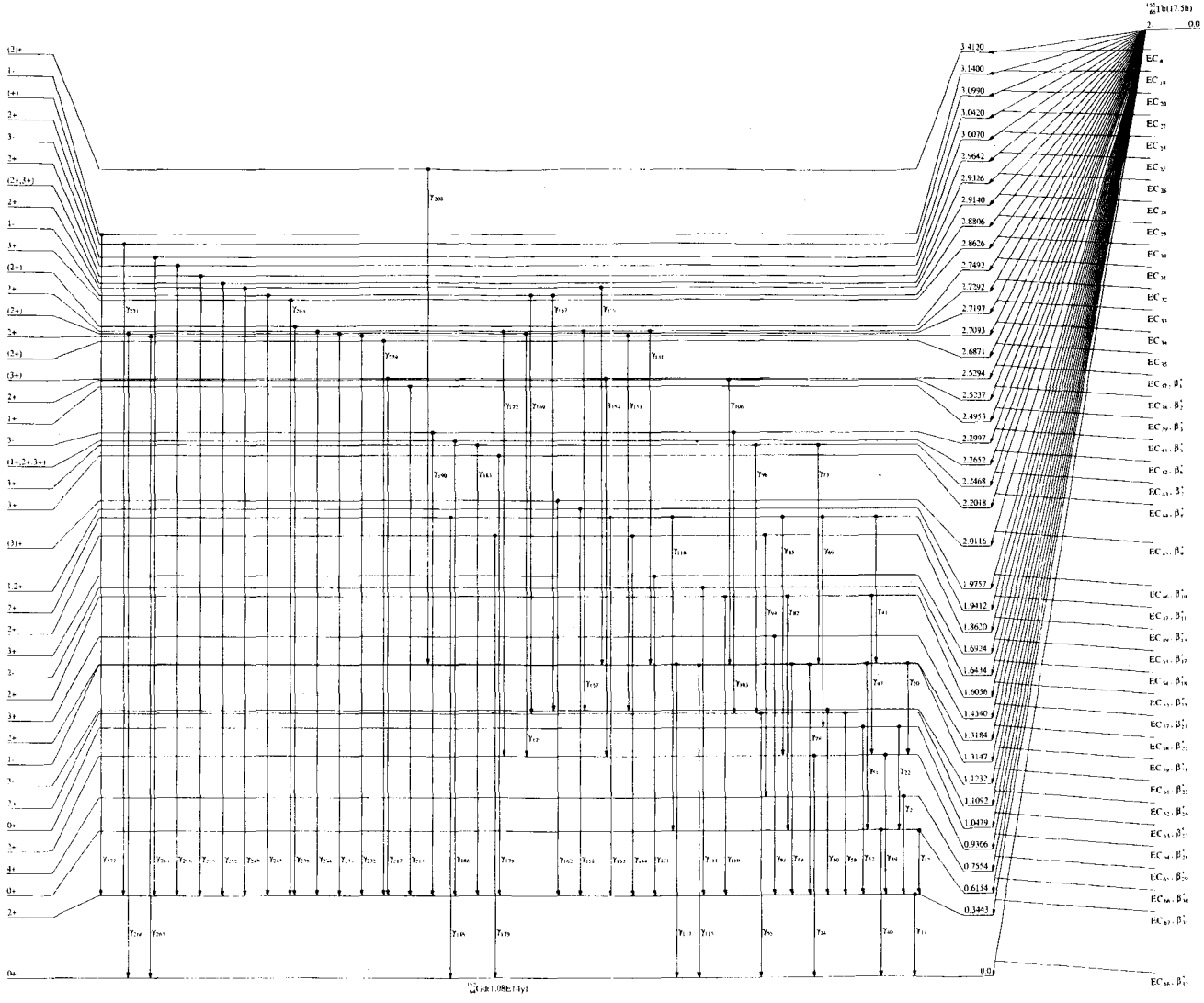
Half-life = 17.5 h
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 11	1.80E−03	4.695E−01*	8.43E−04
β^+ 13	1.07E−03	5.043E−01*	5.38E−04
β^+ 18	1.90E−03	6.009E−01*	1.14E−03
β^+ 19	2.59E−03	6.176E−01*	1.60E−03
β^+ 21	1.10E−03	6.939E−01*	7.62E−04
β^+ 22	5.09E−03	7.454E−01*	3.79E−03
β^+ 23	2.00E−03	7.471E−01*	1.49E−03
β^+ 25	5.19E−03	8.329E−01*	4.32E−03
β^+ 26	7.38E−03	8.392E−01*	6.20E−03
β^+ 27	9.98E−04	8.753E−01*	8.73E−04
β^+ 28	2.29E−02	9.196E−01*	2.11E−02
β^+ 29	1.50E−03	1.003E+00*	1.50E−03
β^+ 30	9.98E−03	1.065E+00*	1.06E−02
β^+ 31	5.99E−02	1.186E+00*	7.10E−02
β^+ 32	6.98E−02	1.337E+00*	9.34E−02
$\gamma^\pm$	3.92E−01	5.110E−01	2.00E−01
γ 12	8.58E−02	2.711E−01	2.33E−02
ce-K, γ 12	5.35E−03	2.208E−01	1.18E−03
γ 17	6.50E−01	3.443E−01	2.24E−01
ce-K, γ 17	2.02E−02	2.940E−01	5.95E−03
ce-L_1, γ 17	2.33E−03	3.359E−01	7.83E−04
ce-K, γ 20	1.59E−03	3.376E−01	5.36E−04
γ 21	4.09E−02	4.111E−01	1.68E−02
ce-K, γ 22	4.41E−03	3.823E−01	1.69E−03
γ 39	9.42E−02	5.863E−01	5.53E−02
ce-K, γ 39	1.95E−03	5.361E−01	1.04E−03
ce-K, γ 40	1.09E−02	5.654E−01	6.19E−03
ce-L_1, γ 40	1.51E−03	6.072E−01	9.16E−04
γ 41	9.36E−03	6.228E−01	5.83E−03
γ 47	5.52E−03	6.751E−01	3.73E−03
γ 51	7.86E−03	7.033E−01	5.53E−03
γ 52	1.69E−02	7.033E−01	1.19E−02
γ 58	2.92E−02	7.649E−01	2.24E−02
γ 60	5.78E−02	7.789E−01	4.51E−02
γ 69	6.69E−03	8.933E−01	5.98E−03
γ 73	4.55E−03	9.287E−01	4.23E−03
γ 74	1.82E−02	9.307E−01	1.69E−02
γ 78	9.29E−03	9.704E−01	9.02E−03
γ 79	3.12E−02	9.741E−01	3.04E−02
γ 82	7.80E−03	9.903E−01	7.72E−03
γ 83	4.23E−03	1.011E+00	4.27E−03
γ 93	1.00E−02	1.090E+00	1.09E−02
γ 94	4.23E−03	1.107E+00	4.68E−03
γ 95	2.66E−02	1.109E+00	2.96E−02
γ 98	8.38E−03	1.138E+00	9.54E−03
γ 103	4.48E−03	1.191E+00	5.34E−03
γ 106	2.92E−03	1.209E+00	3.54E−03
γ 110	1.08E−02	1.261E+00	1.36E−02
γ 114	2.14E−02	1.299E+00	2.79E−02
γ 115	1.43E−02	1.315E+00	1.88E−02
γ 117	3.90E−03	1.318E+00	5.14E−03
γ 118	9.10E−03	1.326E+00	1.21E−02
γ 121	9.49E−03	1.348E+00	1.28E−02
γ 127	4.23E−03	1.383E+00	5.85E−03
γ 131	7.21E−03	1.411E+00	1.02E−02
γ 144	7.09E−03	1.518E+00	1.08E−02
γ 151	9.69E−03	1.586E+00	1.54E−02
γ 153	2.08E−03	1.597E+00	3.32E−03
γ 154	2.34E−03	1.599E+00	3.74E−03
γ 155	1.89E−03	1.599E+00	3.01E−03
γ 157	2.01E−03	1.606E+00	3.24E−03
γ 158	2.53E−03	1.632E+00	4.14E−03
γ 162	7.54E−03	1.667E+00	1.26E−02
γ 167	7.21E−03	1.757E+00	1.27E−02
γ 169	2.99E−03	1.771E+00	5.30E−03
γ 171	5.72E−03	1.789E+00	1.02E−02
γ 172	1.95E−03	1.798E+00	3.51E−03
γ 178	1.75E−03	1.857E+00	3.26E−03
γ 179	4.94E−03	1.862E+00	9.20E−03
γ 183	1.90E−02	1.902E+00	3.62E−02
γ 186	4.29E−03	1.921E+00	8.24E−03
γ 188	7.21E−03	1.941E+00	1.40E−02
γ 190	3.51E−03	1.955E+00	6.86E−03
γ 208	1.43E−03	2.093E+00	2.99E−03
γ 213	2.28E−03	2.151E+00	4.89E−03
γ 217	2.14E−03	2.185E+00	4.69E−03
γ 229	1.43E−03	2.343E+00	3.35E−03
γ 232	4.35E−03	2.365E+00	1.03E−02
γ 233	8.90E−03	2.375E+00	2.12E−02
γ 234	1.82E−03	2.385E+00	4.34E−03
γ 236	1.49E−02	2.405E+00	3.58E−02
γ 243	1.30E−03	2.519E+00	3.27E−03
γ 245	3.19E−03	2.536E+00	8.08E−03
γ 248	2.21E−03	2.570E+00	5.68E−03
γ 252	4.16E−03	2.588E+00	1.08E−02
γ 255	3.05E−03	2.620E+00	8.00E−03
γ 258	2.28E−03	2.663E+00	6.06E−03
γ 259	1.56E−03	2.668E+00	4.16E−03
γ 263	2.66E−03	2.698E+00	7.19E−03
γ 265	2.47E−03	2.709E+00	6.69E−03
γ 266	3.90E−03	2.720E+00	1.06E−02
γ 271	1.30E−03	2.755E+00	3.58E−03
γ 277	1.11E−03	2.796E+00	3.09E−03
γ 288	1.30E−03	2.882E+00	3.75E−03
K_{α_1} X-ray	3.47E−01	4.300E−02	1.49E−02
K_{α_2} X-ray	1.93E−01	4.231E−02	8.17E−03
K_{β_1} X-ray	6.67E−02	4.870E−02	3.25E−03
Auger-KLL	3.01E−02	3.450E−02*	1.04E−03
Auger-KLX	1.53E−02	4.085E−02*	6.25E−04
Auger-LMM	3.57E−01	4.811E−03*	1.72E−03
Auger-LMX	2.15E−01	6.198E−03*	1.33E−03
Auger-MXY	1.18E+00	1.381E−03*	1.63E−03

Listed X, γ and $\gamma^\pm$ radiations	1.22E+00
Omitted X, γ and $\gamma^\pm$ radiations**	2.70E−01
Listed β, ce and Auger radiations	2.44E−01
Omitted β, ce and Auger radiations**	7.32E−03
Listed radiations	1.47E+00
Omitted radiations**	2.77E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum$y(i)×E(i) in its category.

Gd-152 daughter is radioactive.


$^{155}_{65}$Tb(17.5h)
2- 0.0
3.4120
3.1400
3.0990
3.0420
3.0070
2.9642
2.9126
2.9140
2.8806
2.8626
2.7492
2.7292
2.7197
2.7093
2.6871
2.5294
2.5237
2.4953
2.2997
2.2652
2.2468
2.2018
2.0116
1.9757
1.9412
1.8620
1.6924
1.6434
1.6056
1.4340
1.3184
1.3147
1.2232
1.1092
1.0479
0.9306
0.7554
0.6154
0.3443
0.0
$^{155}_{64}$Gd(1.08E1-4y)

65-Tb-163

21-JAN-97

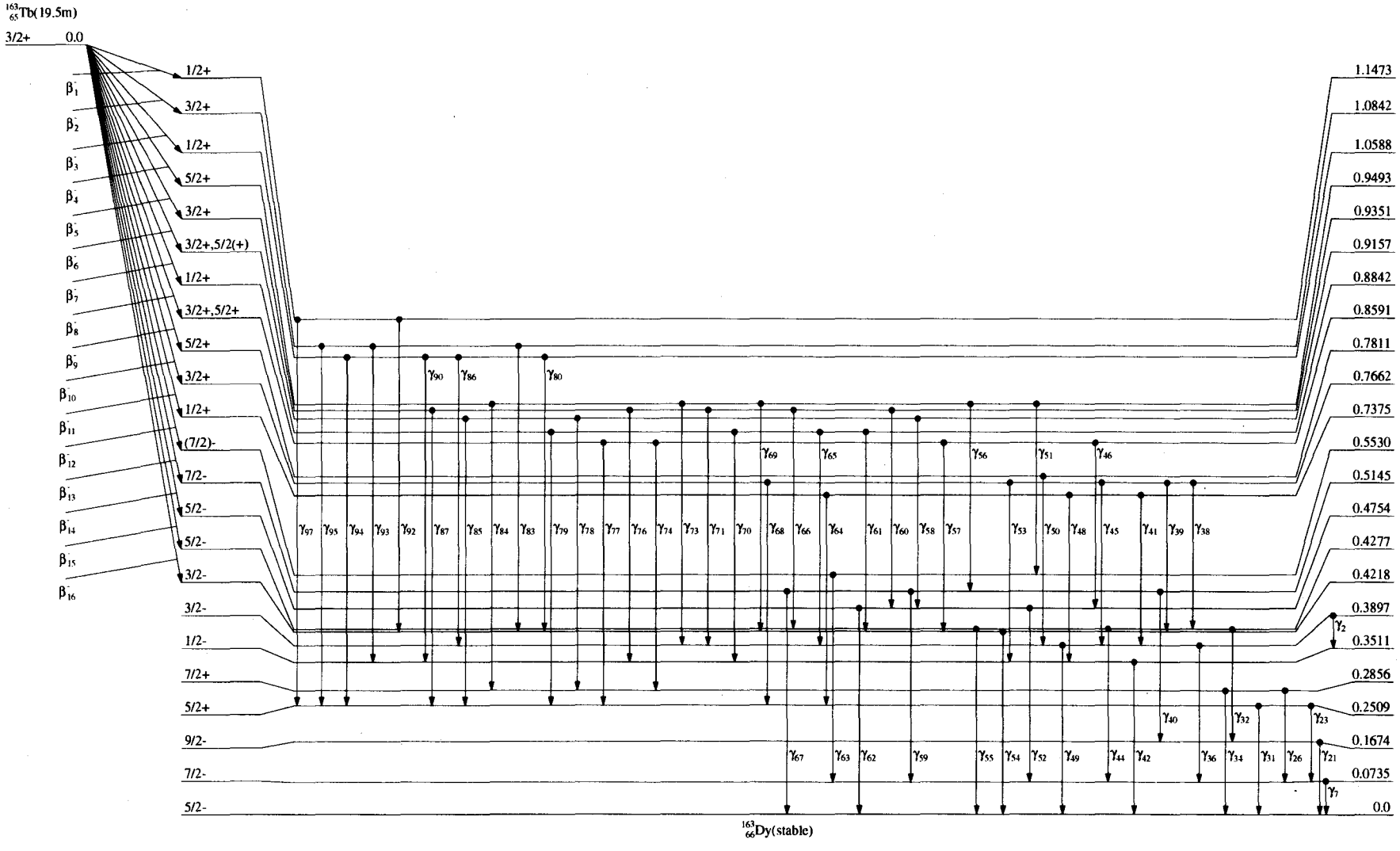
Half-life = 19.5 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	2.38E−03	1.998E−01*	4.76E−04
β^- 2	1.53E−02	2.229E−01*	3.40E−03
β^- 3	1.33E−02	2.324E−01*	3.10E−03
β^- 4	4.29E−02	2.738E−01*	1.17E−02
β^- 5	1.47E−01	2.792E−01*	4.10E−02
β^- 6	1.53E−02	2.867E−01*	4.37E−03
β^- 7	3.33E−01	2.990E−01*	9.95E−02
β^- 8	4.29E−02	3.087E−01*	1.32E−02
β^- 9	3.15E−03	3.395E−01*	1.07E−03
β^- 10	1.22E−01	3.455E−01*	4.22E−02
β^- 11	1.10E−01	3.569E−01*	3.91E−02
β^- 12	3.15E−03	4.352E−01*	1.37E−03
β^- 13	1.33E−02	4.503E−01*	6.01E−03
β^- 14	3.72E−02	4.640E−01*	1.73E−02
β^- 15	1.33E−02	4.839E−01*	6.46E−03
β^- 16	8.67E−02	4.864E−01*	4.22E−02
ce-L_1, γ 2	1.67E−02	2.955E−02	4.93E−04
γ 7	2.03E−02	7.340E−02	1.49E−03
ce-K, γ 7	4.45E−02	1.961E−02	8.73E−04
ce-L_2, γ 7	4.90E−02	6.482E−02	3.18E−03
ce-L_3, γ 7	5.28E−02	6.561E−02	3.46E−03
ce-M, γ 7	2.53E−02	7.172E−02*	1.81E−03
ce-N^+, γ 7	6.86E−03	7.340E−02*	5.04E−04
γ 21	5.62E−03	1.673E−01	9.41E−04
γ 23	6.52E−03	1.774E−01	1.16E−03
γ 26	6.75E−03	2.122E−01	1.43E−03
γ 31	6.73E−02	2.508E−01	1.69E−02
ce-K, γ 31	1.99E−03	1.970E−01	3.92E−04
γ 32	6.07E−03	2.601E−01	1.58E−03
γ 34	8.32E−03	2.856E−01	2.38E−03
γ 36	8.32E−02	3.164E−01	2.63E−02
ce-K, γ 36	3.47E−03	2.626E−01	9.12E−04
γ 38	4.52E−02	3.385E−01	1.53E−02
γ 39	4.50E−03	3.443E−01	1.55E−03
γ 40	3.38E−03	3.470E−01	1.17E−03
γ 41	6.16E−02	3.478E−01	2.14E−02
γ 42	2.63E−01	3.512E−01	9.25E−02
ce-K, γ 42	8.19E−03	2.974E−01	2.44E−03
γ 44	4.64E−02	3.543E−01	1.64E−02
ce-K, γ 44	1.91E−03	3.005E−01	5.75E−04
γ 45	6.30E−03	3.765E−01	2.37E−03
γ 46	2.25E−03	3.840E−01	8.64E−04
γ 48	4.52E−02	3.863E−01	1.75E−02
γ 49	2.43E−01	3.898E−01	9.47E−02
ce-K, γ 49	7.98E−03	3.360E−01	2.68E−03
ce-L_1, γ 49	1.01E−03	3.808E−01	3.84E−04
γ 50	4.50E−03	3.910E−01	1.76E−03
γ 51	4.72E−03	3.963E−01	1.87E−03
γ 52	2.50E−02	4.019E−01	1.00E−02
γ 53	5.38E−02	4.150E−01	2.23E−02
γ 54	1.15E−01	4.219E−01	4.84E−02
ce-K, γ 54	3.21E−03	3.681E−01	1.18E−03
γ 55	3.51E−02	4.276E−01	1.50E−02
γ 56	1.42E−02	4.348E−01	6.16E−03
γ 57	3.38E−03	4.373E−01	1.48E−03
γ 58	2.25E−03	4.400E−01	9.90E−04
γ 59	6.75E−03	4.412E−01	2.98E−03
γ 60	1.15E−02	4.598E−01	5.28E−03
γ 61	2.20E−02	4.624E−01	1.02E−02
γ 62	2.95E−02	4.754E−01	1.40E−02
γ 63	3.38E−03	4.797E−01	1.62E−03
γ 64	1.10E−02	4.867E−01	5.37E−03
γ 65	2.25E−01	4.945E−01	1.11E−01
ce-K, γ 65	1.01E−03	4.407E−01	4.45E−04
γ 66	4.61E−02	5.075E−01	2.34E−02
γ 67	2.25E−03	5.150E−01	1.16E−03
γ 68	5.62E−03	5.150E−01	2.90E−03
γ 69	2.70E−03	5.274E−01	1.42E−03
γ 70	9.45E−02	5.330E−01	5.04E−02
γ 71	1.69E−02	5.453E−01	9.20E−03
γ 73	2.05E−02	5.595E−01	1.15E−02
γ 74	1.58E−03	5.735E−01	9.03E−04
γ 75	1.80E−03	5.782E−01	1.04E−03
γ 76	7.02E−02	5.839E−01	4.10E−02
γ 77	3.69E−02	6.083E−01	2.24E−02
γ 78	1.12E−02	6.301E−01	7.09E−03
γ 79	2.92E−03	6.334E−01	1.85E−03
γ 80	2.03E−03	6.370E−01	1.29E−03
γ 83	2.03E−03	6.625E−01	1.34E−03
γ 84	1.58E−03	6.640E−01	1.05E−03
γ 85	2.25E−03	6.650E−01	1.50E−03
γ 86	6.07E−03	6.689E−01	4.06E−03
γ 87	2.92E−03	6.843E−01	2.00E−03
γ 90	3.15E−03	7.075E−01	2.23E−03
γ 92	1.58E−03	7.251E−01	1.14E−03
γ 93	2.47E−03	7.330E−01	1.81E−03
γ 94	1.80E−03	8.080E−01	1.45E−03
γ 95	1.01E−02	8.334E−01	8.44E−03
γ 96	1.12E−03	8.442E−01	9.50E−04
γ 97	1.35E−03	8.964E−01	1.21E−03
K_{α_1} X-ray	5.10E−02	4.600E−02	2.34E−03
K_{α_2} X-ray	2.85E−02	4.521E−02	1.29E−03
Auger-LMM	1.18E−01	5.196E−03*	6.13E−04
Auger-LMX	7.18E−02	6.699E−03*	4.81E−04
Auger-MXY	4.02E−01	1.482E−03*	5.95E−04

Listed X, γ and $\gamma^{\pm}$ radiations	7.81E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	8.05E−03
Listed β, ce and Auger radiations	3.53E−01
Omitted β, ce and Auger radiations**	1.00E−02
Listed radiations	1.13E+00
Omitted radiations**	1.81E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Dy-163 daughter is stable.


163 65 Tb(19.5m)
3/2+ 0.0
β-1
β-2
β-3
β-4
β-5
β-6
β-7
β-8
β-9
β-10
β-11
β-12
β-13
β-14
β-15
β-16
1/2+
3/2+
1/2+
5/2+
3/2+
3/2+,5/2(+)
1/2+
3/2+,5/2+
5/2+
3/2+
1/2+
(7/2)-
7/2-
5/2-
5/2-
3/2-
3/2-
1/2-
7/2+
5/2+
9/2-
7/2-
5/2-
1.1473
1.0842
1.0588
0.9493
0.9351
0.9157
0.8842
0.8591
0.7811
0.7662
0.7375
0.5530
0.5145
0.4754
0.4277
0.4218
0.3897
0.3511
0.2856
0.2509
0.1674
0.0735
0.0
γ90 γ86 γ80
γ69 γ65 γ56 γ51 γ46
γ97 γ95 γ94 γ93 γ92 γ87 γ85 γ84 γ83 γ79 γ78 γ77 γ76 γ74 γ73 γ71 γ70 γ68 γ66 γ64 γ61 γ60 γ58 γ57 γ53 γ50 γ48 γ45 γ41 γ39 γ38
γ2
γ40 γ32 γ23
γ67 γ63 γ62 γ59 γ55 γ54 γ52 γ49 γ44 γ42 γ36 γ34 γ31 γ26 γ21
γ7
163 66 Dy(stable)

66-Dy-151

α: 30-JUN-97
EC, β^+: 11-MAR-97

Half-life = 17.9 m
Decay mode(s): α, EC, β^+

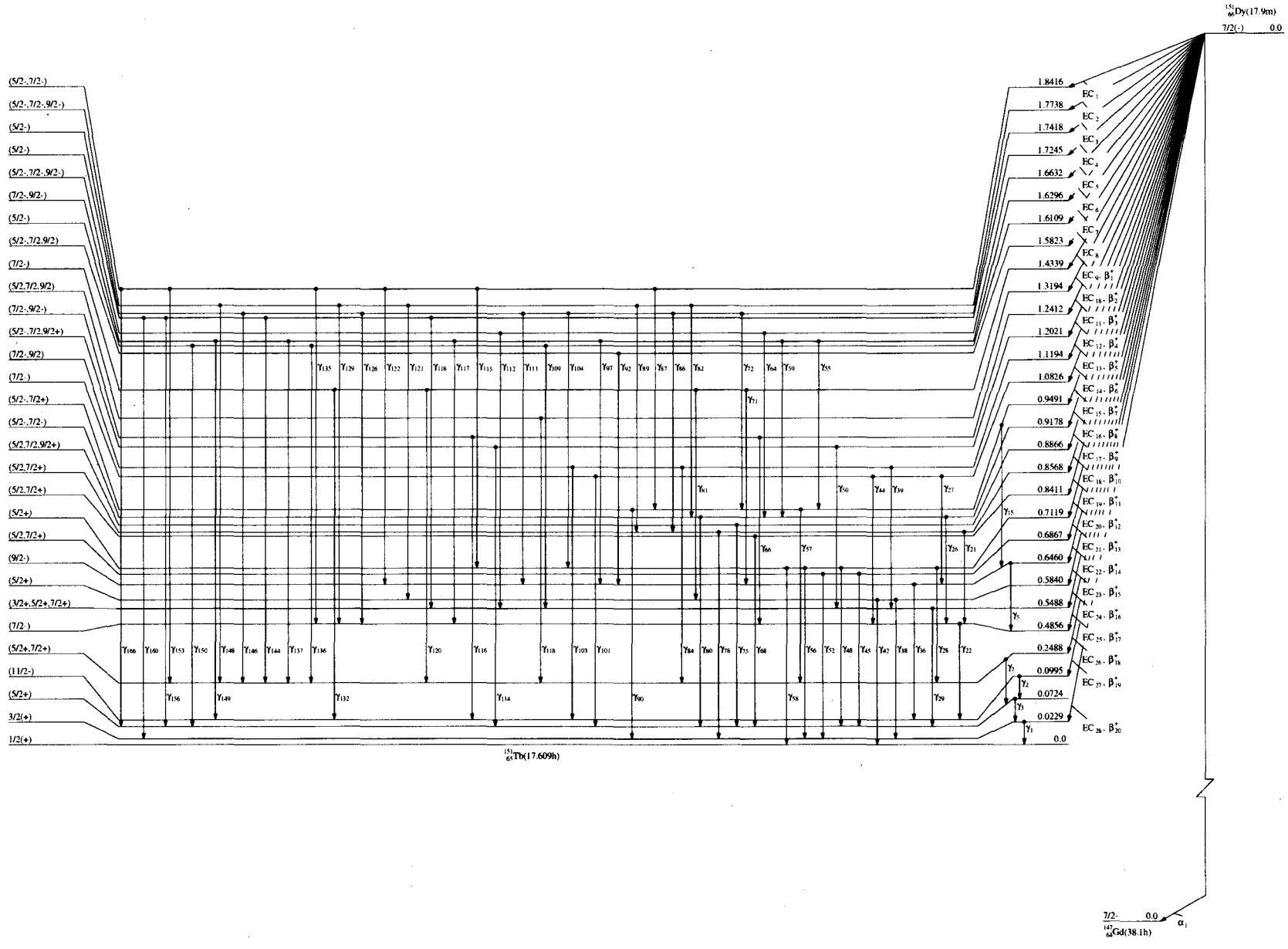
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	5.60E−02	4.069E+00	2.28E−01
α recoil	5.60E−02	1.108E−01	6.20E−03
β^+ 6	6.96E−04	3.553E−01*	2.47E−04
β^+ 8	9.74E−04	4.277E−01*	4.16E−04
β^+ 10	4.73E−04	4.545E−01*	2.15E−04
β^+ 12	2.69E−03	5.182E−01*	1.39E−03
β^+ 13	4.45E−04	5.293E−01*	2.36E−04
β^+ 14	3.43E−03	5.473E−01*	1.88E−03
β^+ 15	4.82E−04	5.747E−01*	2.77E−04
β^+ 16	6.49E−04	6.053E−01*	3.93E−04
β^+ 17	7.51E−03	6.182E−01*	4.64E−03
β^+ 18	6.49E−04	7.234E−01*	4.70E−04
β^+ 19	4.32E−03	8.001E−01*	3.46E−03
β^+ 20	5.56E−03	8.334E−01*	4.64E−03
$\gamma^\pm$	5.96E−02	5.110E−01	3.04E−02
ce-L_1, γ 1	5.65E−01	1.421E−02	8.02E−03
ce-L_2, γ 1	6.97E−02	1.467E−02	1.02E−03
ce-L_3, γ 1	3.28E−02	1.541E−02	5.05E−04
ce-M, γ 1	1.46E−01	2.131E−02*	3.11E−03
ce-N^+, γ 1	5.86E−02	2.292E−02*	1.34E−03
ce-L_2, γ 2	1.23E−01	1.885E−02	2.32E−03
ce-L_3, γ 2	1.57E−01	1.959E−02	3.07E−03
ce-M, γ 2	7.94E−02	2.549E−02*	2.02E−03
ce-N^+, γ 2	2.75E−02	2.710E−02*	7.45E−04
γ 3	1.80E−01	4.946E−02	8.89E−03
ce-L_1, γ 3	3.48E−01	4.075E−02	1.42E−02
ce-L_2, γ 3	4.01E−02	4.121E−02	1.65E−03
ce-L_3, γ 3	1.64E−02	4.195E−02	6.87E−04
ce-M, γ 3	8.84E−02	4.785E−02*	4.23E−03
ce-N^+, γ 3	2.54E−02	4.946E−02*	1.26E−03
ce-K, γ 5	1.93E−03	1.084E−01	2.10E−04
γ 7	1.06E−01	1.764E−01	1.87E−02
ce-K, γ 7	3.70E−02	1.244E−01	4.60E−03
ce-L_1, γ 7	4.74E−03	1.677E−01	7.95E−04
ce-L_2, γ 7	1.18E−03	1.681E−01	1.98E−04
ce-M, γ 7	1.49E−03	1.748E−01*	2.60E−04
γ 15	1.35E−02	3.030E−01	4.11E−03
γ 21	7.73E−03	3.711E−01	2.87E−03
γ 22	1.94E−01	3.861E−01	7.48E−02
ce-K, γ 22	4.51E−03	3.341E−01	1.51E−03
ce-L_1, γ 22	5.33E−04	3.774E−01	2.01E−04
γ 26	4.03E−02	4.322E−01	1.74E−02
ce-K, γ 26	1.39E−03	3.802E−01	5.28E−04
γ 27	7.64E−03	4.369E−01	3.34E−03
γ 28	2.40E−02	4.632E−01	1.11E−02
ce-K, γ 28	5.51E−04	4.112E−01	2.27E−04
γ 29	8.00E−02	4.766E−01	3.81E−02
ce-K, γ 29	2.14E−03	4.246E−01	9.10E−04
γ 31	8.68E−03	4.943E−01	4.29E−03
γ 36	1.43E−01	5.463E−01	7.83E−02
ce-K, γ 36	2.71E−03	4.943E−01	1.34E−03
γ 38	8.16E−03	5.610E−01	4.58E−03
γ 39	1.12E−02	5.707E−01	6.39E−03
ce-K, γ 39	5.59E−04	5.187E−01	2.90E−04
γ 42	1.04E−02	5.839E−01	6.09E−03
γ 44	1.57E−02	5.968E−01	9.38E−03
γ 45	5.21E−03	6.143E−01	3.20E−03
γ 48	1.36E−02	6.395E−01	8.72E−03
γ 50	6.17E−03	6.532E−01	4.03E−03
γ 52	8.51E−03	6.637E−01	5.65E−03
γ 54	4.78E−03	6.776E−01	3.24E−03
γ 55	9.64E−03	6.804E−01	6.56E−03
γ 56	2.53E−02	6.892E−01	1.74E−02
γ 57	1.80E−02	7.003E−01	1.26E−02
γ 58	1.20E−02	7.120E−01	8.53E−03
γ 59	1.20E−02	7.120E−01	8.53E−03
γ 62	6.69E−03	7.328E−01	4.90E−03
γ 64	1.22E−02	7.454E−01	9.06E−03
γ 66	2.03E−02	7.556E−01	1.54E−02
γ 68	8.08E−03	7.689E−01	6.21E−03
γ 69	4.78E−03	7.715E−01	3.69E−03
γ 71	8.60E−03	7.881E−01	6.78E−03
γ 72	5.12E−03	7.931E−01	4.06E−03
γ 75	1.02E−02	8.141E−01	8.27E−03
γ 77	3.39E−03	8.228E−01	2.79E−03
γ 78	2.21E−02	8.339E−01	1.84E−02
γ 80	2.01E−02	8.455E−01	1.70E−02
γ 81	9.03E−03	8.496E−01	7.67E−03
γ 82	1.30E−02	8.558E−01	1.11E−02
γ 83	5.73E−03	8.592E−01	4.92E−03
γ 84	1.41E−02	8.704E−01	1.22E−02
γ 86	6.60E−03	8.846E−01	5.84E−03
γ 87	7.03E−03	8.919E−01	6.27E−03
γ 88	4.17E−03	9.103E−01	3.79E−03
γ 89	8.68E−03	9.170E−01	7.96E−03
γ 90	4.60E−03	9.260E−01	4.26E−03
γ 92	1.07E−02	9.363E−01	1.00E−02
γ 94	3.91E−03	9.523E−01	3.72E−03
γ 95	3.39E−03	9.609E−01	3.25E−03
γ 96	3.82E−03	9.708E−01	3.71E−03
γ 97	2.06E−02	9.837E−01	2.02E−02
γ 99	6.69E−03	9.959E−01	6.66E−03
γ 101	3.06E−02	1.010E+00	3.09E−02
γ 102	7.73E−03	1.017E+00	7.86E−03
γ 103	8.51E−03	1.020E+00	8.68E−03
γ 104	3.73E−03	1.029E+00	3.84E−03
γ 105	2.95E−03	1.036E+00	3.06E−03
γ 107	5.91E−03	1.050E+00	6.20E−03
γ 108	7.99E−03	1.059E+00	8.46E−03
γ 109	1.01E−02	1.063E+00	1.07E−02
γ 110	1.23E−02	1.071E+00	1.32E−02
γ 111	1.76E−02	1.096E+00	1.93E−02
γ 112	2.67E−02	1.114E+00	2.97E−02
γ 113	3.65E−03	1.124E+00	4.10E−03
γ 114	2.28E−02	1.130E+00	2.58E−02
γ 115	1.13E−02	1.130E+00	1.28E−02
γ 116	2.01E−02	1.142E+00	2.30E−02
γ 117	4.08E−03	1.144E+00	4.67E−03
γ 118	9.99E−03	1.176E+00	1.17E−02
γ 120	4.60E−03	1.186E+00	5.46E−03
γ 121	4.17E−03	1.191E+00	4.96E−03
γ 122	9.47E−03	1.197E+00	1.13E−02
γ 123	2.78E−03	1.201E+00	3.34E−03
γ 126	1.09E−02	1.256E+00	1.36E−02
γ 129	7.99E−03	1.288E+00	1.03E−02
γ 130	4.95E−03	1.291E+00	6.39E−03
γ 132	4.43E−03	1.334E+00	5.91E−03
γ 133	2.95E−03	1.340E+00	3.96E−03
γ 135	3.30E−03	1.355E+00	4.47E−03
γ 136	2.43E−03	1.362E+00	3.31E−03
γ 137	3.73E−03	1.381E+00	5.16E−03
γ 138	3.73E−03	1.410E+00	5.27E−03
γ 139	2.69E−03	1.422E+00	3.83E−03
γ 140	2.17E−03	1.431E+00	3.11E−03
γ 144	2.14E−02	1.476E+00	3.15E−02
γ 146	2.78E−03	1.493E+00	4.15E−03
γ 147	3.82E−03	1.511E+00	5.77E−03
γ 148	1.49E−02	1.525E+00	2.28E−02
γ 149	8.25E−03	1.530E+00	1.26E−02
γ 150	1.98E−02	1.538E+00	3.05E−02
γ 151	3.91E−03	1.542E+00	6.03E−03
γ 152	1.82E−03	1.546E+00	2.82E−03

γ 153	2.61E−02	1.593E+00	4.15E−02
γ 154	3.47E−03	1.603E+00	5.57E−03
γ 156	1.43E−02	1.652E+00	2.37E−02
γ 157	2.17E−03	1.660E+00	3.60E−03
γ 158	2.78E−03	1.678E+00	4.66E−03
γ 159	3.73E−03	1.696E+00	6.33E−03
γ 160	4.57E−02	1.702E+00	7.77E−02
γ 162	6.69E−03	1.722E+00	1.15E−02
γ 163	2.26E−03	1.728E+00	3.90E−03
γ 164	3.91E−03	1.741E+00	6.80E−03
γ 166	3.13E−03	1.770E+00	5.53E−03
γ 170	4.60E−03	1.835E+00	8.45E−03
γ 171	1.48E−03	1.904E+00	2.81E−03
γ 174	2.43E−03	2.089E+00	5.08E−03
K_{α_1} X-ray	3.96E−01	4.448E−02	1.76E−02
K_{α_2} X-ray	2.21E−01	4.374E−02	9.66E−03
K_{β_1} X-ray	7.72E−02	5.038E−02	3.89E−03
Auger-KLL	3.26E−02	3.563E−02*	1.16E−03
Auger-KLX	1.67E−02	4.224E−02*	7.07E−04
Auger-LMM	1.04E+00	5.138E−03*	5.34E−03
Auger-LMX	6.43E−01	6.594E−03*	4.24E−03
Auger-LXY	1.08E−01	7.684E−03*	8.33E−04
Auger-MXY	3.53E+00	1.425E−03*	5.03E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.27E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.04E−01
Listed β, ce and Auger radiations	9.08E−02
Omitted β, ce and Auger radiations**	7.29E−03
Listed α and α recoil radiations	2.34E−01
Listed radiations	1.60E+00
Omitted radiations**	1.11E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Gd-147 daughter, yield 5.6E−02, is radioactive.
Tb-151 daughter, yield 9.44E−01, is radioactive.


$^{151}_{66}$Dy(17.9m)
7/2(-) 0.0
1.8416
1.7738
1.7418
1.7245
1.6632
1.6296
1.6109
1.5823
1.4339
1.3194
1.2412
1.2021
1.1194
1.0826
0.9491
0.9178
0.8866
0.8568
0.8411
0.7119
0.6867
0.6460
0.5840
0.5488
0.4856
0.2488
0.0995
0.0724
0.0229
0.0
(5/2-,7/2-)
(5/2-,7/2-,9/2-)
(5/2-)
(5/2-)
(5/2-,7/2-,9/2-)
(7/2-,9/2-)
(5/2-)
(5/2-,7/2,9/2)
(7/2-)
(5/2,7/2,9/2)
(7/2-,9/2-)
(5/2-,7/2,9/2+)
(7/2-,9/2)
(7/2-)
(5/2-,7/2+)
(5/2-,7/2-)
(5/2,7/2,9/2+)
(5/2,7/2+)
(5/2,7/2+)
(5/2+)
(5/2,7/2+)
(9/2-)
(5/2+)
(3/2+,5/2+,7/2+)
(7/2-)
(5/2+,7/2+)
(11/2-)
(5/2+)
3/2(+)
1/2(+)
$^{151}_{65}$Tb(17.609h)
7/2- 0.0
$^{147}_{64}$Gd(38.1h)

66-Dy-152

α: 23-AUG-90
EC: 16-JAN-97

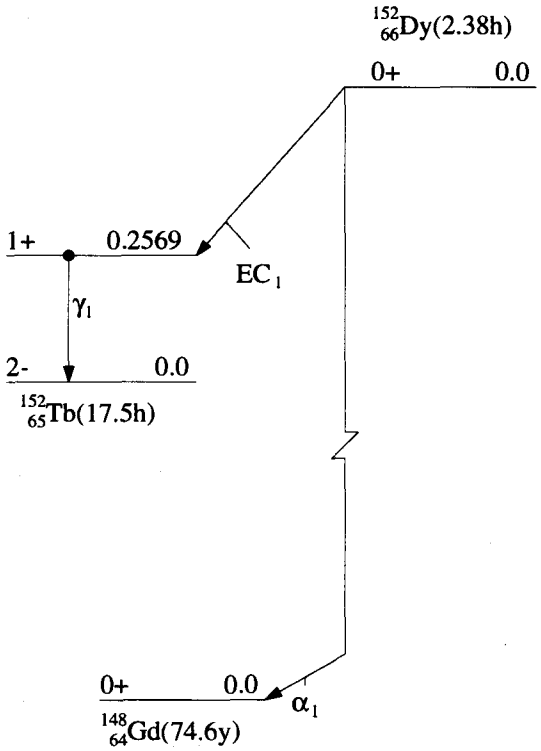
Half-life = 2.38 h
Decay mode(s): α, EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E−03	3.629E+00	3.63E−03
α recoil	1.00E−03	9.814E−02	9.81E−05
γ 1	9.75E−01	2.569E−01	2.51E−01
ce-K, γ 1	2.04E−02	2.049E−01	4.17E−03
ce-L_1, γ 1	2.31E−03	2.482E−01	5.74E−04
ce-L_2, γ 1	2.62E−04	2.487E−01	6.50E−05
ce-L_3, γ 1	2.86E−04	2.494E−01	7.13E−05
ce-M, γ 1	6.18E−04	2.553E−01*	1.58E−04
ce-N^+, γ 1	1.70E−04	2.569E−01*	4.37E−05
K_{α_1} X-ray	3.93E−01	4.448E−02	1.75E−02
K_{α_2} X-ray	2.19E−01	4.374E−02	9.60E−03
K_{β_1} X-ray	7.67E−02	5.038E−02	3.86E−03
K_{β_2} X-ray	3.50E−02	5.173E−02	1.81E−03
K_{β_3} X-ray	3.96E−02	5.023E−02	1.99E−03
L_α X-ray	6.86E−02	6.269E−03*	4.30E−04
L_β X-ray	6.65E−02	7.066E−03*	4.70E−04
Auger-KLL	3.24E−02	3.563E−02*	1.15E−03
Auger-KLX	1.66E−02	4.224E−02*	7.02E−04
Auger-KXY	2.44E−03	4.872E−02*	1.19E−04
Auger-LMM	4.11E−01	4.996E−03*	2.05E−03
Auger-LMX	2.50E−01	6.441E−03*	1.61E−03
Auger-LXY	4.25E−02	7.537E−03*	3.20E−04
Auger-MXY	1.37E+00	1.445E−03*	1.98E−03
ΔE	3.27E−01	1.790E−04*	5.85E−05

Listed X, γ and $\gamma^{\pm}$ radiations	2.86E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.74E−04
Listed β, ce and Auger radiations	1.31E−02
Listed α and α recoil radiations	3.73E−03
Listed radiations	3.03E−01
Omitted radiations**	1.74E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Gd-148 daughter, yield 1E−03, is radioactive.
Tb-152 daughter, yield 9.99E−01, is radioactive.



66-Dy-153

α: 26-JAN-95
EC, β^+: 28-AUG-90

Half-life = 6.4 h
Decay mode(s): α, EC, β^+

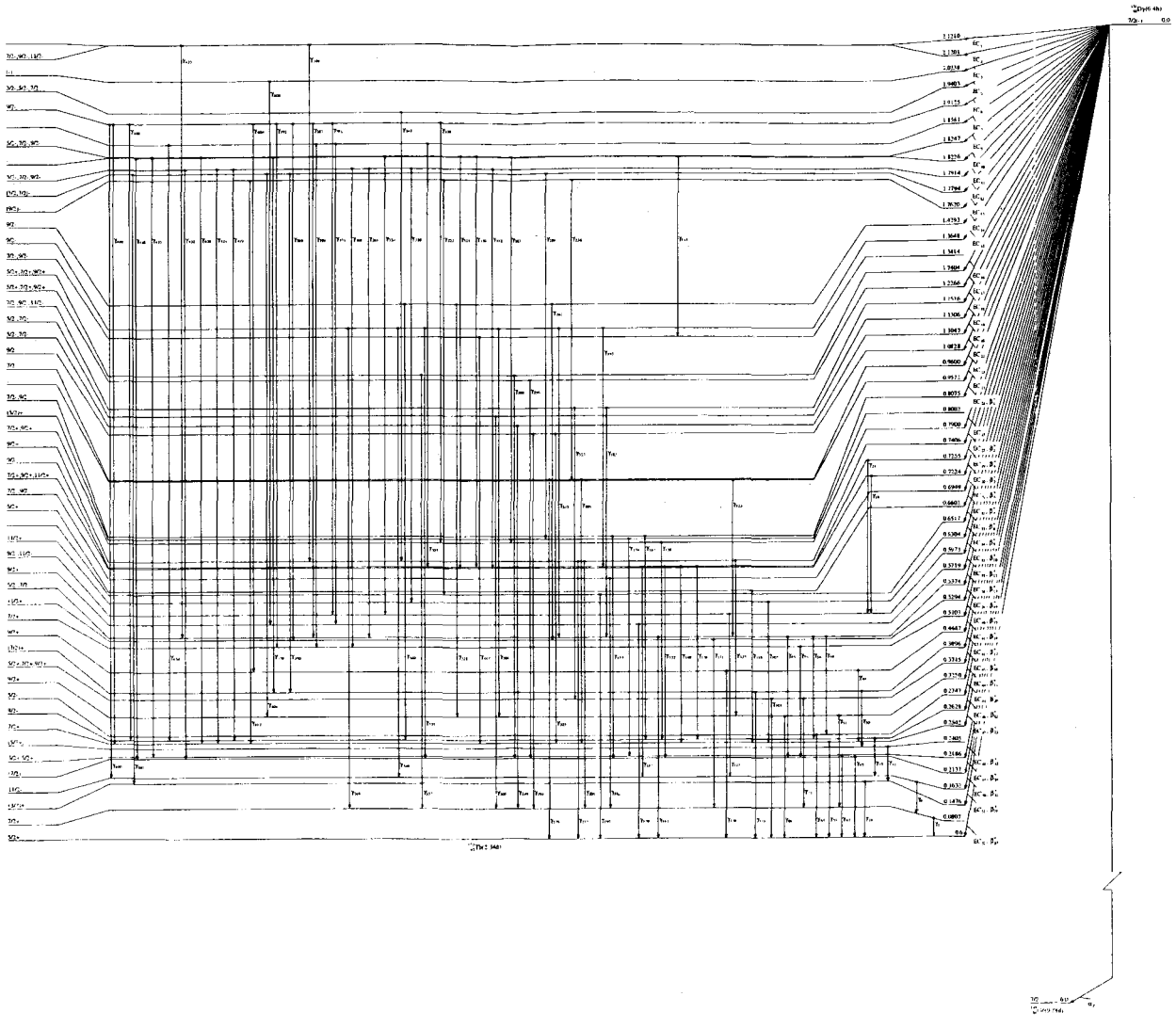
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 2	9.40E−05	3.466E+00	3.26E−04
α recoil	9.40E−05	9.310E−02	8.75E−06
β^+ 20	6.82E−04	4.027E−01*	2.75E−04
β^+ 21	5.84E−03	4.079E−01*	2.38E−03
β^+ 22	4.84E−04	4.117E−01*	1.99E−04
β^+ 24	7.81E−04	4.294E−01*	3.35E−04
β^+ 25	2.17E−03	4.689E−01*	1.02E−03
β^+ 27	7.90E−04	5.235E−01*	4.14E−04
$\gamma^{\pm}$	2.54E−02	5.110E−01	1.30E−02
γ 7	1.11E−01	8.072E−02	8.96E−03
ce-K, γ 7	3.85E−01	2.873E−02	1.11E−02
ce-L_1, γ 7	5.11E−02	7.202E−02	3.68E−03
ce-L_2, γ 7	6.93E−03	7.247E−02	5.02E−04
ce-L_3, γ 7	3.49E−03	7.321E−02	2.55E−04
ce-M, γ 7	1.35E−02	7.911E−02*	1.07E−03
ce-N^+, γ 7	3.85E−03	8.072E−02*	3.11E−04
ce-K, γ 8	3.14E−01	3.047E−02	9.58E−03
ce-L_1, γ 8	6.76E−02	7.376E−02	4.99E−03
ce-L_2, γ 8	7.66E−03	7.421E−02	5.69E−04
ce-L_3, γ 8	1.58E−02	7.495E−02	1.18E−03
ce-M, γ 8	2.13E−02	8.085E−02*	1.72E−03
ce-N^+, γ 8	6.21E−03	8.246E−02*	5.12E−04
ce-K, γ 9	1.02E−02	3.629E−02	3.70E−04
ce-K, γ 10	5.85E−03	3.693E−02	2.16E−04
ce-L_2, γ 10	3.37E−03	8.067E−02	2.72E−04
ce-L_3, γ 10	3.51E−03	8.141E−02	2.86E−04
ce-K, γ 11	2.28E−02	4.096E−02	9.35E−04
ce-L_1, γ 11	3.01E−03	8.425E−02	2.54E−04
ce-K, γ 12	3.34E−02	4.209E−02	1.41E−03
ce-L_1, γ 12	6.85E−03	8.538E−02	5.84E−04
ce-M, γ 12	2.11E−03	9.248E−02*	1.95E−04
ce-K, γ 13	5.16E−03	4.263E−02	2.20E−04
γ 16	1.05E−01	9.966E−02	1.05E−02
ce-K, γ 16	2.00E−01	4.766E−02	9.51E−03
ce-L_1, γ 16	2.65E−02	9.095E−02	2.41E−03
ce-L_2, γ 16	2.71E−03	9.141E−02	2.48E−04
ce-M, γ 16	6.56E−03	9.805E−02*	6.43E−04
ce-K, γ 21	2.88E−03	7.624E−02	2.20E−04
γ 29	3.88E−02	1.476E−01	5.73E−03
ce-K, γ 29	2.26E−02	9.556E−02	2.16E−03
ce-L_1, γ 29	2.91E−03	1.389E−01	4.04E−04
ce-K, γ 30	5.77E−03	9.701E−02	5.60E−04
γ 41	9.83E−03	1.905E−01	1.87E−03
ce-K, γ 41	2.94E−03	1.385E−01	4.08E−04
γ 45	1.09E−01	2.138E−01	2.33E−02
ce-K, γ 45	3.65E−03	1.618E−01	5.91E−04
γ 47	1.45E−02	2.186E−01	3.18E−03
ce-K, γ 47	2.82E−03	1.666E−01	4.70E−04
γ 51	4.30E−02	2.442E−01	1.05E−02
ce-K, γ 51	5.98E−03	1.923E−01	1.15E−03
γ 55	8.58E−02	2.543E−01	2.18E−02
ce-K, γ 55	1.14E−02	2.023E−01	2.31E−03
ce-L_1, γ 55	1.49E−03	2.456E−01	3.65E−04
γ 59	7.80E−03	2.626E−01	2.05E−03
ce-K, γ 59	1.00E−03	2.106E−01	2.10E−04
γ 64	2.00E−02	2.747E−01	5.49E−03
ce-K, γ 64	1.23E−03	2.227E−01	2.73E−04
γ 65	3.11E−02	2.747E−01	8.54E−03
γ 66	2.00E−02	2.747E−01	5.49E−03
ce-K, γ 66	1.23E−03	2.227E−01	2.73E−04
γ 71	6.22E−03	2.907E−01	1.81E−03
γ 75	1.04E−02	2.967E−01	3.10E−03
γ 85	1.18E−02	3.237E−01	3.81E−03
γ 86	8.08E−03	3.250E−01	2.63E−03
γ 103	8.99E−03	3.717E−01	3.34E−03
γ 105	5.44E−03	3.761E−01	2.05E−03
γ 111	1.52E−02	3.895E−01	5.92E−03
γ 118	4.88E−03	4.059E−01	1.98E−03
γ 121	1.12E−02	4.156E−01	4.66E−03
γ 123	6.16E−03	4.198E−01	2.59E−03
γ 127	1.22E−02	4.341E−01	5.30E−03
γ 130	7.43E−03	4.447E−01	3.30E−03
γ 131	1.05E−02	4.487E−01	4.73E−03
γ 135	8.07E−03	4.616E−01	3.73E−03
γ 136	6.55E−03	4.626E−01	3.03E−03
γ 140	1.34E−02	4.714E−01	6.33E−03
γ 143	3.86E−03	4.811E−01	1.86E−03
γ 151	1.13E−02	5.105E−01	5.78E−03
γ 152	1.80E−02	5.120E−01	9.21E−03
γ 158	5.00E−03	5.272E−01	2.63E−03
γ 161	1.33E−02	5.372E−01	7.16E−03
γ 163	5.33E−03	5.448E−01	2.90E−03
γ 167	6.39E−03	5.622E−01	3.59E−03
γ 170	3.26E−03	5.720E−01	1.87E−03
γ 173	3.89E−03	5.790E−01	2.25E−03
γ 177	1.12E−02	5.937E−01	6.66E−03
γ 182	4.66E−03	6.142E−01	2.86E−03
γ 183	4.66E−03	6.142E−01	2.86E−03
γ 192	3.22E−03	6.398E−01	2.06E−03
γ 201	1.10E−02	6.598E−01	7.25E−03
γ 202	2.99E−03	6.737E−01	2.01E−03
γ 209	3.00E−03	7.058E−01	2.12E−03
γ 217	2.84E−03	7.405E−01	2.10E−03
γ 227	2.70E−03	7.799E−01	2.10E−03
γ 236	2.30E−03	8.052E−01	1.85E−03
γ 242	4.11E−03	8.275E−01	3.40E−03
γ 243	2.44E−03	8.292E−01	2.02E−03
γ 253	3.22E−03	8.719E−01	2.81E−03
γ 262	3.27E−03	9.000E−01	2.95E−03
γ 279	7.55E−03	9.601E−01	7.25E−03
γ 283	2.11E−03	9.721E−01	2.05E−03
γ 286	3.02E−03	9.790E−01	2.96E−03
γ 292	3.77E−03	1.002E+00	3.78E−03
γ 296	3.66E−03	1.013E+00	3.71E−03
γ 299	1.09E−02	1.024E+00	1.11E−02
γ 300	1.89E−03	1.026E+00	1.94E−03
γ 303	2.01E−03	1.035E+00	2.08E−03
γ 304	6.68E−03	1.040E+00	6.95E−03
γ 306	1.13E−02	1.050E+00	1.19E−02
γ 307	1.72E−03	1.056E+00	1.82E−03
γ 309	1.91E−03	1.059E+00	2.02E−03
γ 312	1.78E−03	1.069E+00	1.90E−03
γ 317	1.98E−03	1.087E+00	2.15E−03
γ 320	1.73E−03	1.100E+00	1.90E−03
γ 321	2.28E−03	1.102E+00	2.51E−03
γ 322	9.88E−03	1.104E+00	1.09E−02
γ 323	1.71E−03	1.110E+00	1.90E−03
γ 325	2.12E−03	1.119E+00	2.37E−03
γ 326	2.68E−03	1.123E+00	3.00E−03
γ 327	2.09E−03	1.129E+00	2.36E−03
γ 329	2.02E−03	1.133E+00	2.29E−03
γ 335	2.05E−03	1.151E+00	2.36E−03
γ 337	1.83E−03	1.159E+00	2.12E−03
γ 339	2.77E−03	1.161E+00	3.22E−03
γ 340	1.94E−03	1.166E+00	2.27E−03
γ 346	1.91E−03	1.194E+00	2.28E−03
γ 347	1.62E−03	1.200E+00	1.94E−03
γ 348	2.66E−03	1.202E+00	3.20E−03
γ 354	2.22E−03	1.225E+00	2.72E−03
γ 361	5.02E−03	1.254E+00	6.29E−03
γ 368	2.76E−03	1.281E+00	3.54E−03
γ 369	1.83E−03	1.284E+00	2.35E−03

γ 371	2.09E−03	1.286E+00	2.68E−03
γ 381	8.11E−03	1.315E+00	1.07E−02
γ 386	2.11E−03	1.347E+00	2.84E−03
γ 387	8.00E−03	1.375E+00	1.10E−02
γ 388	5.24E−03	1.380E+00	7.23E−03
γ 389	3.34E−03	1.383E+00	4.62E−03
γ 390	3.11E−03	1.390E+00	4.32E−03
γ 392	6.28E−03	1.402E+00	8.81E−03
γ 398	1.42E−03	1.433E+00	2.04E−03
γ 400	1.51E−03	1.452E+00	2.19E−03
γ 401	1.94E−03	1.455E+00	2.83E−03
γ 404	1.42E−03	1.468E+00	2.09E−03
γ 411	1.50E−03	1.507E+00	2.26E−03
γ 412	2.02E−03	1.508E+00	3.05E−03
γ 418	1.53E−03	1.527E+00	2.34E−03
γ 419	2.89E−03	1.529E+00	4.41E−03
γ 421	5.62E−03	1.537E+00	8.63E−03
γ 430	3.92E−03	1.571E+00	6.15E−03
γ 432	7.70E−03	1.578E+00	1.22E−02
γ 433	3.12E−03	1.584E+00	4.94E−03
γ 434	1.50E−03	1.595E+00	2.39E−03
γ 435	1.38E−03	1.607E+00	2.21E−03
γ 436	4.63E−03	1.609E+00	7.45E−03
γ 441	1.31E−03	1.632E+00	2.14E−03
γ 448	2.58E−03	1.650E+00	4.25E−03
γ 449	2.06E−03	1.658E+00	3.42E−03
γ 450	2.06E−03	1.659E+00	3.42E−03
γ 469	1.05E−03	1.748E+00	1.84E−03
γ 470	1.48E−03	1.750E+00	2.58E−03
K_{α_1} X-ray	9.02E−01	4.448E−02	4.01E−02
K_{α_2} X-ray	5.03E−01	4.374E−02	2.20E−02
K_{β_1} X-ray	1.76E−01	5.038E−02	8.86E−03
K_{β_2} X-ray	8.03E−02	5.173E−02	4.15E−03
K_{β_3} X-ray	9.08E−02	5.023E−02	4.56E−03
Auger-KLL	7.43E−02	3.563E−02*	2.65E−03
Auger-KLX	3.81E−02	4.224E−02*	1.61E−03
Auger-KXY	5.60E−03	4.872E−02*	2.73E−04
Auger-LMM	9.47E−01	4.986E−03*	4.72E−03
Auger-LMX	5.76E−01	6.431E−03*	3.70E−03
Auger-LXY	9.78E−02	7.526E−03*	7.36E−04
Auger-MXY	3.16E+00	1.444E−03*	4.57E−03

Listed X, γ and $\gamma^{\pm}$ radiations	5.95E−01
Omitted X, γ AND $\gamma^{\pm}$ radiations**	2.86E−01
Listed β, ce AND Auger radiations	8.53E−02
Omitted β, ce AND Auger radiations**	1.11E−02
Listed α and α recoil radiations	3.34E−04
Omitted α and α recoil radiations	6.38E−08
Listed radiations	6.80E−01
Omitted radiations**	2.97E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Gd-149 daughter, yield 9.4E−05, is radioactive.
Tb-153 daughter, yield 1.00E+00, is radioactive.



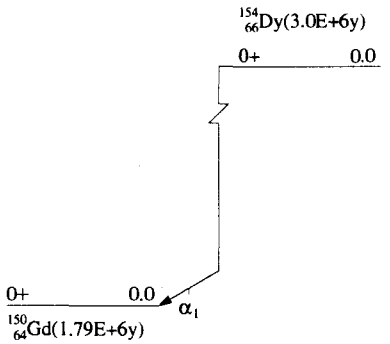
66-Dy-154

26-OCT-95

Half-life = 3.0E+6 y
Decay mode(s): α

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E+00	2.870E+00	2.87E+00
α recoil	1.00E+00	7.659E−02	7.66E−02
Listed α and α recoil radiations			2.95E+00
Listed radiations			2.95E+00

Gd-150 daughter is radioactive.



67-Ho-154

α: 26-OCT-95
EC, β^+: 21-MAY-96

Half-life = 11.76 m
Decay mode(s): α, EC, β^+

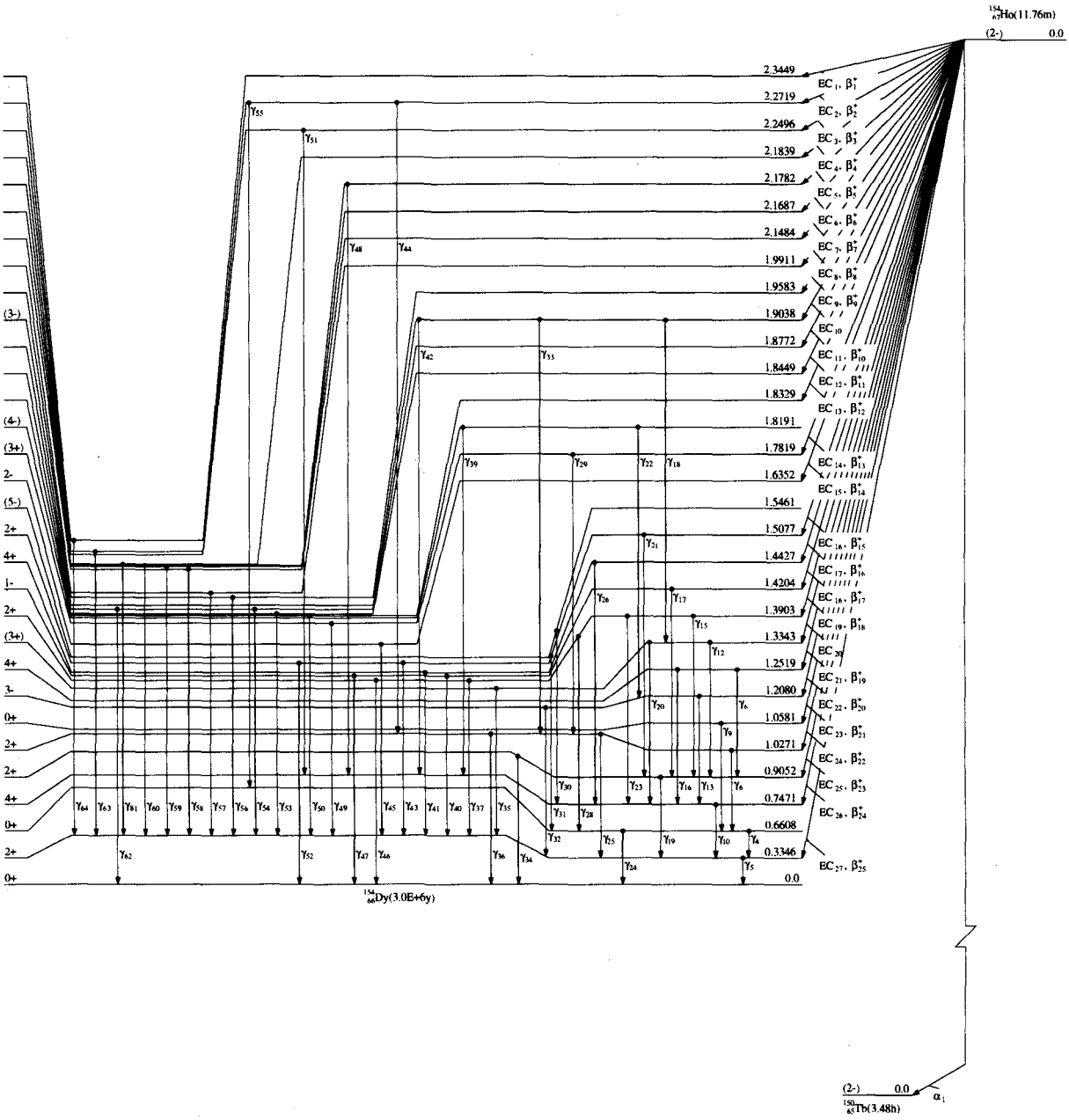
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.90E−04	3.935E+00	7.48E−04
α recoil	1.90E−04	1.050E−01	2.00E−05
β^+ 1	2.15E−03	1.077E+00*	2.31E−03
β^+ 2	5.26E−03	1.110E+00*	5.84E−03
β^+ 3	3.22E−03	1.120E+00*	3.61E−03
β^+ 4	4.29E−03	1.150E+00*	4.94E−03
β^+ 5	4.83E−03	1.153E+00*	5.57E−03
β^+ 6	4.40E−03	1.157E+00*	5.09E−03
β^+ 7	2.15E−03	1.166E+00*	2.50E−03
β^+ 8	6.87E−03	1.238E+00*	8.51E−03
β^+ 9	3.22E−03	1.253E+00*	4.04E−03
β^+ 10	7.30E−03	1.290E+00*	9.42E−03
β^+ 11	1.01E−02	1.305E+00*	1.32E−02
β^+ 12	7.52E−03	1.310E+00*	9.85E−03
β^+ 13	6.01E−03	1.334E+00*	8.02E−03
β^+ 14	2.25E−02	1.401E+00*	3.16E−02
β^+ 15	2.47E−02	1.460E+00*	3.61E−02
β^+ 16	8.37E−03	1.476E+00*	1.24E−02
β^+ 17	2.58E−02	1.500E+00*	3.87E−02
β^+ 18	3.22E−02	1.514E+00*	4.88E−02
β^+ 19	1.83E−02	1.561E+00*	2.85E−02
β^+ 20	8.59E−02	1.598E+00*	1.37E−01
β^+ 21	1.04E−02	1.648E+00*	1.72E−02
β^+ 22	6.98E−02	1.682E+00*	1.17E−01
β^+ 23	7.73E−02	1.739E+00*	1.34E−01
β^+ 24	3.87E−02	1.789E+00*	6.91E−02
β^+ 25	1.30E−01	2.005E+00*	2.61E−01
$\gamma^{\pm}$	1.22E+00	5.110E−01	6.25E−01
γ 4	4.73E−02	3.262E−01	1.54E−02
γ 5	8.44E−01	3.346E−01	2.82E−01
ce-K, γ 5	3.01E−02	2.808E−01	8.44E−03
ce-L$_1$, γ 5	3.51E−03	3.256E−01	1.14E−03
γ 6	1.00E−02	3.466E−01	3.48E−03
γ 8	1.07E−02	3.662E−01	3.92E−03
ce-K, γ 9	1.03E−02	3.435E−01	3.53E−03
γ 10	1.50E−01	4.125E−01	6.20E−02
γ 12	4.47E−03	4.291E−01	1.92E−03
γ 13	9.20E−03	4.609E−01	4.24E−03
ce-K, γ 15	5.66E−03	4.315E−01	2.44E−03
ce-K, γ 16	1.39E−02	4.511E−01	6.28E−03
γ 17	4.05E−03	5.152E−01	2.09E−03
γ 18	1.11E−01	5.690E−01	6.34E−02
ce-K, γ 19	9.67E−02	5.162E−01	4.99E−02
ce-L$_1$, γ 19	1.37E−02	5.610E−01	7.67E−03
ce-M, γ 19	2.97E−03	5.683E−01*	1.69E−03
γ 20	7.93E−03	5.874E−01	4.66E−03
γ 21	3.04E−03	6.029E−01	1.83E−03
γ 22	2.95E−03	6.106E−01	1.80E−03
γ 23	4.56E−03	6.428E−01	2.93E−03
ce-K, γ 24	3.79E−03	6.070E−01	2.30E−03
γ 25	5.15E−02	6.925E−01	3.56E−02
γ 26	1.08E−02	6.955E−01	7.51E−03
γ 28	1.23E−02	7.297E−01	8.99E−03
γ 29	5.48E−03	7.551E−01	4.14E−03
γ 30	5.57E−03	7.990E−01	4.45E−03
γ 31	9.45E−03	8.466E−01	8.00E−03
γ 32	1.25E−01	8.734E−01	1.09E−01
γ 33	6.08E−03	8.766E−01	5.33E−03
γ 34	2.19E−02	9.052E−01	1.99E−02
γ 35	3.26E−02	9.997E−01	3.26E−02
γ 36	5.74E−02	1.027E+00	5.89E−02

ce-K, γ 37	8.34E−03	1.002E+00	8.36E−03
ce-L_1, γ 37	1.15E−03	1.047E+00	1.21E−03
γ 39	9.96E−03	1.072E+00	1.07E−02
γ 40	1.64E−02	1.086E+00	1.78E−02
γ 41	6.75E−03	1.108E+00	7.48E−03
γ 42	4.81E−03	1.157E+00	5.56E−03
γ 43	1.78E−02	1.173E+00	2.09E−02
γ 44	3.38E−03	1.245E+00	4.20E−03
γ 45	3.78E−02	1.301E+00	4.92E−02
γ 46	4.89E−03	1.390E+00	6.80E−03
γ 47	2.03E−02	1.420E+00	2.89E−02
γ 48	5.65E−03	1.431E+00	8.09E−03
γ 49	4.98E−03	1.447E+00	7.20E−03
γ 50	1.42E−02	1.498E+00	2.12E−02
γ 51	6.50E−03	1.503E+00	9.76E−03
γ 52	7.51E−03	1.508E+00	1.13E−02
γ 53	1.86E−02	1.510E+00	2.82E−02
γ 54	8.86E−03	1.543E+00	1.37E−02
γ 55	3.12E−03	1.611E+00	5.03E−03
γ 56	6.75E−03	1.624E+00	1.10E−02
γ 57	1.39E−02	1.656E+00	2.31E−02
γ 58	5.40E−03	1.814E+00	9.80E−03
γ 59	1.00E−02	1.834E+00	1.84E−02
γ 60	5.06E−03	1.844E+00	9.34E−03
γ 61	9.20E−03	1.849E+00	1.70E−02
γ 62	4.64E−03	1.877E+00	8.71E−03
γ 63	6.16E−03	1.938E+00	1.19E−02
γ 64	5.23E−03	2.010E+00	1.05E−02
K_{α_1} X-ray	2.43E−01	4.600E−02	1.12E−02
K_{α_2} X-ray	1.36E−01	4.521E−02	6.15E−03
K_{β_1} X-ray	4.81E−02	5.211E−02	2.51E−03
Auger-LMM	2.41E−01	5.156E−03*	1.24E−03
Auger-MXY	8.11E−01	1.509E−03*	1.22E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.76E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.13E−02
Listed β, ce and Auger radiations	1.11E+00
Omitted β, ce and Auger radiations**	1.34E−02
Listed α and α recoil radiations	7.68E−04
Listed radiations	2.88E+00
Omitted radiations**	2.47E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Tb-150 daughter, yield 1.9E−04, is radioactive.
Dy-154 daughter, yield 9.9981E−01, is radioactive.


154 67Ho(11.76m)
(2-) 0.0
2.3449
2.2719
2.2496
2.1839
2.1782
2.1687
2.1484
1.9911
1.9583
1.9038
1.8772
1.8449
1.8329
1.8191
1.7819
1.6352
1.5461
1.5077
1.4427
1.4204
1.3903
1.3343
1.2519
1.2080
1.0581
1.0271
0.9052
0.7471
0.6608
0.3346
0.0
(3-)
(4-)
(3+)
2-
(5-)
2+
4+
1-
2+
(3+)
4+
3-
0+
2+
2+
4+
0+
2+
0+
154 66Dy(3.0E+6y)
(2-) 0.0
150 65Tb(3.48h)
α1

67-Ho-156

03-MAR-92

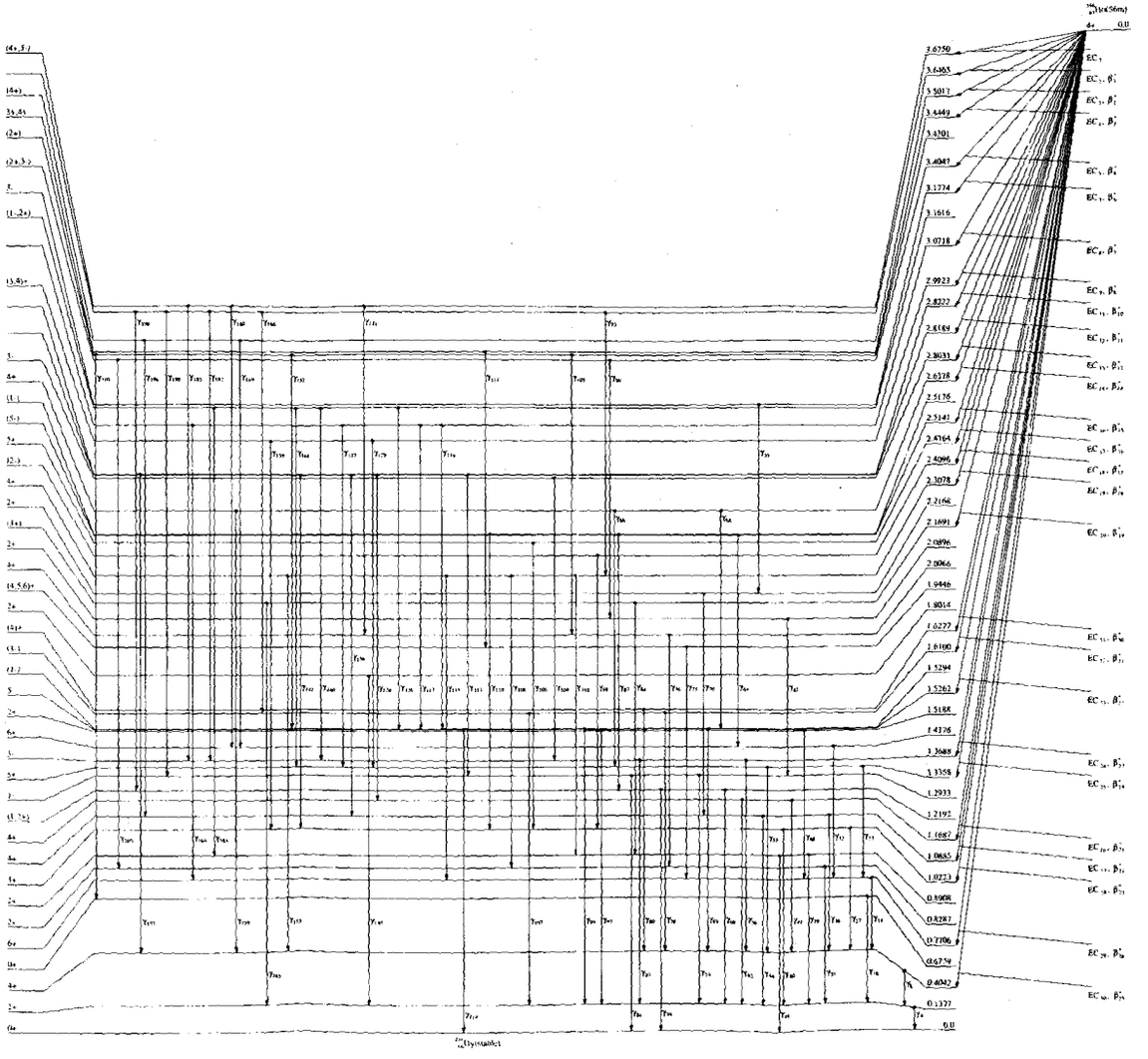
Half-life = 56 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 14	3.36E−03	6.355E−01*	2.14E−03
β^+ 16	2.24E−03	7.072E−01*	1.58E−03
β^+ 18	3.36E−03	7.824E−01*	2.63E−03
β^+ 19	3.36E−03	8.445E−01*	2.84E−03
β^+ 20	8.59E−03	1.089E+00*	9.35E−03
β^+ 21	3.73E−03	1.097E+00*	4.09E−03
β^+ 22	1.37E−02	1.135E+00*	1.55E−02
β^+ 23	6.60E−03	1.207E+00*	7.96E−03
β^+ 24	7.22E−03	1.222E+00*	8.82E−03
β^+ 25	3.61E−02	1.298E+00*	4.68E−02
β^+ 26	2.12E−02	1.335E+00*	2.82E−02
β^+ 27	3.86E−02	1.365E+00*	5.27E−02
β^+ 28	4.98E−02	1.468E+00*	7.31E−02
β^+ 29	2.12E−01	1.651E+00*	3.49E−01
$\gamma^\pm$	8.35E−01	5.110E−01	4.27E−01
γ 4	5.11E−01	1.378E−01	7.04E−02
ce-K, γ 4	2.44E−01	8.401E−02	2.05E−02
ce-L_1, γ 4	2.37E−02	1.288E−01	3.05E−03
ce-L_2, γ 4	6.64E−02	1.292E−01	8.58E−03
ce-L_3, γ 4	5.96E−02	1.300E−01	7.75E−03
ce-M, γ 4	3.53E−02	1.361E−01*	4.81E−03
γ 8	5.47E−01	2.666E−01	1.46E−01
ce-K, γ 8	3.74E−02	2.128E−01	7.96E−03
γ 14	1.07E−01	3.664E−01	3.93E−02
γ 21	6.39E−03	5.652E−01	3.61E−03
γ 27	1.37E−02	6.181E−01	8.47E−03
ce-K, γ 32	9.40E−03	6.134E−01	5.76E−03
ce-K, γ 36	4.73E−02	6.306E−01	2.98E−02
ce-L_1, γ 36	6.64E−03	6.753E−01	4.49E−03
ce-K, γ 37	3.78E−02	6.373E−01	2.41E−02
ce-L_1, γ 37	5.31E−03	6.820E−01	3.62E−03
ce-K, γ 39	1.33E−02	6.994E−01	9.32E−03
γ 40	7.10E−03	7.554E−01	5.37E−03
ce-K, γ 41	3.04E−02	7.106E−01	2.16E−02
ce-L_1, γ 41	4.26E−03	7.554E−01	3.22E−03
γ 42	5.77E−03	7.962E−01	4.60E−03
γ 48	7.08E−02	8.846E−01	6.27E−02
γ 49	2.66E−02	8.909E−01	2.37E−02
γ 53	2.98E−02	9.316E−01	2.78E−02
γ 54	7.10E−03	9.505E−01	6.75E−03
γ 55	3.93E−03	9.604E−01	3.78E−03
γ 56	6.23E−03	9.645E−01	6.01E−03
γ 62	3.16E−02	1.031E+00	3.26E−02
γ 65	3.78E−03	1.076E+00	4.07E−03
γ 66	5.16E−03	1.081E+00	5.58E−03
γ 68	3.27E−03	1.112E+00	3.64E−03
γ 69	3.34E−02	1.122E+00	3.75E−02
γ 70	5.26E−03	1.128E+00	5.94E−03
γ 74	1.09E−02	1.156E+00	1.26E−02
γ 75	4.65E−03	1.175E+00	5.46E−03
γ 78	4.96E−03	1.206E+00	5.98E−03
γ 79	3.78E−03	1.219E+00	4.61E−03
γ 80	2.43E−02	1.224E+00	2.97E−02
γ 81	2.15E−02	1.231E+00	2.64E−02
γ 84	4.09E−03	1.278E+00	5.23E−03
γ 86	6.54E−03	1.293E+00	8.46E−03
γ 87	3.83E−03	1.298E+00	4.97E−03
γ 88	1.64E−02	1.302E+00	2.14E−02
γ 89	3.88E−03	1.310E+00	5.09E−03
γ 90	3.22E−03	1.315E+00	4.23E−03
γ 93	6.13E−03	1.339E+00	8.21E−03
γ 97	3.27E−03	1.381E+00	4.52E−03
γ 98	3.42E−03	1.387E+00	4.75E−03
γ 99	8.18E−03	1.392E+00	1.14E−02
γ 102	1.13E−02	1.417E+00	1.60E−02
γ 103	3.78E−03	1.424E+00	5.38E−03
γ 104	5.26E−03	1.434E+00	7.55E−03
γ 105	1.08E−02	1.454E+00	1.58E−02
γ 107	1.11E−02	1.472E+00	1.63E−02
γ 108	3.37E−03	1.479E+00	4.99E−03
γ 110	3.78E−03	1.495E+00	5.65E−03
γ 111	3.42E−03	1.501E+00	5.14E−03
γ 113	3.47E−03	1.525E+00	5.30E−03
γ 114	6.69E−03	1.529E+00	1.02E−02
γ 115	2.91E−03	1.537E+00	4.48E−03
γ 116	2.61E−03	1.542E+00	4.02E−03
γ 117	5.42E−03	1.546E+00	8.37E−03
γ 126	3.47E−03	1.635E+00	5.68E−03
γ 128	9.40E−03	1.650E+00	1.55E−02
γ 129	2.76E−03	1.656E+00	4.57E−03
γ 130	3.58E−03	1.664E+00	5.95E−03
γ 131	2.25E−03	1.668E+00	3.75E−03
γ 136	2.50E−03	1.731E+00	4.33E−03
γ 137	4.09E−03	1.736E+00	7.10E−03
γ 140	2.30E−03	1.792E+00	4.12E−03
γ 141	2.35E−03	1.796E+00	4.22E−03
γ 144	3.17E−03	1.826E+00	5.79E−03
γ 147	3.47E−03	1.862E+00	6.47E−03
γ 152	1.99E−03	1.900E+00	3.79E−03
γ 153	2.45E−03	1.904E+00	4.67E−03
γ 159	2.61E−03	1.970E+00	5.13E−03
γ 164	2.04E−03	2.027E+00	4.14E−03
γ 165	9.61E−03	2.031E+00	1.95E−02
γ 166	7.36E−03	2.036E+00	1.50E−02
γ 168	6.54E−03	2.053E+00	1.34E−02
γ 169	2.50E−03	2.064E+00	5.17E−03
γ 172	3.37E−03	2.086E+00	7.04E−03
γ 179	7.46E−03	2.234E+00	1.67E−02
γ 180	2.71E−03	2.238E+00	6.06E−03
γ 181	4.14E−03	2.271E+00	9.40E−03
γ 182	1.89E−03	2.277E+00	4.31E−03
γ 184	1.53E−03	2.302E+00	3.53E−03
γ 185	1.53E−03	2.307E+00	3.54E−03
γ 190	5.11E−03	2.353E+00	1.20E−02
γ 191	1.48E−03	2.365E+00	3.50E−03
γ 193	1.74E−03	2.374E+00	4.12E−03
γ 196	7.26E−03	2.413E+00	1.75E−02
γ 197	1.50E−02	2.418E+00	3.62E−02
γ 198	1.79E−03	2.428E+00	4.34E−03
γ 204	1.89E−03	2.571E+00	4.86E−03
γ 205	1.74E−03	2.575E+00	4.47E−03
γ 206	1.74E−03	2.580E+00	4.48E−03
γ 210	1.38E−03	2.754E+00	3.80E−03
K_{α_1} X-ray	4.43E−01	4.600E−02	2.04E−02
K_{α_2} X-ray	2.48E−01	4.521E−02	1.12E−02
K_{β_1} X-ray	8.77E−02	5.211E−02	4.57E−03
Auger-LMM	4.94E−01	5.155E−03*	2.55E−03
Auger-LMX	3.00E−01	6.657E−03*	2.00E−03
Auger-MXY	1.67E+00	1.504E−03*	2.51E−03

Listed X, γ and $\gamma^\pm$ radiations	1.52E+00
Omitted X, γ and $\gamma^\pm$ radiations**	2.23E−01
Listed β, ce and Auger radiations	7.67E−01
Omitted β, ce and Auger radiations**	2.28E−02
Listed radiations	2.28E+00
Omitted radiations**	2.46E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum$y(i)×E(i) in its category.

Dy-156 daughter is stable.



67-Ho-160

24-JAN-97

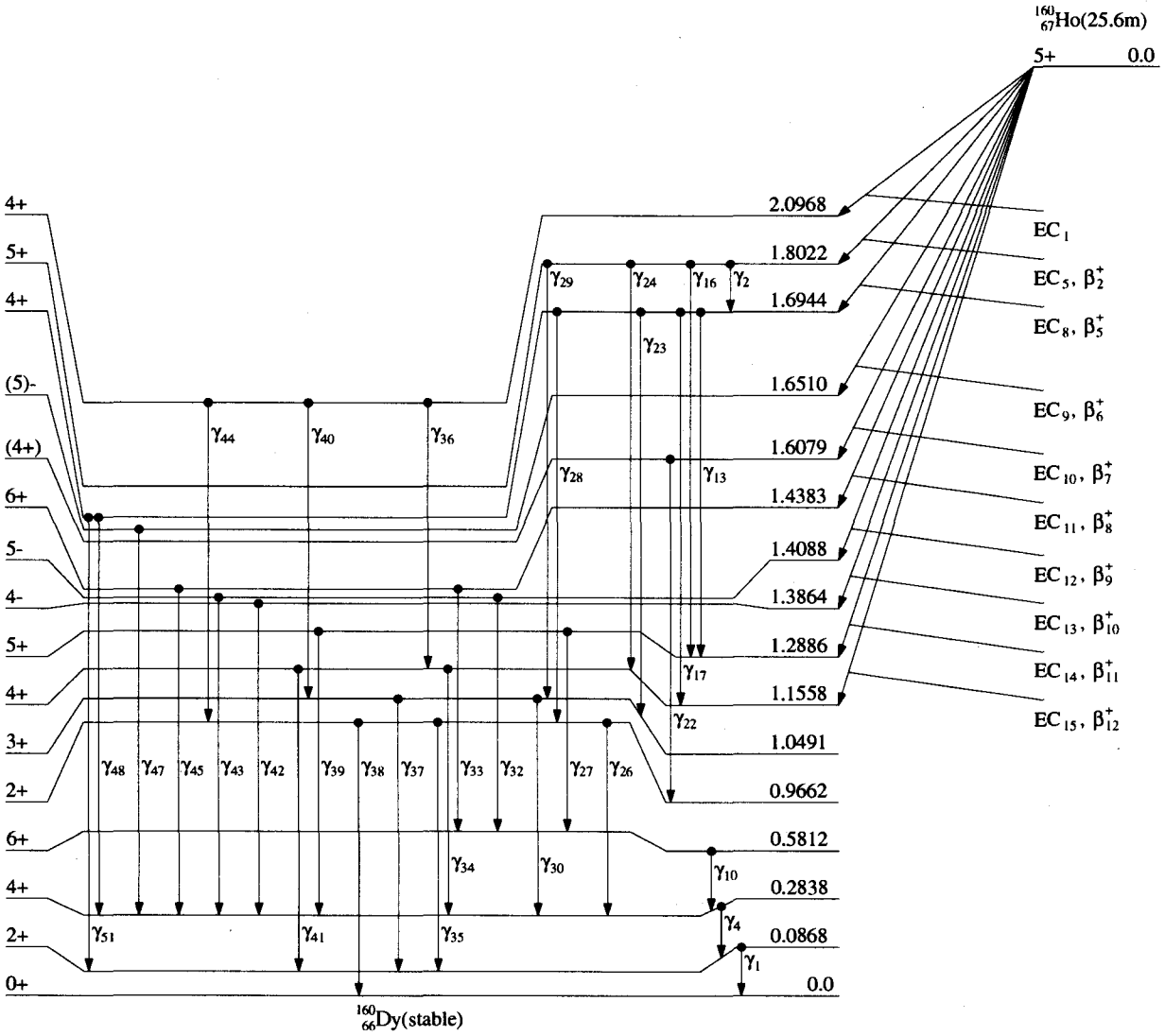
Half-life = 25.6 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 5	3.23E−03	2.718E−01*	8.77E−04
β^+ 11	2.02E−04	4.499E−01*	9.07E−05
β^+ 12	7.06E−04	5.083E−01*	3.59E−04
$\gamma^{\pm}$	9.41E−03	5.110E−01	4.81E−03
γ 1	1.36E−01	8.679E−02	1.18E−02
ce-K, γ 1	2.16E−01	3.300E−02	7.14E−03
ce-L$_1$, γ 1	1.96E−02	7.774E−02	1.52E−03
ce-L$_2$, γ 1	1.50E−01	7.821E−02	1.17E−02
ce-L$_3$, γ 1	1.55E−01	7.900E−02	1.22E−02
ce-M, γ 1	7.73E−02	8.511E−02*	6.57E−03
ce-N$^+$, γ 1	2.12E−02	8.679E−02*	1.84E−03
ce-K, γ 2	3.38E−03	5.419E−02	1.83E−04
ce-L$_2$, γ 2	1.44E−03	9.940E−02	1.43E−04
ce-L$_3$, γ 2	1.40E−03	1.002E−01	1.40E−04
ce-M, γ 2	7.47E−04	1.063E−01*	7.95E−05
γ 4	1.66E−01	1.970E−01	3.27E−02
ce-K, γ 4	2.77E−02	1.432E−01	3.97E−03
ce-L$_1$, γ 4	2.92E−03	1.880E−01	5.50E−04
ce-L$_2$, γ 4	4.34E−03	1.884E−01	8.18E−04
ce-L$_3$, γ 4	3.42E−03	1.892E−01	6.47E−04
ce-M, γ 4	2.49E−03	1.953E−01*	4.87E−04
ce-N$^+$, γ 4	6.84E−04	1.970E−01*	1.35E−04
γ 10	1.70E−02	2.972E−01	5.06E−03
ce-K, γ 10	8.50E−04	2.434E−01	2.07E−04
γ 13	4.69E−03	4.057E−01	1.90E−03
γ 16	2.13E−02	5.135E−01	1.09E−02
ce-K, γ 16	2.44E−04	4.597E−01	1.12E−04
γ 17	5.96E−02	5.386E−01	3.21E−02
ce-K, γ 17	6.12E−04	4.848E−01	2.97E−04
γ 22	4.47E−03	6.418E−01	2.87E−03
γ 23	2.47E−01	6.454E−01	1.59E−01
ce-K, γ 23	1.72E−03	5.916E−01	1.02E−03
ce-L$_1$, γ 23	2.14E−04	6.364E−01	1.36E−04
γ 24	4.69E−02	6.463E−01	3.03E−02
ce-K, γ 24	3.09E−04	5.925E−01	1.83E−04
γ 26	4.90E−03	6.823E−01	3.34E−03
γ 27	6.82E−03	7.076E−01	4.82E−03
γ 28	4.69E−01	7.282E−01	3.41E−01
ce-K, γ 28	2.36E−03	6.744E−01	1.59E−03
ce-L$_1$, γ 28	2.94E−04	7.191E−01	2.11E−04
γ 29	4.26E−02	7.531E−01	3.21E−02
ce-K, γ 29	1.99E−04	6.993E−01	1.39E−04
γ 30	5.11E−02	7.653E−01	3.91E−02
ce-K, γ 30	2.30E−04	7.115E−01	1.64E−04
γ 32	3.41E−03	8.276E−01	2.82E−03
γ 33	7.67E−03	8.569E−01	6.57E−03
γ 34	9.37E−02	8.720E−01	8.17E−02
ce-K, γ 34	3.19E−04	8.182E−01	2.61E−04
γ 35	2.66E−01	8.794E−01	2.34E−01
ce-K, γ 35	8.90E−04	8.256E−01	7.35E−04
ce-L$_1$, γ 35	1.11E−04	8.703E−01	9.70E−05
γ 36	5.75E−03	9.410E−01	5.41E−03
γ 37	2.56E−01	9.624E−01	2.46E−01
ce-K, γ 37	7.09E−04	9.086E−01	6.44E−04
ce-L$_1$, γ 37	8.87E−05	9.533E−01	8.46E−05
γ 38	2.19E−01	9.662E−01	2.12E−01
ce-K, γ 38	6.03E−04	9.124E−01	5.51E−04
ce-L$_1$, γ 38	7.56E−05	9.571E−01	7.23E−05
γ 39	2.90E−02	1.005E+00	2.91E−02
ce-K, γ 39	7.47E−05	9.509E−01	7.10E−05
γ 40	1.21E−02	1.048E+00	1.27E−02
γ 41	4.05E−02	1.069E+00	4.33E−02
ce-K, γ 41	9.05E−05	1.015E+00	9.19E−05
γ 42	2.13E−03	1.103E+00	2.35E−03
γ 43	2.13E−03	1.125E+00	2.40E−03
γ 44	1.66E−02	1.131E+00	1.88E−02
γ 45	2.34E−03	1.156E+00	2.71E−03
γ 47	2.34E−03	1.367E+00	3.20E−03
γ 48	8.73E−03	1.410E+00	1.23E−02
γ 51	1.64E−03	1.606E+00	2.63E−03
K$_{\alpha_1}$ X-ray	5.22E−01	4.600E−02	2.40E−02
K$_{\alpha_2}$ X-ray	2.92E−01	4.521E−02	1.32E−02
K$_{\beta_1}$ X-ray	1.03E−01	5.211E−02	5.39E−03
K$_{\beta_2}$ X-ray	4.65E−02	5.352E−02	2.49E−03
K$_{\beta_3}$ X-ray	5.33E−02	5.195E−02	2.77E−03
Auger-KLL	4.09E−02	3.679E−02*	1.50E−03
Auger-KLX	2.11E−02	4.365E−02*	9.20E−04
Auger-KXY	3.13E−03	5.039E−02*	1.57E−04
Auger-LMM	6.62E−01	5.156E−03*	3.41E−03
Auger-LMX	4.02E−01	6.656E−03*	2.68E−03
Auger-LXY	6.82E−02	7.800E−03*	5.32E−04
Auger-MXY	2.24E+00	1.498E−03*	3.35E−03
ΔE	5.42E−01	1.890E−04*	1.02E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.68E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.62E−02
Listed β, ce and Auger radiations	6.88E−02
Omitted β, ce and Auger radiations**	1.55E−03
Listed radiations	1.75E+00
Omitted radiations**	1.77E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Dy-160 daughter is stable.


160 67 Ho(25.6m)
5+ 0.0
2.0968
1.8022
1.6944
1.6510
1.6079
1.4383
1.4088
1.3864
1.2886
1.1558
1.0491
0.9662
0.5812
0.2838
0.0868
0.0
4+
5+
4+
(5)-
(4+)
6+
5-
4-
5+
4+
3+
2+
6+
4+
2+
0+
EC1
EC5, β+2
EC8, β+5
EC9, β+6
EC10, β+7
EC11, β+8
EC12, β+9
EC13, β+10
EC14, β+11
EC15, β+12
γ29 γ24 γ16 γ2
γ23
γ44 γ40 γ36
γ28 γ13
γ17
γ22
γ48 γ47 γ45 γ43 γ42 γ39 γ38 γ37 γ33 γ32 γ27 γ26
γ34 γ30 γ10
γ51 γ41 γ35 γ4
γ1
160 66 Dy(stable)

67-Ho-163

21-JAN-97

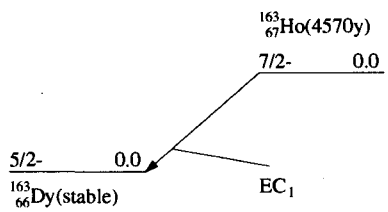
Half-life = 4570 y
Decay mode(s): EC

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
Auger-MXY	7.88E−01	1.676E−03*	1.32E−03
ΔE	2.12E−01	2.929E−04*	6.21E−05

Listed β, ce and Auger radiations	1.38E−03
Listed radiations	1.38E−03

* Average energy (MeV)

Dy-163 daughter is stable.



68-Er-156

03-MAR-92

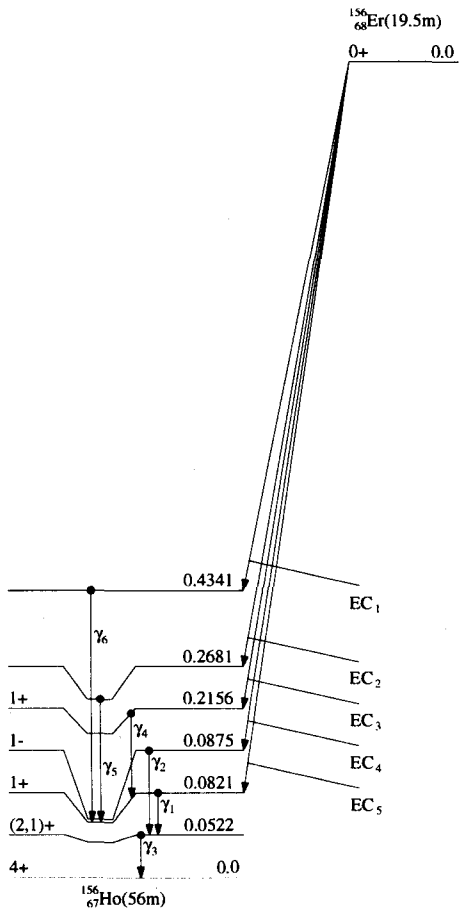
Half-life = 19.5 m
Decay mode(s): EC

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	3.71E−02	2.990E−02	1.11E−03
ce-L$_1$, γ 1	3.86E−01	2.051E−02	7.91E−03
ce-L$_2$, γ 1	4.35E−02	2.098E−02	9.13E−04
ce-L$_3$, γ 1	1.60E−02	2.183E−02	3.49E−04
ce-M, γ 1	9.81E−02	2.816E−02*	2.76E−03
ce-N$^+$, γ 1	3.25E−02	2.990E−02*	9.73E−04
γ 2	1.89E−01	3.530E−02	6.69E−03
ce-L$_1$, γ 2	6.30E−02	2.591E−02	1.63E−03
ce-L$_2$, γ 2	3.47E−02	2.638E−02	9.15E−04
ce-L$_3$, γ 2	4.82E−02	2.723E−02	1.31E−03
ce-M, γ 2	3.23E−02	3.356E−02*	1.08E−03
ce-N$^+$, γ 2	9.38E−03	3.530E−02*	3.31E−04
ce-L$_1$, γ 3	2.22E−01	4.281E−02	9.52E−03
ce-L$_2$, γ 3	2.84E−02	4.328E−02	1.23E−03
ce-L$_3$, γ 3	4.90E−01	4.413E−02	2.16E−02
ce-M, γ 3	2.04E−01	5.046E−02*	1.03E−02
ce-N$^+$, γ 3	6.05E−02	5.220E−02*	3.16E−03
γ 4	1.10E−02	1.335E−01	1.46E−03
ce-K, γ 4	1.08E−02	7.788E−02	8.40E−04
ce-L$_1$, γ 4	1.45E−03	1.241E−01	1.81E−04
γ 5	2.74E−03	1.860E−01	5.11E−04
γ 6	2.93E−03	3.520E−01	1.03E−03
K_{α_1} X-ray	4.03E−01	4.755E−02	1.92E−02
K_{α_2} X-ray	2.27E−01	4.670E−02	1.06E−02
K_{β_1} X-ray	8.06E−02	5.388E−02	4.34E−03
K_{β_2} X-ray	3.57E−02	5.533E−02	1.97E−03
K_{β_3} X-ray	4.17E−02	5.369E−02	2.24E−03
K_{β_5} X-ray	1.47E−03	5.425E−02	7.96E−05
L_α X-ray	1.90E−01	6.716E−03*	1.27E−03
L_β X-ray	1.92E−01	7.618E−03*	1.46E−03
L_γ X-ray	3.60E−02	8.943E−03*	3.22E−04
Auger-KLL	3.19E−02	3.797E−02*	1.21E−03
Auger-KLX	1.34E−02	4.494E−02*	6.00E−04
Auger-KXY	2.47E−03	5.208E−02*	1.29E−04
Auger-LMM	1.02E+00	5.389E−03*	5.48E−03
Auger-LMX	6.29E−01	6.955E−03*	4.37E−03
Auger-LXY	1.05E−01	8.151E−03*	8.58E−04
Auger-MXY	3.52E+00	1.548E−03*	5.45E−03
ΔE	9.18E−01	2.128E−04*	1.95E−04

Listed X, γ and $\gamma^{\pm}$ radiations	5.22E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	6.44E−05
Listed β, ce and Auger radiations	8.34E−02
Omitted β, ce and Auger radiations**	2.42E−04
Listed radiations	1.36E−01
Omitted radiations**	3.07E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ho-156 daughter is radioactive.



68-Er-158

05-APR-96

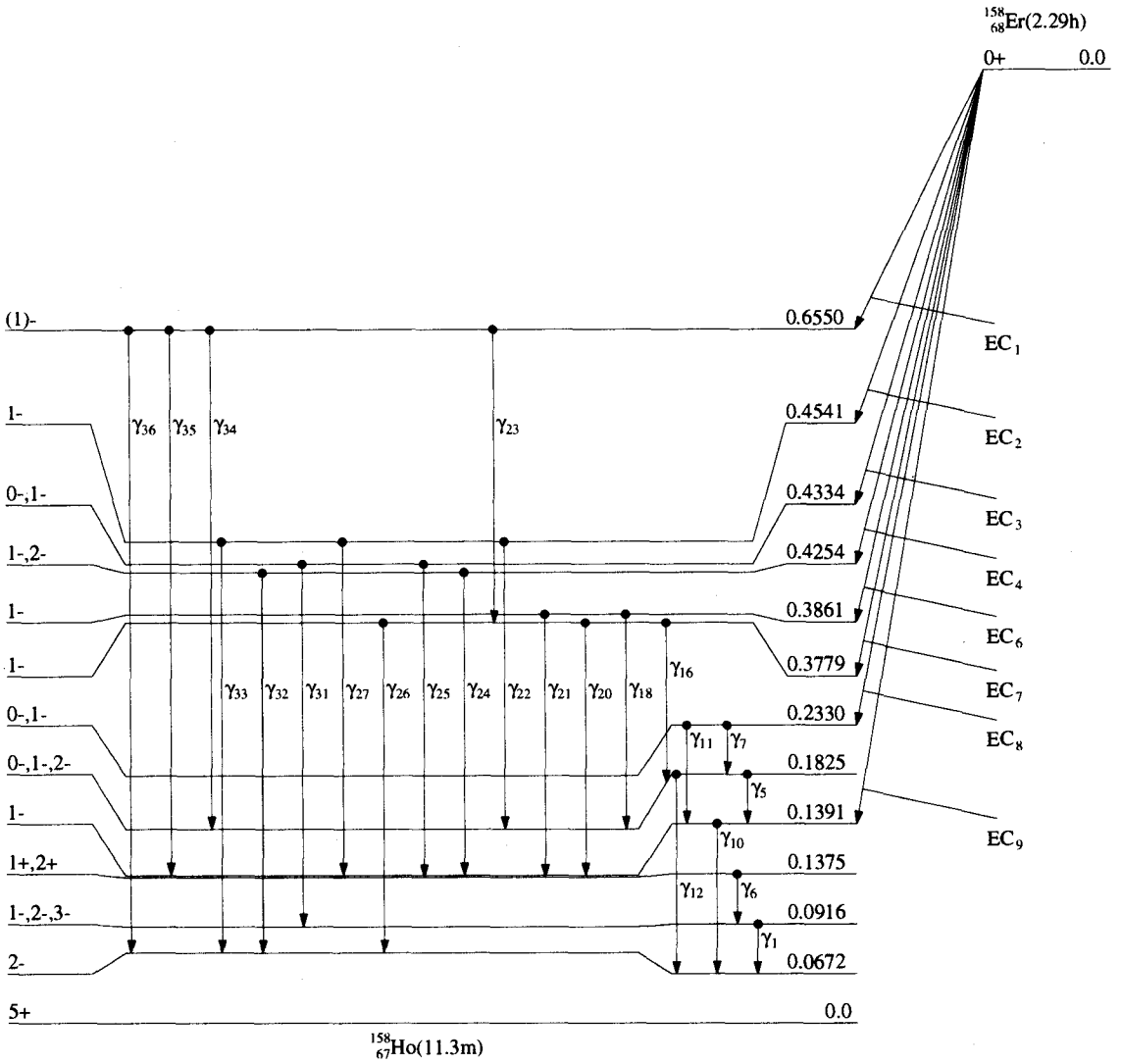
Half-life = 2.29 h
Decay mode(s): EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-L_1, γ 1	3.27E−02	1.492E−02	4.88E−04
ce-L_2, γ 1	7.74E−03	1.539E−02	1.19E−04
ce-L_3, γ 1	6.66E−03	1.624E−02	1.08E−04
ce-M, γ 1	1.06E−02	2.257E−02*	2.38E−04
ce-N^+, γ 1	3.94E−03	2.431E−02*	9.57E−05
ce-L_1, γ 2	6.11E−03	1.611E−02	9.84E−05
ce-L_2, γ 2	6.63E−01	1.658E−02	1.10E−02
ce-L_3, γ 2	8.65E−01	1.743E−02	1.51E−02
ce-M, γ 2	3.64E−01	2.376E−02*	8.65E−03
ce-N^+, γ 2	1.29E−01	2.550E−02*	3.28E−03
ce-L_2, γ 4	4.65E−02	2.188E−02	1.02E−03
ce-L_3, γ 4	5.90E−02	2.273E−02	1.34E−03
ce-M, γ 4	2.52E−02	2.906E−02*	7.33E−04
ce-N^+, γ 4	7.94E−03	3.080E−02*	2.45E−04
γ 5	5.58E−03	4.350E−02	2.43E−04
ce-L_1, γ 5	1.91E−02	3.411E−02	6.52E−04
ce-M, γ 5	4.88E−03	4.176E−02*	2.04E−04
γ 6	2.91E−02	4.550E−02	1.32E−03
ce-L_1, γ 6	5.40E−03	3.611E−02	1.95E−04
ce-L_3, γ 6	3.21E−03	3.743E−02	1.20E−04
ce-M, γ 6	2.43E−03	4.376E−02*	1.06E−04
ce-L_1, γ 7	2.48E−03	4.121E−02	1.02E−04
γ 10	9.99E−02	7.191E−02	7.18E−03
ce-K, γ 10	5.79E−01	1.629E−02	9.44E−03
ce-L_1, γ 10	7.82E−02	6.252E−02	4.89E−03
ce-L_2, γ 10	8.24E−03	6.299E−02	5.19E−04
ce-L_3, γ 10	2.51E−03	6.384E−02	1.60E−04
ce-M, γ 10	1.97E−02	7.017E−02*	1.38E−03
ce-N^+, γ 10	5.62E−03	7.191E−02*	4.04E−04
γ 11	2.43E−03	9.370E−02	2.28E−04
ce-K, γ 11	6.57E−03	3.808E−02	2.50E−04
γ 12	1.80E−03	1.153E−01	2.08E−04
γ 13	1.62E−03	1.186E−01	1.92E−04
γ 16	1.64E−02	1.954E−01	3.20E−03
ce-K, γ 16	5.55E−03	1.398E−01	7.76E−04
ce-L_1, γ 16	7.47E−04	1.860E−01	1.39E−04
γ 18	1.80E−03	2.041E−01	3.67E−04
γ 20	2.70E−03	2.389E−01	6.45E−04
ce-K, γ 20	5.27E−04	1.833E−01	9.66E−05
γ 21	3.42E−02	2.486E−01	8.50E−03
ce-K, γ 21	8.31E−04	1.930E−01	1.60E−04
γ 22	2.34E−03	2.715E−01	6.35E−04
γ 23	6.30E−04	2.769E−01	1.74E−04
γ 24	1.71E−03	2.863E−01	4.90E−04
γ 25	1.19E−02	2.960E−01	3.52E−03
γ 26	1.99E−02	3.107E−01	6.18E−03
ce-K, γ 26	1.91E−03	2.551E−01	4.88E−04
γ 27	3.15E−03	3.149E−01	9.92E−04
γ 28	3.33E−03	3.267E−01	1.09E−03
γ 29	5.40E−04	3.289E−01	1.78E−04
γ 30	1.26E−03	3.361E−01	4.23E−04
γ 31	1.08E−02	3.416E−01	3.69E−03
ce-K, γ 31	3.73E−04	2.860E−01	1.07E−04
γ 32	2.25E−02	3.582E−01	8.06E−03
ce-K, γ 32	1.49E−03	3.026E−01	4.49E−04
γ 33	9.00E−02	3.868E−01	3.48E−02
ce-K, γ 33	4.86E−03	3.312E−01	1.61E−03
ce-L_1, γ 33	6.47E−04	3.774E−01	2.44E−04
γ 34	8.55E−03	4.726E−01	4.04E−03
ce-K, γ 34	2.74E−04	4.170E−01	1.14E−04
γ 35	1.03E−02	5.159E−01	5.34E−03
ce-K, γ 35	2.65E−04	4.603E−01	1.22E−04
γ 36	1.26E−03	5.882E−01	7.41E−04
K_{α_1} X-ray	6.86E−01	4.755E−02	3.26E−02
K_{α_2} X-ray	3.85E−01	4.670E−02	1.80E−02
K_{β_1} X-ray	1.37E−01	5.388E−02	7.39E−03
K_{β_2} X-ray	6.07E−02	5.533E−02	3.36E−03
K_{β_3} X-ray	7.10E−02	5.369E−02	3.81E−03
L_α X-ray	2.80E−01	6.716E−03*	1.88E−03
L_β X-ray	2.78E−01	7.604E−03*	2.11E−03
L_γ X-ray	4.29E−02	8.819E−03*	3.79E−04
Auger-KLL	5.42E−02	3.797E−02*	2.06E−03
Auger-KLX	2.27E−02	4.494E−02*	1.02E−03
Auger-KXY	4.20E−03	5.208E−02*	2.19E−04
Auger-LMM	1.49E+00	5.329E−03*	7.96E−03
Auger-LMX	9.08E−01	6.879E−03*	6.25E−03
Auger-LXY	1.53E−01	8.081E−03*	1.24E−03
Auger-MXY	5.12E+00	1.545E−03*	7.90E−03
ΔE	1.32E+00	2.103E−04*	2.77E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.62E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	8.78E−04
Listed β, ce and Auger radiations	9.21E−02
Omitted β, ce and Auger radiations**	2.27E−03
Listed radiations	2.54E−01
Omitted radiations**	3.14E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ho-158m daughter is radioactive.


158 68 Er(2.29h)
0+ 0.0
(1)- 0.6550
1- 0.4541
0-,1- 0.4334
1-,2- 0.4254
1- 0.3861
1- 0.3779
0-,1- 0.2330
0-,1-,2- 0.1825
1- 0.1391
1+,2+ 0.1375
1-,2-,3- 0.0916
2- 0.0672
5+ 0.0
158 67 Ho(11.3m)
EC1
EC2
EC3
EC4
EC6
EC7
EC8
EC9
γ36 γ35 γ34 γ23
γ33 γ32 γ31 γ27 γ26 γ25 γ24 γ22 γ21 γ20 γ18 γ16
γ11 γ7
γ5
γ10
γ12 γ6
γ1

68-Er-159

16-AUG-94

Half-life = 36 m
Decay mode(s): EC, β^+

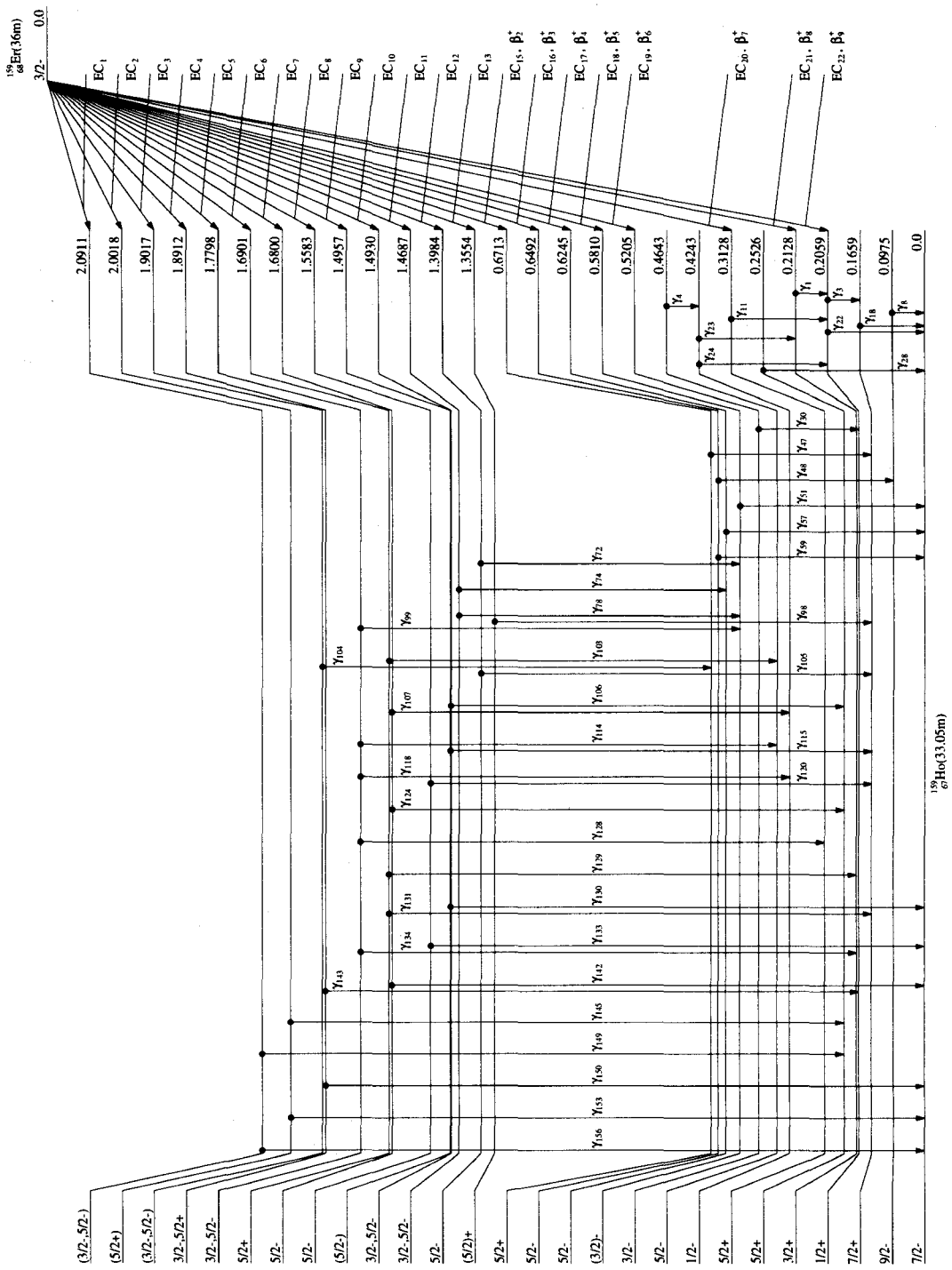
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 2	6.54E−04	4.927E−01*	3.22E−04
β^+ 3	1.02E−02	5.024E−01*	5.13E−03
β^+ 4	1.43E−02	5.132E−01*	7.34E−03
β^+ 5	1.23E−03	5.324E−01*	6.53E−04
β^+ 6	8.17E−04	5.591E−01*	4.57E−04
β^+ 7	9.19E−04	6.509E−01*	5.98E−04
β^+ 8	1.02E−02	6.953E−01*	7.10E−03
β^+ 9	1.02E−02	6.983E−01*	7.13E−03
$\gamma^\pm$	9.76E−02	5.110E−01	4.99E−02
ce-N$^+$, γ 1	8.91E−02	6.500E−03*	5.79E−04
ce-L$_3$, γ 3	7.30E−03	3.193E−02	2.33E−04
ce-K, γ 7	5.85E−03	3.348E−02	1.96E−04
ce-L$_2$, γ 7	2.49E−03	8.018E−02	1.99E−04
ce-L$_3$, γ 7	2.49E−03	8.103E−02	2.02E−04
ce-K, γ 8	1.15E−02	4.183E−02	4.83E−04
ce-L$_2$, γ 8	4.06E−03	8.853E−02	3.59E−04
ce-L$_3$, γ 8	3.96E−03	8.938E−02	3.54E−04
ce-M, γ 8	2.21E−03	9.571E−02*	2.12E−04
ce-K, γ 11	7.42E−03	5.128E−02	3.80E−04
γ 18	5.01E−02	1.659E−01	8.31E−03
ce-K, γ 18	3.48E−03	1.103E−01	3.84E−04
γ 22	9.69E−02	2.059E−01	1.99E−02
ce-K, γ 22	4.81E−02	1.503E−01	7.23E−03
ce-L$_1$, γ 22	5.70E−03	1.965E−01	1.12E−03
ce-L$_2$, γ 22	3.65E−02	1.970E−01	7.20E−03
ce-L$_3$, γ 22	2.29E−02	1.978E−01	4.54E−03
ce-M, γ 22	1.60E−02	2.042E−01*	3.28E−03
ce-N$^+$, γ 22	4.42E−03	2.059E−01*	9.10E−04
γ 23	1.17E−02	2.115E−01	2.47E−03
γ 24	9.35E−03	2.184E−01	2.04E−03
γ 28	3.34E−02	2.523E−01	8.43E−03
γ 30	1.17E−02	3.146E−01	3.68E−03
γ 47	1.84E−02	5.054E−01	9.28E−03
ce-K, γ 47	4.23E−04	4.498E−01	1.90E−04
γ 48	2.34E−02	5.517E−01	1.29E−02
γ 51	4.04E−02	5.810E−01	2.35E−02
ce-K, γ 51	3.93E−04	5.254E−01	2.07E−04
γ 52	4.68E−03	5.855E−01	2.74E−03
γ 57	3.34E−01	6.245E−01	2.09E−01
ce-K, γ 57	5.28E−03	5.689E−01	3.00E−03
ce-L$_1$, γ 57	7.00E−04	6.151E−01	4.31E−04
γ 58	3.34E−03	6.353E−01	2.12E−03
γ 59	2.34E−01	6.491E−01	1.52E−01
ce-K, γ 59	2.81E−03	5.935E−01	1.67E−03
ce-L$_1$, γ 59	3.69E−04	6.397E−01	2.36E−04
γ 66	3.01E−03	7.798E−01	2.34E−03
γ 68	3.01E−03	7.964E−01	2.39E−03
γ 70	3.01E−03	8.093E−01	2.43E−03
γ 72	2.57E−03	8.176E−01	2.10E−03
γ 74	7.01E−03	8.440E−01	5.92E−03
γ 75	7.68E−03	8.515E−01	6.54E−03
γ 76	2.34E−03	8.573E−01	2.00E−03
γ 77	3.01E−03	8.800E−01	2.65E−03
γ 78	5.01E−03	8.881E−01	4.45E−03
γ 79	2.34E−03	9.103E−01	2.13E−03
γ 81	3.67E−03	9.326E−01	3.43E−03
γ 82	1.07E−02	9.425E−01	1.01E−02
γ 84	3.01E−03	9.649E−01	2.90E−03
γ 86	1.97E−03	9.885E−01	1.95E−03
γ 87	1.90E−03	1.046E+00	1.99E−03
γ 91	2.34E−03	1.103E+00	2.58E−03
γ 95	2.00E−03	1.139E+00	2.28E−03
γ 96	1.97E−03	1.152E+00	2.27E−03
γ 97	2.77E−03	1.186E+00	3.29E−03
γ 98	2.14E−03	1.189E+00	2.54E−03
γ 99	8.35E−03	1.199E+00	1.00E−02
γ 100	4.34E−03	1.210E+00	5.26E−03
γ 101	2.07E−03	1.220E+00	2.53E−03
γ 103	2.94E−03	1.226E+00	3.60E−03
γ 104	3.67E−03	1.230E+00	4.52E−03
γ 105	5.34E−03	1.232E+00	6.59E−03
γ 106	6.01E−03	1.240E+00	7.45E−03
γ 107	1.84E−03	1.256E+00	2.31E−03
γ 109	1.67E−03	1.261E+00	2.11E−03
γ 110	1.67E−03	1.281E+00	2.14E−03
γ 111	1.90E−03	1.285E+00	2.45E−03
γ 112	2.10E−03	1.293E+00	2.72E−03
γ 114	1.54E−03	1.316E+00	2.02E−03
γ 115	2.87E−03	1.329E+00	3.82E−03
γ 116	2.61E−03	1.334E+00	3.48E−03
γ 117	1.67E−03	1.339E+00	2.24E−03
γ 118	9.69E−03	1.355E+00	1.31E−02
γ 120	5.68E−03	1.393E+00	7.91E−03
γ 121	2.91E−03	1.403E+00	4.08E−03
γ 122	3.67E−03	1.409E+00	5.18E−03
γ 123	1.57E−03	1.419E+00	2.23E−03
γ 124	7.68E−03	1.427E+00	1.10E−02
γ 125	1.67E−03	1.443E+00	2.41E−03
γ 126	2.07E−03	1.446E+00	2.99E−03
γ 127	3.34E−03	1.459E+00	4.87E−03
γ 128	2.61E−03	1.468E+00	3.82E−03
γ 129	1.94E−03	1.477E+00	2.86E−03
γ 130	1.34E−03	1.496E+00	2.00E−03
γ 131	1.47E−03	1.523E+00	2.24E−03
γ 132	9.35E−03	1.552E+00	1.45E−02
γ 133	4.68E−03	1.558E+00	7.28E−03
γ 134	2.71E−03	1.566E+00	4.24E−03
γ 135	1.40E−03	1.594E+00	2.24E−03
γ 136	2.64E−03	1.598E+00	4.22E−03
γ 137	1.27E−03	1.617E+00	2.05E−03
γ 138	3.34E−03	1.630E+00	5.44E−03
γ 139	1.24E−03	1.654E+00	2.04E−03
γ 140	1.70E−03	1.659E+00	2.83E−03
γ 142	1.47E−03	1.680E+00	2.47E−03
γ 143	1.27E−03	1.685E+00	2.14E−03
γ 144	1.30E−03	1.709E+00	2.23E−03
γ 145	1.20E−03	1.750E+00	2.10E−03
γ 146	2.44E−03	1.776E+00	4.33E−03
γ 147	1.70E−03	1.786E+00	3.04E−03
γ 148	1.20E−03	1.791E+00	2.15E−03
γ 149	1.24E−02	1.838E+00	2.27E−02
γ 150	1.04E−02	1.891E+00	1.96E−02
γ 151	1.30E−03	1.906E+00	2.48E−03
γ 152	1.67E−03	1.928E+00	3.22E−03
γ 153	9.69E−03	2.002E+00	1.94E−02
γ 154	5.01E−03	2.006E+00	1.01E−02
γ 155	2.10E−03	2.037E+00	4.29E−03
γ 156	2.87E−03	2.091E+00	6.01E−03
γ 157	1.67E−03	2.204E+00	3.68E−03
γ 158	3.01E−03	2.429E+00	7.30E−03
K$_{\alpha_1}$ X-ray	4.31E−01	4.755E−02	2.05E−02
K$_{\alpha_2}$ X-ray	2.42E−01	4.670E−02	1.13E−02
K$_{\beta_1}$ X-ray	8.61E−02	5.388E−02	4.64E−03
K$_{\beta_2}$ X-ray	3.81E−02	5.533E−02	2.11E−03
K$_{\beta_3}$ X-ray	4.46E−02	5.369E−02	2.39E−03
Auger-KLL	3.41E−02	3.797E−02*	1.29E−03
Auger-KLX	1.43E−02	4.494E−02*	6.41E−04
Auger-LMM	4.64E−01	5.342E−03*	2.48E−03
Auger-LMX	2.83E−01	6.896E−03*	1.95E−03
Auger-LXY	4.77E−02	8.097E−03*	3.86E−04
Auger-MXY	1.60E+00	1.573E−03*	2.52E−03

Listed X, γ and $\gamma^\pm$ radiations 9.03E−01

Omitted X, γ and $\gamma^{\pm}$ radiations**	6.14E−02
Listed β, ce and Auger radiations	7.16E−02
Omitted β, ce and Auger radiations**	5.83E−03
Listed radiations	9.74E−01
Omitted radiations**	6.73E−02

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Ho-159 daughter is radioactive.



68-Er-160

24-JAN-97

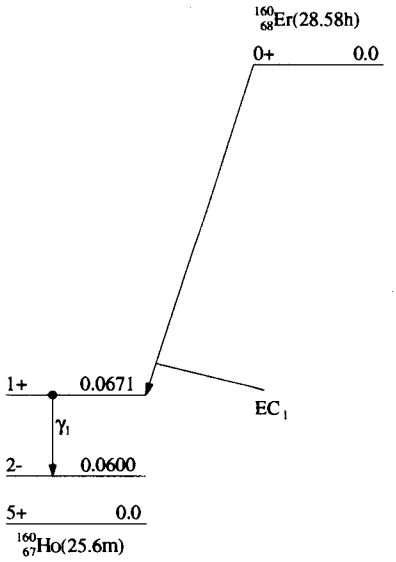
Half-life = 28.58 h
Decay mode(s): EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	4.95E−02	7.133E−03	3.53E−04
ce-M, γ 1	2.83E−01	5.392E−03*	1.53E−03
ce-N$^+$, γ 1	6.67E−01	7.133E−03*	4.76E−03
K_{α_1} X-ray	3.71E−01	4.755E−02	1.76E−02
K_{α_2} X-ray	2.09E−01	4.670E−02	9.74E−03
K_{β_1} X-ray	7.42E−02	5.388E−02	4.00E−03
K_{β_2} X-ray	3.28E−02	5.533E−02	1.82E−03
K_{β_3} X-ray	3.84E−02	5.369E−02	2.06E−03
K_{β_5} X-ray	1.35E−03	5.425E−02	7.33E−05
L_α X-ray	7.12E−02	6.716E−03*	4.78E−04
L_β X-ray	7.40E−02	7.608E−03*	5.63E−04
L_γ X-ray	1.26E−02	8.879E−03*	1.12E−04
Auger-KLL	2.94E−02	3.797E−02*	1.11E−03
Auger-KLX	1.23E−02	4.494E−02*	5.53E−04
Auger-KXY	2.27E−03	5.208E−02*	1.18E−04
Auger-LMM	3.87E−01	5.365E−03*	2.08E−03
Auger-LMX	2.37E−01	6.923E−03*	1.64E−03
Auger-LXY	3.99E−02	8.122E−03*	3.24E−04
Auger-MXY	1.60E+00	1.603E−03*	2.57E−03
ΔE	9.83E−01	2.732E−04*	2.68E−04

Listed X, γ and $\gamma^\pm$ radiations	3.68E−02
Omitted X, γ and $\gamma^\pm$ radiations**	2.39E−05
Listed β, ce and Auger radiations	1.50E−02
Listed radiations	5.18E−02
Omitted radiations**	2.39E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ho-160m daughter is radioactive.



68-Er-163

21-JAN-97

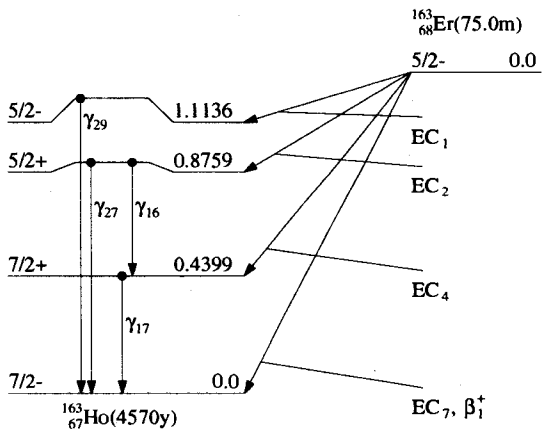
Half-life = 75 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 16	2.85E−04	4.361E−01	1.24E−04
γ 17	2.76E−04	4.399E−01	1.21E−04
γ 27	6.90E−05	8.758E−01	6.04E−05
γ 29	4.90E−04	1.113E+00	5.46E−04
K_{α_1} X-ray	3.98E−01	4.755E−02	1.89E−02
K_{α_2} X-ray	2.24E−01	4.670E−02	1.04E−02
K_{β_1} X-ray	7.96E−02	5.388E−02	4.29E−03
K_{β_2} X-ray	3.52E−02	5.533E−02	1.95E−03
K_{β_3} X-ray	4.12E−02	5.369E−02	2.21E−03
K_{β_5} X-ray	1.45E−03	5.425E−02	7.86E−05
L_α X-ray	7.38E−02	6.716E−03*	4.96E−04
L_β X-ray	7.24E−02	7.610E−03*	5.51E−04
L_γ X-ray	1.19E−02	8.861E−03*	1.05E−04
Auger-KLL	3.15E−02	3.797E−02*	1.20E−03
Auger-KLX	1.32E−02	4.494E−02*	5.93E−04
Auger-KXY	2.44E−03	5.208E−02*	1.27E−04
Auger-LMM	3.91E−01	5.342E−03*	2.09E−03
Auger-LMX	2.39E−01	6.897E−03*	1.65E−03
Auger-LXY	4.02E−02	8.097E−03*	3.26E−04
Auger-MXY	1.33E+00	1.575E−03*	2.09E−03
ΔE	3.14E−01	2.009E−04*	6.31E−05

Listed X, γ and $\gamma^\pm$ radiations	3.99E−02
Omitted X, γ and $\gamma^\pm$ radiations**	1.80E−04
Listed β, ce and Auger radiations	8.13E−03
Omitted β, ce and Auger radiations**	2.60E−05
Listed radiations	4.80E−02
Omitted radiations**	2.06E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ho-163 daughter is radioactive.



69-Tm-163

21-JAN-97

Half-life = 1.81 h
Decay mode(s): EC, β^+

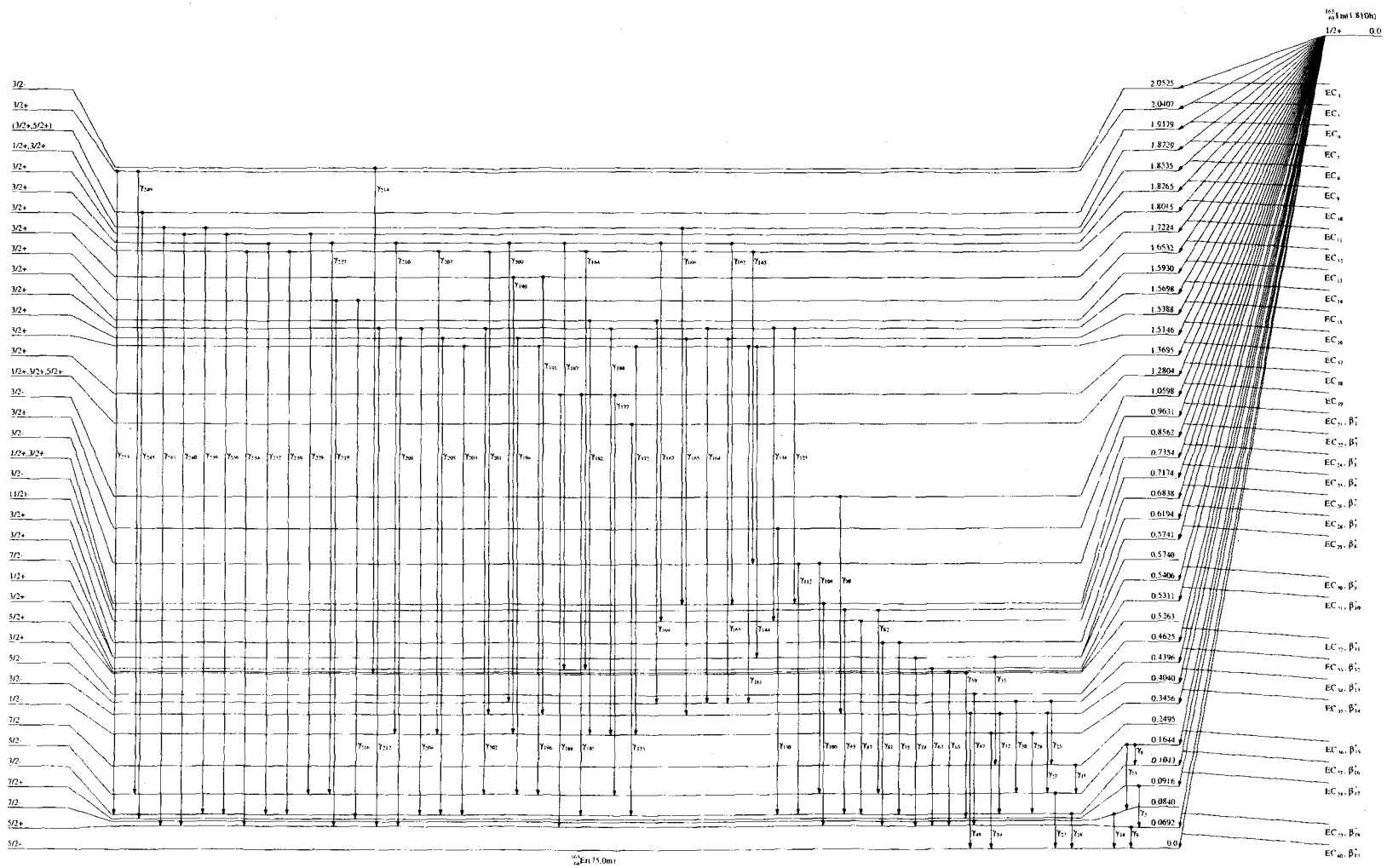
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 9	6.42E−04	4.059E−01*	2.61E−04
β^+ 11	4.79E−04	4.402E−01*	2.11E−04
β^+ 13	6.01E−04	4.659E−01*	2.80E−04
β^+ 14	1.83E−03	4.916E−01*	9.02E−04
β^+ 15	3.06E−04	5.854E−01*	1.79E−04
β^+ 16	6.01E−04	5.979E−01*	3.59E−04
β^+ 18	4.08E−04	6.264E−01*	2.55E−04
β^+ 19	4.08E−04	6.563E−01*	2.68E−04
$\gamma^\pm$	1.26E−02	5.110E−01	6.46E−03
ce-K, γ 8	1.48E−01	2.620E−03	3.89E−04
ce-L_1, γ 8	2.02E−02	5.035E−02	1.02E−03
ce-L_2, γ 8	6.88E−03	5.084E−02	3.50E−04
ce-L_3, γ 8	5.89E−03	5.175E−02	3.05E−04
ce-M, γ 8	7.53E−03	5.829E−02*	4.39E−04
γ 9	1.16E−01	6.923E−02	8.03E−03
ce-K, γ 9	8.22E−02	1.174E−02	9.65E−04
ce-L_1, γ 9	8.11E−03	5.948E−02	4.82E−04
ce-L_2, γ 9	2.65E−03	5.996E−02	1.59E−04
ce-L_3, γ 9	3.31E−03	6.087E−02	2.02E−04
ce-M, γ 9	3.11E−03	6.742E−02*	2.10E−04
ce-K, γ 13	2.38E−02	2.297E−02	5.46E−04
ce-L_1, γ 13	3.24E−03	7.071E−02	2.29E−04
ce-K, γ 14	1.71E−02	2.648E−02	4.52E−04
ce-L_1, γ 14	1.96E−03	7.422E−02	1.45E−04
ce-L_2, γ 14	8.38E−03	7.470E−02	6.26E−04
ce-L_3, γ 14	8.46E−03	7.561E−02	6.40E−04
ce-M, γ 14	4.53E−03	8.216E−02*	3.73E−04
ce-K, γ 15	1.47E−02	2.763E−02	4.07E−04
ce-L_1, γ 15	2.00E−03	7.537E−02	1.51E−04
γ 18	1.86E−01	1.043E−01	1.94E−02
ce-K, γ 18	4.02E−01	4.683E−02	1.88E−02
ce-L_1, γ 18	5.47E−02	9.457E−02	5.17E−03
ce-L_2, γ 18	5.14E−03	9.506E−02	4.88E−04
ce-M, γ 18	1.35E−02	1.025E−01*	1.38E−03
ce-N^+, γ 18	3.93E−03	1.043E−01*	4.10E−04
ce-K, γ 23	5.33E−03	1.069E−01	5.70E−04
γ 25	1.43E−02	1.900E−01	2.71E−03
ce-K, γ 25	5.59E−03	1.325E−01	7.40E−04
γ 27	4.41E−02	2.396E−01	1.06E−02
ce-K, γ 27	9.05E−03	1.821E−01	1.65E−03
ce-L_1, γ 27	1.22E−03	2.298E−01	2.82E−04
γ 28	1.09E−01	2.413E−01	2.62E−02
ce-K, γ 28	2.24E−02	1.839E−01	4.11E−03
ce-L_1, γ 28	3.04E−03	2.316E−01	7.04E−04
ce-M, γ 28	7.32E−04	2.395E−01*	1.75E−04
γ 30	2.68E−02	2.751E−01	7.37E−03
ce-K, γ 30	3.76E−03	2.176E−01	8.19E−04
γ 32	4.56E−02	2.997E−01	1.37E−02
ce-K, γ 32	5.10E−03	2.422E−01	1.24E−03
ce-L_1, γ 32	6.89E−04	2.899E−01	2.00E−04
γ 39	1.10E−02	3.456E−01	3.79E−03
γ 47	1.37E−02	3.933E−01	5.39E−03
ce-K, γ 47	6.98E−04	3.358E−01	2.34E−04
γ 49	1.05E−02	4.040E−01	4.25E−03
ce-K, γ 49	5.64E−04	3.465E−01	1.95E−04
γ 65	6.21E−03	4.618E−01	2.87E−03
γ 67	4.05E−02	4.713E−01	1.91E−02
ce-K, γ 67	6.17E−04	4.138E−01	2.55E−04
γ 74	1.17E−02	5.049E−01	5.92E−03
γ 75	8.37E−03	5.150E−01	4.31E−03
γ 81	1.54E−02	5.502E−01	8.45E−03
ce-K, γ 81	3.48E−04	4.927E−01	1.71E−04
γ 82	6.86E−03	5.529E−01	3.80E−03
γ 87	1.59E−02	5.795E−01	9.19E−03
ce-K, γ 87	2.90E−04	5.220E−01	1.51E−04
γ 93	6.70E−03	6.131E−01	4.11E−03
γ 98	7.90E−03	6.558E−01	5.18E−03
γ 100	2.05E−02	6.662E−01	1.37E−02
γ 102	4.95E−03	6.839E−01	3.38E−03
γ 104	6.01E−03	6.917E−01	4.16E−03
γ 112	3.74E−03	7.520E−01	2.81E−03
γ 115	6.58E−03	7.799E−01	5.14E−03
γ 116	3.78E−03	7.819E−01	2.95E−03
γ 125	5.12E−03	8.340E−01	4.27E−03
γ 130	3.57E−03	8.587E−01	3.07E−03
γ 134	3.72E−03	8.861E−01	3.30E−03
γ 144	5.06E−03	9.406E−01	4.76E−03
γ 145	8.69E−03	9.453E−01	8.21E−03
γ 148	3.72E−03	9.752E−01	3.63E−03
γ 161	7.96E−03	1.075E+00	8.56E−03
γ 162	3.31E−03	1.091E+00	3.61E−03
γ 163	5.25E−03	1.099E+00	5.77E−03
γ 164	2.29E−02	1.130E+00	2.59E−02
γ 165	3.37E−03	1.135E+00	3.82E−03
γ 166	3.74E−03	1.137E+00	4.25E−03
γ 167	8.05E−03	1.143E+00	9.20E−03
γ 169	1.05E−02	1.153E+00	1.21E−02
γ 172	4.30E−03	1.169E+00	5.02E−03
γ 173	4.84E−03	1.176E+00	5.69E−03
γ 177	2.44E−02	1.205E+00	2.94E−02
γ 180	2.08E−02	1.224E+00	2.55E−02
γ 182	9.06E−03	1.247E+00	1.13E−02
γ 184	2.42E−03	1.261E+00	3.05E−03
γ 185	5.17E−02	1.265E+00	6.54E−02
γ 187	3.35E−03	1.286E+00	4.30E−03
γ 188	5.17E−03	1.300E+00	6.72E−03
γ 191	1.54E−02	1.318E+00	2.03E−02
γ 196	4.26E−03	1.350E+00	5.75E−03
γ 198	4.28E−02	1.374E+00	5.88E−02
γ 199	3.40E−03	1.377E+00	4.69E−03
γ 200	1.08E−02	1.387E+00	1.50E−02
γ 201	7.03E−02	1.398E+00	9.83E−02
γ 202	7.64E−03	1.405E+00	1.07E−02
γ 203	4.59E−03	1.410E+00	6.48E−03
γ 205	7.96E−02	1.434E+00	1.14E−01
γ 207	3.63E−02	1.456E+00	5.28E−02
γ 208	1.92E−02	1.466E+00	2.81E−02
γ 209	2.90E−02	1.469E+00	4.26E−02
γ 210	6.19E−03	1.481E+00	9.17E−03
γ 212	3.72E−03	1.501E+00	5.58E−03
γ 214	7.51E−03	1.526E+00	1.15E−02
γ 216	2.06E−03	1.562E+00	3.22E−03
γ 219	3.96E−03	1.584E+00	6.28E−03
γ 227	9.95E−03	1.662E+00	1.65E−02
γ 229	3.68E−03	1.689E+00	6.22E−03
γ 230	4.84E−03	1.697E+00	8.21E−03
γ 232	5.21E−03	1.722E+00	8.97E−03
γ 234	1.62E−03	1.733E+00	2.80E−03
γ 236	1.03E−02	1.749E+00	1.80E−02
γ 239	1.84E−03	1.768E+00	3.25E−03
γ 240	3.78E−03	1.784E+00	6.74E−03
γ 241	1.54E−03	1.790E+00	2.76E−03
γ 242	1.88E−03	1.793E+00	3.37E−03
γ 243	1.29E−02	1.804E+00	2.33E−02
γ 245	1.95E−03	1.825E+00	3.56E−03
γ 249	2.23E−03	1.876E+00	4.19E−03
γ 253	3.65E−03	1.936E+00	7.06E−03
K_{α_1} X-ray	7.56E−01	4.913E−02	3.71E−02
K_{α_2} X-ray	4.26E−01	4.822E−02	2.06E−02
K_{β_1} X-ray	1.53E−01	5.567E−02	8.50E−03
K_{β_2} X-ray	6.65E−02	5.719E−02	3.80E−03
K_{β_3} X-ray	7.94E−02	5.548E−02	4.40E−03
Auger-KLL	5.40E−02	3.917E−02*	2.11E−03

Auger-KLX	2.82E−02	4.656E−02*	1.31E−03
Auger-KXY	4.23E−03	5.381E−02*	2.28E−04
Auger-LMM	7.61E−01	5.520E−03*	4.20E−03
Auger-LMX	4.66E−01	7.142E−03*	3.33E−03
Auger-LXY	7.81E−02	8.374E−03*	6.54E−04
Auger-MXY	2.61E+00	1.642E−03*	4.29E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.14E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.77E−01
Listed β, ce and Auger radiations	6.47E−02
Omitted β, ce and Auger radiations**	7.00E−03
Listed radiations	1.21E+00
Omitted radiations**	1.84E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Er-163 daughter is radioactive.


163 69 Tm(1.810h)
1/2+ 0.0
2.0525
2.0407
1.9179
1.8739
1.8535
1.8265
1.8015
1.7224
1.6532
1.5930
1.5698
1.5388
1.5146
1.3695
1.2804
1.0598
0.9631
0.8562
0.7354
0.7174
0.6838
0.6194
0.5741
0.5740
0.5406
0.5331
0.5263
0.4625
0.4396
0.4040
0.3456
0.2495
0.1644
0.1043
0.0916
0.0840
0.0692
0.0
3/2-
3/2+
(3/2+,5/2+)
1/2+,3/2+
3/2+
3/2+
3/2+
3/2+
3/2+
3/2+
3/2+
3/2+
3/2+
3/2+
1/2+,3/2+,5/2+
3/2-
3/2+
3/2-
1/2+,3/2+
3/2-
(1/2)-
3/2+
3/2+
7/2-
1/2+
3/2+
5/2+
3/2+
5/2-
3/2-
1/2-
7/2
5/2-
3/2-
7/2+
7/2-
5/2+
5/2-
163 68 Er(75.0m)

69-Tm-164

16-MAR-92

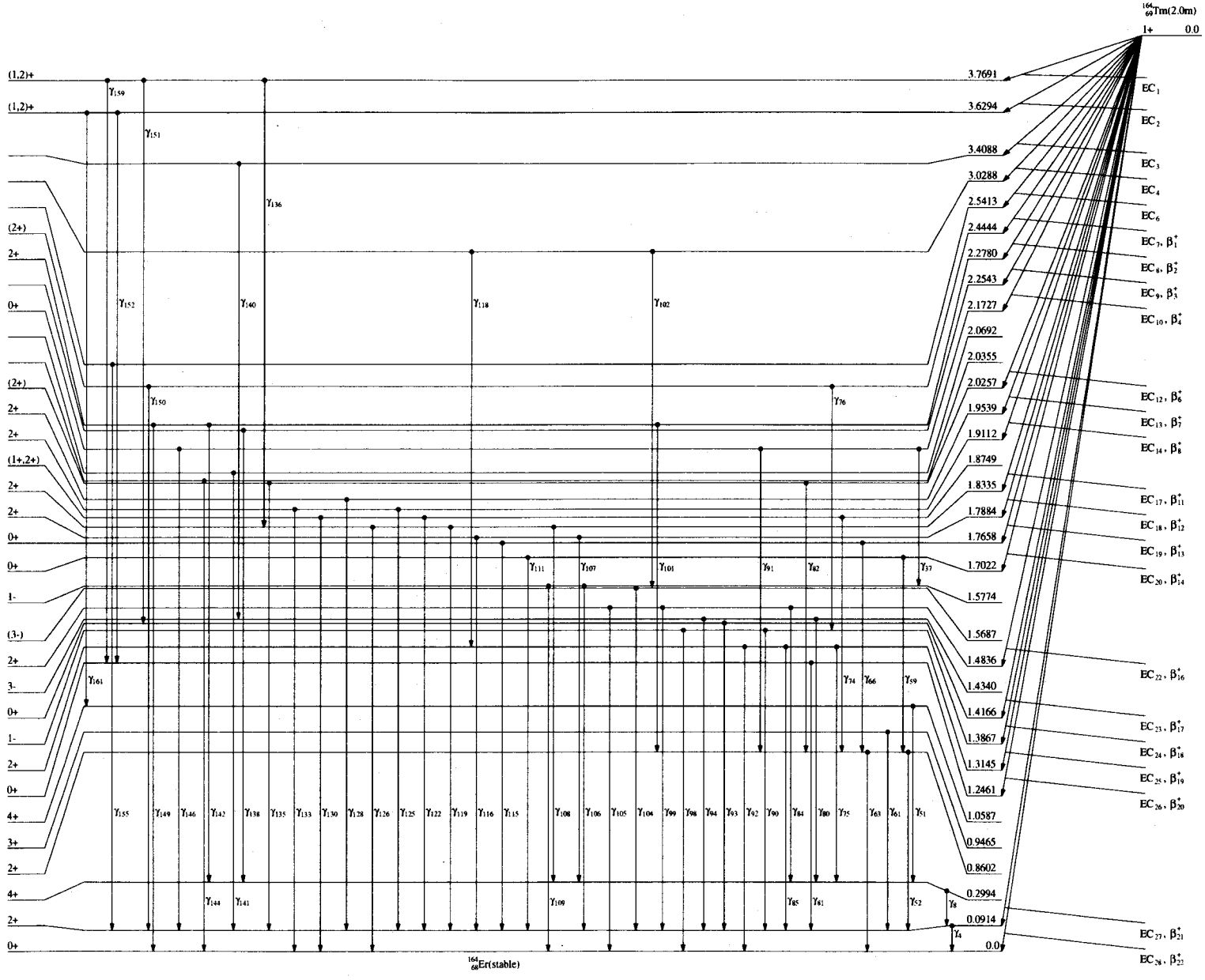
Half-life = 2 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 18	8.42E−04	7.049E−01*	5.94E−04
β^+ 19	1.17E−03	7.370E−01*	8.60E−04
β^+ 20	1.59E−03	7.675E−01*	1.22E−03
β^+ 21	1.02E−01	1.289E+00*	1.32E−01
β^+ 22	2.95E−01	1.331E+00*	3.93E−01
$\gamma^\pm$	8.10E−01	5.110E−01	4.14E−01
γ 4	6.70E−02	9.141E−02	6.12E−03
ce-K, γ 4	8.95E−02	3.392E−02	3.04E−03
ce-L_1, γ 4	8.29E−03	8.166E−02	6.77E−04
ce-L_2, γ 4	6.90E−02	8.215E−02	5.67E−03
ce-L_3, γ 4	6.90E−02	8.305E−02	5.73E−03
ce-M, γ 4	3.55E−02	8.960E−02*	3.18E−03
ce-N^+, γ 4	9.79E−03	9.141E−02*	8.95E−04
γ 8	1.14E−02	2.080E−01	2.37E−03
γ 37	3.95E−03	5.953E−01	2.35E−03
γ 52	1.25E−02	7.689E−01	9.63E−03
γ 59	3.75E−03	8.421E−01	3.16E−03
γ 61	2.95E−03	8.551E−01	2.52E−03
γ 63	1.11E−02	8.603E−01	9.57E−03
γ 66	3.42E−03	9.057E−01	3.09E−03
γ 74	1.54E−03	1.015E+00	1.56E−03
γ 75	1.54E−03	1.015E+00	1.56E−03
γ 76	4.69E−03	1.058E+00	4.96E−03
γ 80	9.38E−04	1.135E+00	1.06E−03
γ 81	1.64E−02	1.155E+00	1.90E−02
γ 82	7.37E−03	1.165E+00	8.59E−03
γ 84	1.74E−03	1.184E+00	2.06E−03
γ 85	5.90E−03	1.223E+00	7.21E−03
γ 90	9.45E−03	1.295E+00	1.22E−02
γ 91	2.81E−03	1.312E+00	3.69E−03
γ 92	3.62E−03	1.314E+00	4.76E−03
γ 93	7.84E−03	1.325E+00	1.04E−02
γ 94	1.34E−03	1.343E+00	1.80E−03
γ 96	6.70E−04	1.362E+00	9.12E−04
γ 98	6.16E−03	1.387E+00	8.55E−03
γ 99	1.47E−03	1.392E+00	2.05E−03
γ 101	1.67E−03	1.418E+00	2.37E−03
γ 102	1.07E−03	1.460E+00	1.57E−03
γ 104	5.36E−04	1.477E+00	7.92E−04
γ 105	1.14E−03	1.483E+00	1.69E−03
γ 106	3.89E−03	1.486E+00	5.78E−03
γ 107	4.49E−03	1.489E+00	6.68E−03
γ 108	1.27E−03	1.534E+00	1.95E−03
γ 109	1.21E−03	1.578E+00	1.90E−03
γ 111	1.01E−02	1.611E+00	1.63E−02
γ 112	6.03E−04	1.624E+00	9.79E−04
γ 115	1.07E−02	1.674E+00	1.78E−02
γ 116	2.48E−03	1.697E+00	4.21E−03
γ 118	4.69E−04	1.714E+00	8.04E−04
γ 119	2.28E−03	1.742E+00	3.97E−03
γ 122	6.70E−04	1.783E+00	1.19E−03
γ 125	4.09E−03	1.820E+00	7.44E−03
γ 126	1.14E−03	1.833E+00	2.09E−03
γ 128	5.02E−03	1.862E+00	9.36E−03
γ 130	5.36E−04	1.873E+00	1.00E−03
γ 133	5.02E−04	1.911E+00	9.60E−04
γ 134	4.02E−04	1.933E+00	7.77E−04
γ 135	1.54E−03	1.936E+00	2.98E−03
γ 136	1.54E−03	1.936E+00	2.98E−03
γ 138	6.70E−04	1.955E+00	1.31E−03
γ 140	4.02E−04	1.974E+00	7.94E−04
γ 141	1.00E−03	1.978E+00	1.99E−03
γ 142	1.00E−03	1.978E+00	1.99E−03
γ 143	8.71E−04	2.023E+00	1.76E−03
γ 144	7.37E−04	2.036E+00	1.50E−03
γ 146	6.70E−03	2.081E+00	1.39E−02
γ 149	8.04E−04	2.278E+00	1.83E−03
γ 150	1.07E−03	2.353E+00	2.52E−03
γ 151	1.07E−03	2.353E+00	2.52E−03
γ 152	3.75E−03	2.383E+00	8.94E−03
γ 154	4.69E−04	2.421E+00	1.14E−03
γ 155	6.03E−04	2.449E+00	1.48E−03
γ 156	1.27E−03	2.484E+00	3.16E−03
γ 157	6.03E−04	2.489E+00	1.50E−03
γ 159	6.03E−04	2.522E+00	1.52E−03
γ 161	3.35E−04	2.570E+00	8.61E−04
γ 163	3.35E−04	3.003E+00	1.01E−03
K_{α_1} X-ray	2.83E−01	4.913E−02	1.39E−02
K_{α_2} X-ray	1.60E−01	4.822E−02	7.71E−03
K_{β_1} X-ray	5.73E−02	5.567E−02	3.19E−03
K_{β_2} X-ray	2.49E−02	5.719E−02	1.43E−03
K_{β_3} X-ray	2.98E−02	5.548E−02	1.65E−03
Auger-KLL	2.02E−02	3.917E−02*	7.93E−04
Auger-LMM	3.35E−01	5.517E−03*	1.85E−03
Auger-LMX	2.05E−01	7.136E−03*	1.46E−03
Auger-MXY	1.15E+00	1.633E−03*	1.88E−03

Listed X, γ and $\gamma^\pm$ radiations	7.16E−01
Omitted X, γ and $\gamma^\pm$ radiations**	2.96E−02
Listed β, ce and Auger radiations	5.53E−01
Omitted β, ce and Auger radiations**	5.93E−03
Listed radiations	1.27E+00
Omitted radiations**	3.55E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Er-164 daughter is stable.


$^{164}_{69}$Tm(2.0m)
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3.6294
3.4088
3.0288
2.5413
2.4444
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2.2543
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1.4836
1.4340
1.4166
1.3867
1.3145
1.2461
1.0587
0.9465
0.8602
0.2994
0.0914
0.0
(1,2)+
(1,2)+
(2+)
2+
0+
(2+)
2+
2+
(1+,2+)
2+
2+
0+
0+
1-
(3-)
2+
3-
0+
1-
2+
0+
4+
3+
2+
4+
2+
0+
$^{164}_{68}$Er(stable)
EC_1
EC_2
EC_3
EC_4
EC_6
EC_7, β^+_1
EC_8, β^+_2
EC_9, β^+_3
EC_{10}, β^+_4
EC_{12}, β^+_6
EC_{13}, β^+_7
EC_{14}, β^+_8
EC_{17}, β^+_{11}
EC_{18}, β^+_{12}
EC_{19}, β^+_{13}
EC_{20}, β^+_{14}
EC_{22}, β^+_{16}
EC_{23}, β^+_{17}
EC_{24}, β^+_{18}
EC_{25}, β^+_{19}
EC_{26}, β^+_{20}
EC_{27}, β^+_{21}
EC_{28}, β^+_{22}
γ_{159} γ_{151} γ_{136} γ_{152} γ_{140} γ_{118} γ_{102} γ_{150} γ_{76} γ_{111} γ_{107} γ_{101} γ_{91} γ_{82} γ_{37} γ_{161} γ_{74} γ_{66} γ_{59}
γ_{155} γ_{149} γ_{146} γ_{142} γ_{138} γ_{135} γ_{133} γ_{130} γ_{128} γ_{126} γ_{125} γ_{122} γ_{119} γ_{116} γ_{115} γ_{108} γ_{106} γ_{105} γ_{104} γ_{99} γ_{98} γ_{94} γ_{93} γ_{92} γ_{90} γ_{84} γ_{80} γ_{75} γ_{63} γ_{61} γ_{51}
γ_{144} γ_{141} γ_{109} γ_{85} γ_{61} γ_{52} γ_8 γ_4

69-Tm-165

16-MAR-92

Half-life = 30.06 h
Decay mode(s): EC, β^+

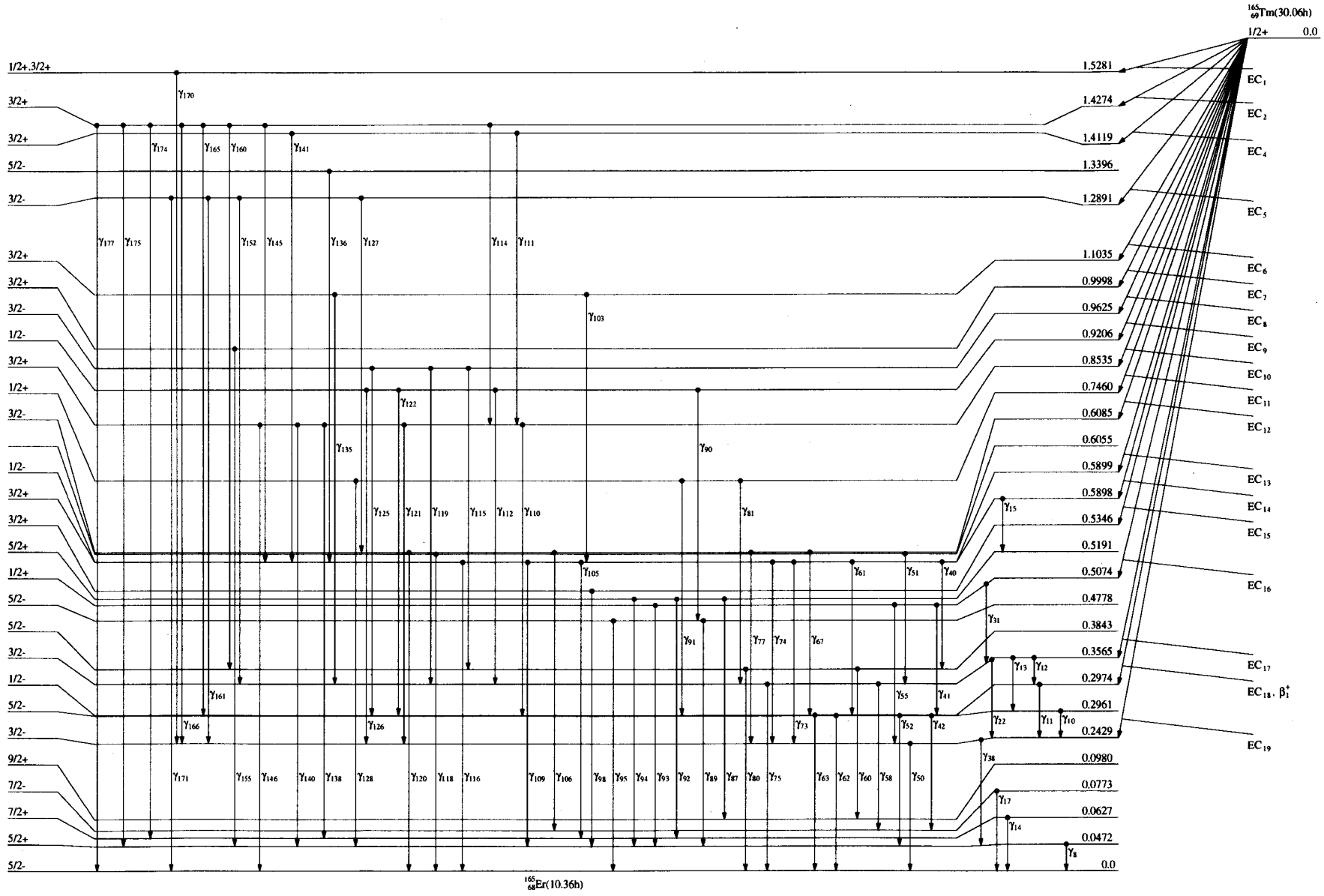
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 8	1.69E−01	4.716E−02	7.95E−03
ce-L$_1$, γ 8	4.00E−02	3.740E−02	1.50E−03
ce-L$_2$, γ 8	1.27E−02	3.789E−02	4.80E−04
ce-L$_3$, γ 8	2.04E−02	3.880E−02	7.90E−04
ce-M, γ 8	1.67E−02	4.534E−02*	7.58E−04
ce-N$^+$, γ 8	4.70E−03	4.716E−02*	2.22E−04
ce-L$_1$, γ 10	1.15E−02	4.343E−02	5.01E−04
ce-L$_2$, γ 10	3.48E−03	4.392E−02	1.53E−04
ce-L$_3$, γ 10	2.94E−03	4.482E−02	1.32E−04
ce-M, γ 10	4.08E−03	5.137E−02*	2.10E−04
γ 11	7.21E−02	5.441E−02	3.92E−03
ce-L$_1$, γ 11	1.40E−01	4.466E−02	6.26E−03
ce-L$_2$, γ 11	1.66E−02	4.515E−02	7.52E−04
ce-L$_3$, γ 11	6.44E−03	4.606E−02	2.97E−04
ce-M, γ 11	3.63E−02	5.260E−02*	1.91E−03
ce-N$^+$, γ 11	1.04E−02	5.441E−02*	5.66E−04
ce-L$_2$, γ 12	1.84E−03	4.986E−02	9.16E−05
ce-L$_3$, γ 12	2.00E−03	5.077E−02	1.01E−04
ce-K, γ 13	7.47E−02	2.914E−03	2.18E−04
ce-L$_1$, γ 13	1.02E−02	5.065E−02	5.15E−04
ce-M, γ 13	2.54E−03	5.859E−02*	1.49E−04
ce-K, γ 15	1.41E−02	1.312E−02	1.85E−04
ce-L$_1$, γ 15	1.92E−03	6.086E−02	1.17E−04
γ 17	7.28E−03	7.725E−02	5.62E−04
ce-K, γ 17	1.81E−02	1.977E−02	3.57E−04
ce-L$_1$, γ 17	2.04E−03	6.750E−02	1.38E−04
ce-L$_2$, γ 17	1.34E−02	6.799E−02	9.08E−04
ce-L$_3$, γ 17	1.38E−02	6.890E−02	9.51E−04
ce-M, γ 17	7.05E−03	7.544E−02*	5.32E−04
ce-N$^+$, γ 17	1.93E−03	7.725E−02*	1.49E−04
γ 22	1.56E−02	1.136E−01	1.77E−03
ce-K, γ 22	2.64E−02	5.611E−02	1.48E−03
ce-L$_1$, γ 22	3.59E−03	1.038E−01	3.72E−04
ce-M, γ 22	8.93E−04	1.118E−01*	9.98E−05
γ 31	5.64E−03	1.509E−01	8.52E−04
γ 38	5.75E−03	1.958E−01	1.13E−03
γ 40	4.27E−03	2.054E−01	8.77E−04
γ 41	8.38E−03	2.101E−01	1.76E−03
γ 42	3.34E−02	2.189E−01	7.30E−03
ce-K, γ 42	8.71E−03	1.614E−01	1.41E−03
ce-L$_1$, γ 42	1.18E−03	2.091E−01	2.47E−04
ce-M, γ 42	2.99E−04	2.170E−01*	6.50E−05
γ 50	3.55E−01	2.429E−01	8.62E−02
ce-K, γ 50	7.18E−02	1.854E−01	1.33E−02
ce-L$_1$, γ 50	9.76E−03	2.332E−01	2.27E−03
ce-L$_2$, γ 50	7.76E−04	2.337E−01	1.81E−04
ce-M, γ 50	2.35E−03	2.411E−01*	5.66E−04
ce-N$^+$, γ 50	6.67E−04	2.429E−01*	1.62E−04
γ 51	7.99E−03	2.490E−01	1.99E−03
γ 52	7.99E−03	2.490E−01	1.99E−03
γ 55	5.54E−03	2.645E−01	1.46E−03
γ 56	2.13E−03	2.757E−01	5.87E−04
γ 58	6.00E−03	2.793E−01	1.68E−03
ce-K, γ 58	3.73E−04	2.218E−01	8.28E−05
γ 60	3.34E−03	2.863E−01	9.55E−04
ce-K, γ 60	1.75E−03	2.288E−01	4.01E−04
ce-L$_1$, γ 60	2.84E−04	2.765E−01	7.87E−05
γ 61	1.27E−02	2.924E−01	3.72E−03
ce-K, γ 61	1.56E−03	2.349E−01	3.66E−04
γ 62	3.88E−02	2.961E−01	1.15E−02
ce-K, γ 62	4.32E−03	2.386E−01	1.03E−03
ce-L$_1$, γ 62	5.80E−04	2.864E−01	1.66E−04
γ 63	1.27E−01	2.974E−01	3.78E−02
ce-K, γ 63	6.62E−03	2.399E−01	1.59E−03
ce-L$_1$, γ 63	7.68E−04	2.876E−01	2.21E−04
ce-L$_2$, γ 63	6.81E−04	2.881E−01	1.96E−04
ce-L$_3$, γ 63	4.40E−04	2.890E−01	1.27E−04
ce-M, γ 63	4.41E−04	2.956E−01*	1.30E−04
γ 67	4.65E−03	3.123E−01	1.45E−03
ce-K, γ 67	4.79E−04	2.548E−01	1.22E−04
γ 73	2.20E−03	3.468E−01	7.63E−04
γ 74	2.88E−02	3.469E−01	9.98E−03
ce-K, γ 74	2.23E−03	2.894E−01	6.45E−04
ce-L$_1$, γ 74	3.01E−04	3.372E−01	1.01E−04
γ 75	2.75E−02	3.565E−01	9.81E−03
ce-K, γ 75	1.53E−03	2.990E−01	4.58E−04
ce-L$_1$, γ 75	2.01E−04	3.468E−01	6.97E−05
γ 77	4.90E−03	3.656E−01	1.79E−03
ce-K, γ 77	3.32E−04	3.081E−01	1.02E−04
γ 80	1.53E−03	3.846E−01	5.87E−04
γ 81	2.82E−02	3.894E−01	1.10E−02
ce-K, γ 81	2.36E−04	3.319E−01	7.82E−05
γ 87	3.27E−03	4.212E−01	1.38E−03
γ 89	2.80E−03	4.306E−01	1.21E−03
γ 90	7.31E−03	4.430E−01	3.24E−03
γ 91	1.63E−02	4.486E−01	7.31E−03
γ 92	1.25E−02	4.565E−01	5.70E−03
ce-K, γ 92	4.76E−04	3.990E−01	1.90E−04
γ 93	4.12E−02	4.603E−01	1.90E−02
ce-K, γ 93	6.65E−04	4.028E−01	2.68E−04
γ 94	3.53E−03	4.720E−01	1.67E−03
γ 95	4.01E−03	4.778E−01	1.92E−03
γ 98	1.04E−02	4.874E−01	5.09E−03
ce-K, γ 98	3.35E−04	4.299E−01	1.44E−04
γ 103	2.41E−03	5.137E−01	1.24E−03
γ 105	9.44E−03	5.271E−01	4.98E−03
γ 106	1.32E−03	5.312E−01	7.02E−04
γ 109	1.43E−02	5.426E−01	7.78E−03
ce-K, γ 109	3.50E−04	4.851E−01	1.70E−04
γ 110	1.85E−03	5.574E−01	1.03E−03
γ 111	3.16E−03	5.587E−01	1.77E−03
γ 112	2.31E−02	5.642E−01	1.30E−02
ce-K, γ 112	5.09E−04	5.067E−01	2.58E−04
γ 114	3.44E−03	5.739E−01	1.98E−03
γ 115	1.66E−03	5.780E−01	9.58E−04
γ 116	1.82E−02	5.899E−01	1.07E−02
ce-K, γ 116	1.61E−04	5.324E−01	8.57E−05
γ 118	1.62E−03	6.059E−01	9.79E−04
γ 119	1.62E−03	6.059E−01	9.79E−04
γ 120	4.51E−03	6.085E−01	2.74E−03
γ 121	4.79E−03	6.106E−01	2.93E−03
γ 122	1.95E−03	6.234E−01	1.21E−03
γ 125	3.77E−03	6.651E−01	2.51E−03
γ 126	1.48E−03	6.778E−01	1.00E−03
γ 127	9.16E−04	6.806E−01	6.23E−04
γ 128	1.29E−02	6.988E−01	8.98E−03
γ 135	1.78E−03	7.470E−01	1.33E−03
γ 136	7.53E−04	7.490E−01	5.64E−04
γ 138	4.58E−03	7.909E−01	3.62E−03
γ 140	9.51E−02	8.064E−01	7.67E−02
ce-K, γ 140	8.61E−04	7.489E−01	6.45E−04
ce-L$_1$, γ 140	1.15E−04	7.966E−01	9.12E−05
γ 141	1.02E−03	8.215E−01	8.37E−04
γ 144	4.86E−03	8.376E−01	4.07E−03
γ 145	4.86E−03	8.376E−01	4.07E−03
γ 146	1.61E−03	8.536E−01	1.38E−03
γ 152	6.89E−04	9.326E−01	6.42E−04
γ 155	1.39E−03	9.527E−01	1.32E−03
γ 160	7.74E−04	1.043E+00	8.07E−04
γ 161	7.70E−04	1.046E+00	8.06E−04
γ 165	1.73E−02	1.131E+00	1.95E−02
γ 166	2.95E−02	1.184E+00	3.49E−02
γ 170	5.47E−04	1.285E+00	7.03E−04

γ 171	1.04E−03	1.289E+00	1.34E−03
γ 174	6.53E−04	1.365E+00	8.91E−04
γ 175	3.87E−03	1.380E+00	5.34E−03
γ 177	8.06E−03	1.427E+00	1.15E−02
K_{α_1} X-ray	5.13E−01	4.913E−02	2.52E−02
K_{α_2} X-ray	2.89E−01	4.822E−02	1.40E−02
K_{β_1} X-ray	1.04E−01	5.567E−02	5.77E−03
K_{β_2} X-ray	4.51E−02	5.719E−02	2.58E−03
K_{β_3} X-ray	5.39E−02	5.548E−02	2.99E−03
L_α X-ray	1.18E−01	6.944E−03*	8.20E−04
L_β X-ray	1.32E−01	7.887E−03*	1.04E−03
Auger-KLL	3.66E−02	3.917E−02*	1.43E−03
Auger-KLX	1.91E−02	4.656E−02*	8.90E−04
Auger-KXY	2.87E−03	5.381E−02*	1.54E−04
Auger-LMM	6.30E−01	5.583E−03*	3.52E−03
Auger-LMX	3.89E−01	7.211E−03*	2.80E−03
Auger-LXY	6.50E−02	8.441E−03*	5.49E−04
Auger-MXY	2.17E+00	1.634E−03*	3.55E−03
ΔE	5.30E−01	2.123E−04*	1.13E−04

Listed X, γ and $\gamma^{\pm}$ radiations	5.45E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.73E−02
Listed β, ce and Auger radiations	5.99E−02
Omitted β, ce and Auger radiations**	3.35E−03
Listed radiations	6.05E−01
Omitted radiations**	2.06E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Er-165 daughter is radioactive.


$^{165}_{69}$Tm(30.06h)
1/2+ 0.0
1/2+,3/2+ 1.5281
3/2+ 1.4274
3/2+ 1.4119
5/2- 1.3396
3/2- 1.2891
3/2+ 1.1035
3/2+ 0.9998
3/2- 0.9625
1/2- 0.9206
3/2+ 0.8535
1/2+ 0.7460
3/2- 0.6085
0.6055
1/2- 0.5899
3/2+ 0.5898
3/2+ 0.5346
5/2+ 0.5191
1/2+ 0.5074
5/2- 0.4778
5/2- 0.3843
3/2- 0.3565
1/2- 0.2974
5/2- 0.2961
3/2- 0.2429
9/2+ 0.0980
7/2- 0.0773
7/2+ 0.0627
5/2+ 0.0472
5/2- 0.0
EC1
EC2
EC4
EC5
EC6
EC7
EC8
EC9
EC10
EC11
EC12
EC13
EC14
EC15
EC16
EC17
EC18, β1+
EC19
$^{165}_{68}$Er(10.36h)

69-Tm-168

08-JUL-94

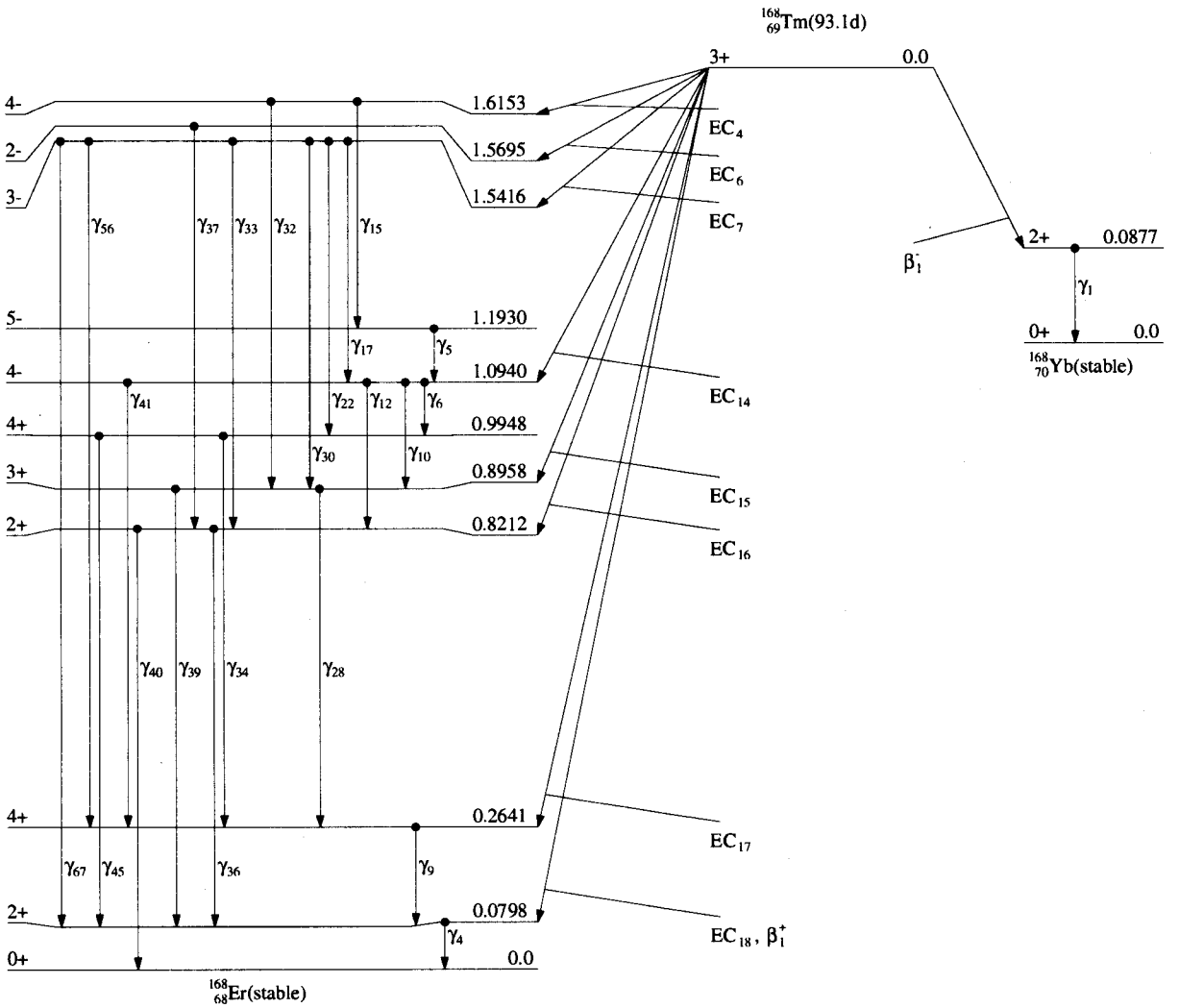
Half-life = 93.1 d
Decay mode(s): EC, β^+, β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 4	1.08E−01	7.980E−02	8.63E−03
ce-K, γ 4	1.87E−01	2.232E−02	4.18E−03
ce-L_1, γ 4	1.77E−02	7.005E−02	1.24E−03
ce-L_2, γ 4	2.11E−01	7.054E−02	1.49E−02
ce-L_3, γ 4	2.18E−01	7.145E−02	1.56E−02
ce-M, γ 4	1.08E−01	7.799E−02*	8.45E−03
ce-N^+, γ 4	2.96E−02	7.980E−02*	2.37E−03
ce-L_2, γ 5	1.07E−03	8.972E−02	9.63E−05
ce-L_3, γ 5	1.05E−03	9.062E−02	9.48E−05
γ 6	4.18E−02	9.929E−02	4.15E−03
ce-K, γ 6	1.46E−02	4.180E−02	6.12E−04
ce-L_1, γ 6	1.86E−03	8.954E−02	1.66E−04
γ 9	1.79E−01	1.843E−01	3.30E−02
ce-K, γ 9	3.71E−02	1.268E−01	4.71E−03
ce-L_1, γ 9	3.90E−03	1.745E−01	6.80E−04
ce-L_2, γ 9	7.61E−03	1.750E−01	1.33E−03
ce-L_3, γ 9	5.96E−03	1.759E−01	1.05E−03
ce-M, γ 9	4.15E−03	1.825E−01*	7.57E−04
ce-N^+, γ 9	1.15E−03	1.843E−01*	2.12E−04
γ 10	5.38E−01	1.983E−01	1.07E−01
ce-K, γ 10	2.42E−02	1.408E−01	3.40E−03
ce-L_1, γ 10	2.73E−03	1.885E−01	5.14E−04
ce-L_3, γ 10	4.45E−04	1.899E−01	8.45E−05
ce-M, γ 10	7.88E−04	1.964E−01*	1.55E−04
ce-K, γ 12	5.62E−04	2.154E−01	1.21E−04
γ 15	3.01E−03	4.223E−01	1.27E−03
γ 17	2.37E−01	4.475E−01	1.06E−01
ce-K, γ 17	9.44E−03	3.900E−01	3.68E−03
ce-L_1, γ 17	1.27E−03	4.378E−01	5.54E−04
ce-M, γ 17	3.02E−04	4.457E−01*	1.35E−04
γ 22	2.62E−02	5.468E−01	1.43E−02
γ 28	9.15E−02	6.317E−01	5.78E−02
ce-K, γ 28	6.98E−04	5.742E−01	4.01E−04
γ 30	1.46E−02	6.458E−01	9.45E−03
γ 32	2.04E−03	7.196E−01	1.47E−03
γ 33	1.20E−01	7.204E−01	8.68E−02
ce-K, γ 33	2.65E−04	6.629E−01	1.76E−04
γ 34	5.21E−02	7.307E−01	3.80E−02
ce-K, γ 34	2.83E−04	6.732E−01	1.91E−04
γ 36	1.26E−01	7.414E−01	9.37E−02
ce-K, γ 36	6.67E−04	6.839E−01	4.56E−04
γ 37	4.20E−03	7.483E−01	3.14E−03
γ 39	5.03E−01	8.160E−01	4.10E−01
ce-K, γ 39	2.19E−03	7.585E−01	1.66E−03
ce-L_1, γ 39	2.79E−04	8.062E−01	2.25E−04
γ 40	1.18E−01	8.212E−01	9.72E−02
ce-K, γ 40	5.00E−04	7.637E−01	3.82E−04
γ 41	6.89E−02	8.299E−01	5.71E−02
ce-K, γ 41	1.18E−04	7.725E−01	9.11E−05
γ 45	3.08E−02	9.149E−01	2.82E−02
ce-K, γ 45	1.04E−04	8.574E−01	8.89E−05
γ 56	1.66E−02	1.277E+00	2.12E−02
γ 67	2.44E−03	1.462E+00	3.57E−03
K_{α_1} X-ray	4.91E−01	4.913E−02	2.41E−02
K_{α_2} X-ray	2.77E−01	4.822E−02	1.33E−02
K_{β_1} X-ray	9.91E−02	5.567E−02	5.52E−03
K_{β_2} X-ray	4.32E−02	5.719E−02	2.47E−03
K_{β_3} X-ray	5.15E−02	5.548E−02	2.86E−03
Auger-KLL	3.50E−02	3.917E−02*	1.37E−03
Auger-KLX	1.83E−02	4.656E−02*	8.52E−04
Auger-KXY	2.75E−03	5.381E−02*	1.48E−04
Auger-LMM	7.10E−01	5.538E−03*	3.93E−03
Auger-LMX	4.35E−01	7.159E−03*	3.11E−03
Auger-LXY	7.29E−02	8.391E−03*	6.12E−04
Auger-MXY	2.46E+00	1.625E−03*	4.00E−03
ΔE	6.03E−01	2.131E−04*	1.28E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.23E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.27E−02
Listed β, ce and Auger radiations	8.29E−02
Omitted β, ce and Auger radiations**	1.55E−03
Listed radiations	1.31E+00
Omitted radiations**	1.42E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Er-168 daughter, yield 9.999E−01, is stable.
Yb-168 daughter, yield 1E−04, is stable.


$^{168}_{69}$Tm(93.1d)
3+
0.0
4-
1.6153
2-
1.5695
3-
1.5416
EC4
EC6
EC7
γ56
γ37
γ33
γ32
γ15
β-1
2+
0.0877
γ1
0+
0.0
$^{168}_{70}$Yb(stable)
5-
1.1930
γ17
γ5
4-
1.0940
γ41
γ22
γ12
γ6
EC14
4+
0.9948
γ30
γ10
3+
0.8958
EC15
2+
0.8212
EC16
γ40
γ39
γ34
γ28
4+
0.2641
EC17
γ67
γ45
γ36
γ9
2+
0.0798
γ4
EC18, β+1
0+
0.0
$^{168}_{68}$Er(stable)

70-Yb-163

21-JAN-97

Half-life = 11.05 m
Decay mode(s): EC, β^+

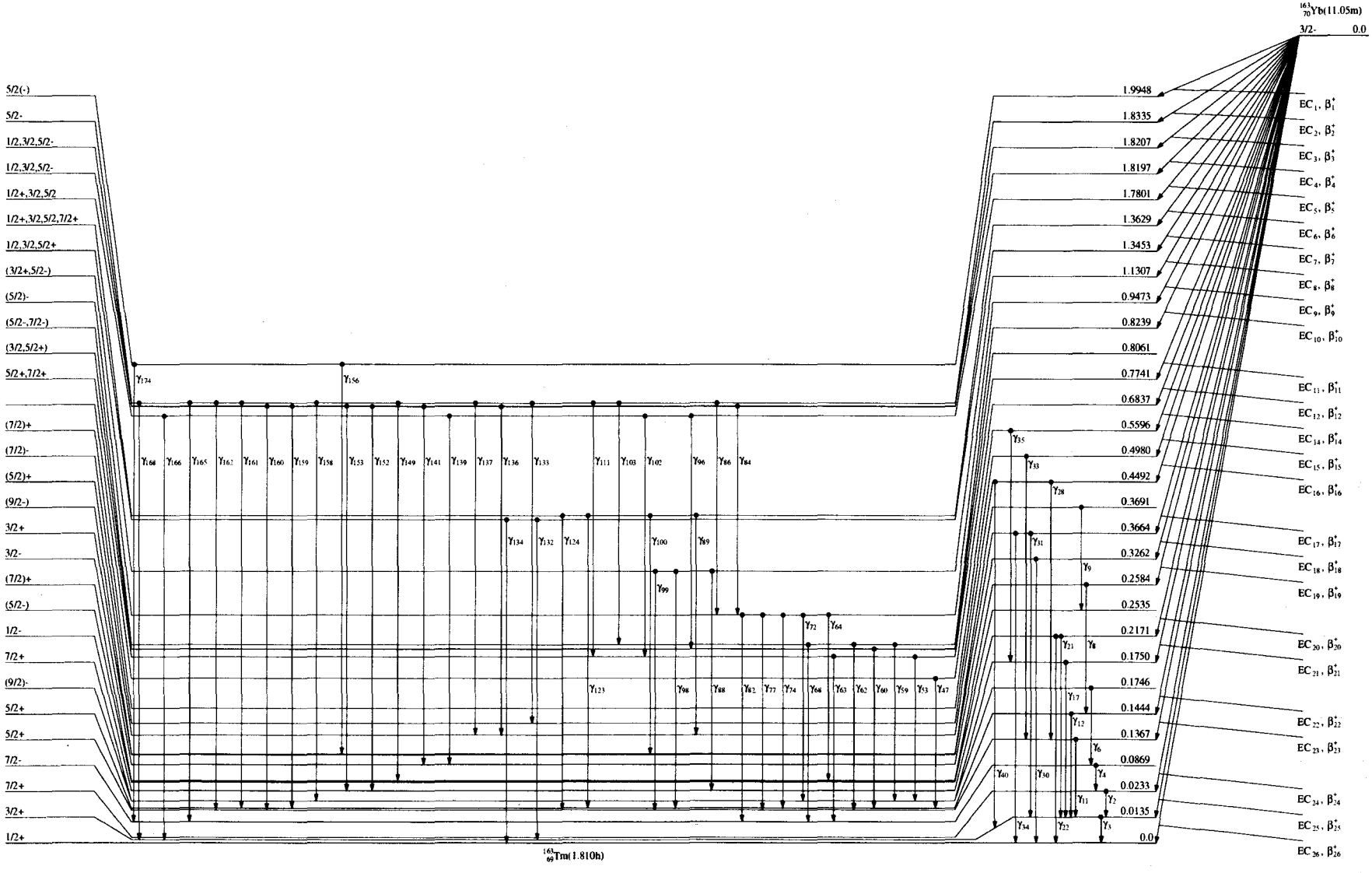
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 9	8.14E−03	6.373E−01*	5.19E−03
β^+ 10	6.53E−04	6.920E−01*	4.52E−04
β^+ 12	5.63E−04	7.542E−01*	4.24E−04
β^+ 15	4.32E−04	8.427E−01*	3.64E−04
β^+ 16	1.81E−03	8.589E−01*	1.55E−03
β^+ 17	2.51E−03	8.960E−01*	2.25E−03
β^+ 18	2.81E−03	9.139E−01*	2.57E−03
β^+ 19	7.33E−04	9.463E−01*	6.94E−04
β^+ 20	2.11E−03	9.629E−01*	2.03E−03
β^+ 21	4.22E−04	9.825E−01*	4.15E−04
β^+ 22	3.82E−03	9.957E−01*	3.80E−03
β^+ 23	3.92E−03	9.991E−01*	3.91E−03
β^+ 25	8.04E−02	1.055E+00*	8.48E−02
β^+ 26	1.10E−01	1.061E+00*	1.17E−01
$\gamma^{\pm}$	4.41E−01	5.110E−01	2.25E−01
ce-N$^+$, γ 2	3.91E−02	9.740E−03*	3.81E−04
ce-L$_1$, γ 3	2.89E−01	3.414E−03	9.88E−04
ce-L$_2$, γ 3	6.86E−02	3.913E−03	2.68E−04
ce-L$_3$, γ 3	6.04E−02	4.882E−03	2.95E−04
ce-M, γ 3	9.41E−02	1.165E−02*	1.10E−03
ce-N$^+$, γ 3	7.13E−02	1.353E−02*	9.65E−04
γ 4	6.46E−02	6.362E−02	4.11E−03
ce-K, γ 4	6.67E−02	4.230E−03	2.82E−04
ce-L$_1$, γ 4	8.04E−03	5.350E−02	4.30E−04
ce-K, γ 8	4.88E−03	5.452E−02	2.66E−04
γ 11	1.98E−02	1.232E−01	2.44E−03
ce-K, γ 11	2.77E−02	6.382E−02	1.77E−03
ce-L$_1$, γ 11	3.78E−03	1.131E−01	4.28E−04
γ 12	1.32E−02	1.309E−01	1.73E−03
ce-K, γ 12	1.45E−02	7.147E−02	1.03E−03
γ 17	1.07E−02	1.615E−01	1.73E−03
ce-K, γ 17	3.25E−03	1.021E−01	3.32E−04
γ 21	5.45E−03	2.036E−01	1.11E−03
γ 22	4.34E−03	2.172E−01	9.43E−04
γ 24	7.78E−03	2.344E−01	1.82E−03
γ 28	3.23E−03	3.125E−01	1.01E−03
γ 30	1.57E−02	3.262E−01	5.11E−03
γ 31	7.27E−03	3.530E−01	2.57E−03
γ 33	2.42E−03	3.616E−01	8.76E−04
γ 34	7.17E−03	3.663E−01	2.63E−03
γ 35	2.25E−03	3.846E−01	8.66E−04
γ 40	6.06E−03	4.356E−01	2.64E−03
γ 47	3.33E−03	5.393E−01	1.80E−03
γ 53	2.63E−03	5.992E−01	1.57E−03
γ 55	5.55E−03	6.060E−01	3.37E−03
γ 56	1.21E−03	6.193E−01	7.51E−04
γ 59	2.22E−03	6.493E−01	1.44E−03
γ 60	1.88E−03	6.620E−01	1.24E−03
γ 62	9.09E−03	6.872E−01	6.25E−03
γ 63	7.07E−03	6.872E−01	4.86E−03
γ 64	2.02E−03	6.889E−01	1.39E−03
γ 65	2.42E−03	6.946E−01	1.68E−03
γ 66	1.11E−03	7.097E−01	7.88E−04
γ 67	1.62E−03	7.301E−01	1.18E−03
γ 68	7.47E−03	7.370E−01	5.51E−03
γ 71	1.01E−03	7.591E−01	7.67E−04
γ 72	2.57E−03	7.727E−01	1.98E−03
γ 73	1.72E−03	7.970E−01	1.37E−03
γ 74	3.53E−03	8.030E−01	2.84E−03
γ 77	6.16E−03	8.106E−01	4.99E−03
γ 78	9.39E−04	8.179E−01	7.68E−04
γ 79	1.52E−03	8.411E−01	1.27E−03
γ 80	2.73E−03	8.485E−01	2.31E−03
γ 81	4.04E−03	8.530E−01	3.45E−03
γ 82	1.01E−01	8.603E−01	8.69E−02
ce-K, γ 82	8.43E−04	8.009E−01	6.75E−04
γ 83	2.32E−03	8.675E−01	2.02E−03
γ 84	1.82E−03	8.719E−01	1.59E−03
γ 86	1.52E−03	8.861E−01	1.34E−03
γ 87	2.83E−03	9.043E−01	2.56E−03
γ 88	1.01E−03	9.137E−01	9.23E−04
γ 89	1.01E−03	9.137E−01	9.23E−04
γ 90	2.83E−03	9.203E−01	2.60E−03
γ 91	1.52E−03	9.349E−01	1.42E−03
γ 92	4.85E−03	9.422E−01	4.57E−03
γ 93	1.41E−03	9.485E−01	1.34E−03
γ 94	3.43E−03	9.591E−01	3.29E−03
γ 95	3.03E−03	9.700E−01	2.94E−03
γ 96	2.02E−03	9.736E−01	1.97E−03
γ 97	1.21E−03	9.830E−01	1.19E−03
γ 98	2.52E−03	9.859E−01	2.49E−03
γ 99	1.92E−03	9.942E−01	1.91E−03
γ 100	2.32E−03	9.965E−01	2.31E−03
γ 101	2.52E−03	1.003E+00	2.53E−03
γ 102	4.14E−03	1.006E+00	4.17E−03
γ 103	2.81E−03	1.010E+00	2.83E−03
γ 106	2.85E−03	1.023E+00	2.91E−03
γ 107	1.72E−03	1.036E+00	1.78E−03
γ 108	2.22E−03	1.041E+00	2.31E−03
γ 109	3.03E−03	1.045E+00	3.17E−03
γ 111	1.92E−03	1.059E+00	2.03E−03
γ 112	1.31E−03	1.065E+00	1.40E−03
γ 113	1.11E−03	1.095E+00	1.22E−03
γ 114	1.01E−03	1.102E+00	1.11E−03
γ 116	9.09E−04	1.114E+00	1.01E−03
γ 118	1.23E−03	1.124E+00	1.39E−03
γ 120	1.31E−03	1.165E+00	1.53E−03
γ 123	6.06E−04	1.219E+00	7.38E−04
γ 124	1.52E−03	1.227E+00	1.86E−03
γ 125	1.26E−03	1.235E+00	1.56E−03
γ 126	1.31E−03	1.241E+00	1.63E−03
γ 127	1.01E−03	1.253E+00	1.27E−03
γ 132	6.56E−03	1.332E+00	8.74E−03
γ 133	1.88E−03	1.336E+00	2.51E−03
γ 134	5.76E−03	1.345E+00	7.74E−03
γ 135	1.72E−03	1.364E+00	2.34E−03
γ 136	1.62E−03	1.370E+00	2.21E−03
γ 137	1.21E−03	1.384E+00	1.68E−03
γ 138	1.32E−03	1.414E+00	1.87E−03
γ 139	6.16E−03	1.454E+00	8.96E−03
γ 140	8.08E−04	1.466E+00	1.18E−03
γ 141	3.53E−03	1.493E+00	5.28E−03
γ 142	5.05E−04	1.498E+00	7.56E−04
γ 143	1.19E−03	1.507E+00	1.80E−03
γ 144	8.08E−04	1.512E+00	1.22E−03
γ 146	7.47E−04	1.520E+00	1.14E−03
γ 148	1.01E−03	1.561E+00	1.58E−03
γ 149	3.57E−03	1.575E+00	5.62E−03
γ 150	7.58E−04	1.591E+00	1.21E−03
γ 152	1.25E−03	1.603E+00	2.01E−03
γ 153	1.25E−03	1.603E+00	2.01E−03
γ 154	1.98E−03	1.611E+00	3.19E−03
γ 155	5.15E−04	1.619E+00	8.34E−04
γ 156	7.07E−04	1.626E+00	1.15E−03
γ 157	6.06E−04	1.651E+00	1.00E−03
γ 158	3.94E−03	1.658E+00	6.53E−03
γ 159	3.53E−03	1.677E+00	5.93E−03
γ 160	2.28E−03	1.684E+00	3.84E−03
γ 161	7.58E−03	1.689E+00	1.28E−02
γ 162	5.05E−03	1.697E+00	8.57E−03
γ 163	9.59E−04	1.708E+00	1.64E−03
γ 164	9.09E−04	1.735E+00	1.58E−03
γ 165	1.72E−02	1.747E+00	3.00E−02

γ 166	4.04E−03	1.767E+00	7.14E−03
γ 167	1.21E−03	1.789E+00	2.17E−03
γ 168	2.04E−03	1.820E+00	3.71E−03
γ 169	6.87E−04	1.844E+00	1.27E−03
γ 170	4.04E−04	1.857E+00	7.50E−04
γ 171	4.04E−04	1.861E+00	7.52E−04
γ 172	7.07E−04	1.871E+00	1.32E−03
γ 173	4.65E−04	1.883E+00	8.75E−04
γ 174	1.54E−02	1.908E+00	2.93E−02
K_{α_1} X-ray	3.79E−01	5.074E−02	1.92E−02
K_{α_2} X-ray	2.14E−01	4.977E−02	1.07E−02
K_{β_1} X-ray	7.75E−02	5.751E−02	4.46E−03
K_{β_2} X-ray	3.32E−02	5.907E−02	1.96E−03
K_{β_3} X-ray	4.02E−02	5.730E−02	2.30E−03
L_α X-ray	1.14E−01	7.176E−03*	8.19E−04
L_β X-ray	1.35E−01	8.171E−03*	1.11E−03
Auger-KLL	2.55E−02	4.039E−02*	1.03E−03
Auger-KLX	1.34E−02	4.807E−02*	6.44E−04
Auger-LMM	5.95E−01	5.797E−03*	3.45E−03
Auger-LMX	3.70E−01	7.482E−03*	2.77E−03
Auger-LXY	6.14E−02	8.780E−03*	5.39E−04
Auger-MXY	2.08E+00	1.692E−03*	3.52E−03

Listed X, γ and $\gamma^{\pm}$ radiations	6.90E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.53E−02
Listed β, ce and Auger radiations	2.47E−01
Omitted β, ce and Auger radiations**	7.14E−03
Listed radiations	9.36E−01
Omitted radiations**	3.24E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Tm-163 daughter is radioactive.


$^{163}_{70}$Yb(11.05m)
3/2- 0.0
5/2(-)
5/2-
1/2,3/2,5/2-
1/2,3/2,5/2-
1/2+,3/2,5/2
1/2+,3/2,5/2,7/2+
1/2,3/2,5/2+
(3/2+,5/2-)
(5/2)-
(5/2-,7/2-)
(3/2,5/2+)
5/2+,7/2+
(7/2)+
(7/2)-
(5/2)+
(9/2-)
3/2+
3/2-
(7/2)+
(5/2-)
1/2-
7/2+
(9/2)-
5/2+
5/2+
7/2-
7/2+
3/2+
1/2+
1.9948
1.8335
1.8207
1.8197
1.7801
1.3629
1.3453
1.1307
0.9473
0.8239
0.8061
0.7741
0.6837
0.5596
0.4980
0.4492
0.3691
0.3664
0.3262
0.2584
0.2535
0.2171
0.1750
0.1746
0.1444
0.1367
0.0869
0.0233
0.0135
0.0
EC1, β+1
EC2, β+2
EC3, β+3
EC4, β+4
EC5, β+5
EC6, β+6
EC7, β+7
EC8, β+8
EC9, β+9
EC10, β+10
EC11, β+11
EC12, β+12
EC14, β+14
EC15, β+15
EC16, β+16
EC17, β+17
EC18, β+18
EC19, β+19
EC20, β+20
EC21, β+21
EC22, β+22
EC23, β+23
EC24, β+24
EC25, β+25
EC26, β+26
$^{163}_{69}$Tm(1.810h)

70-Yb-164

16-MAR-92

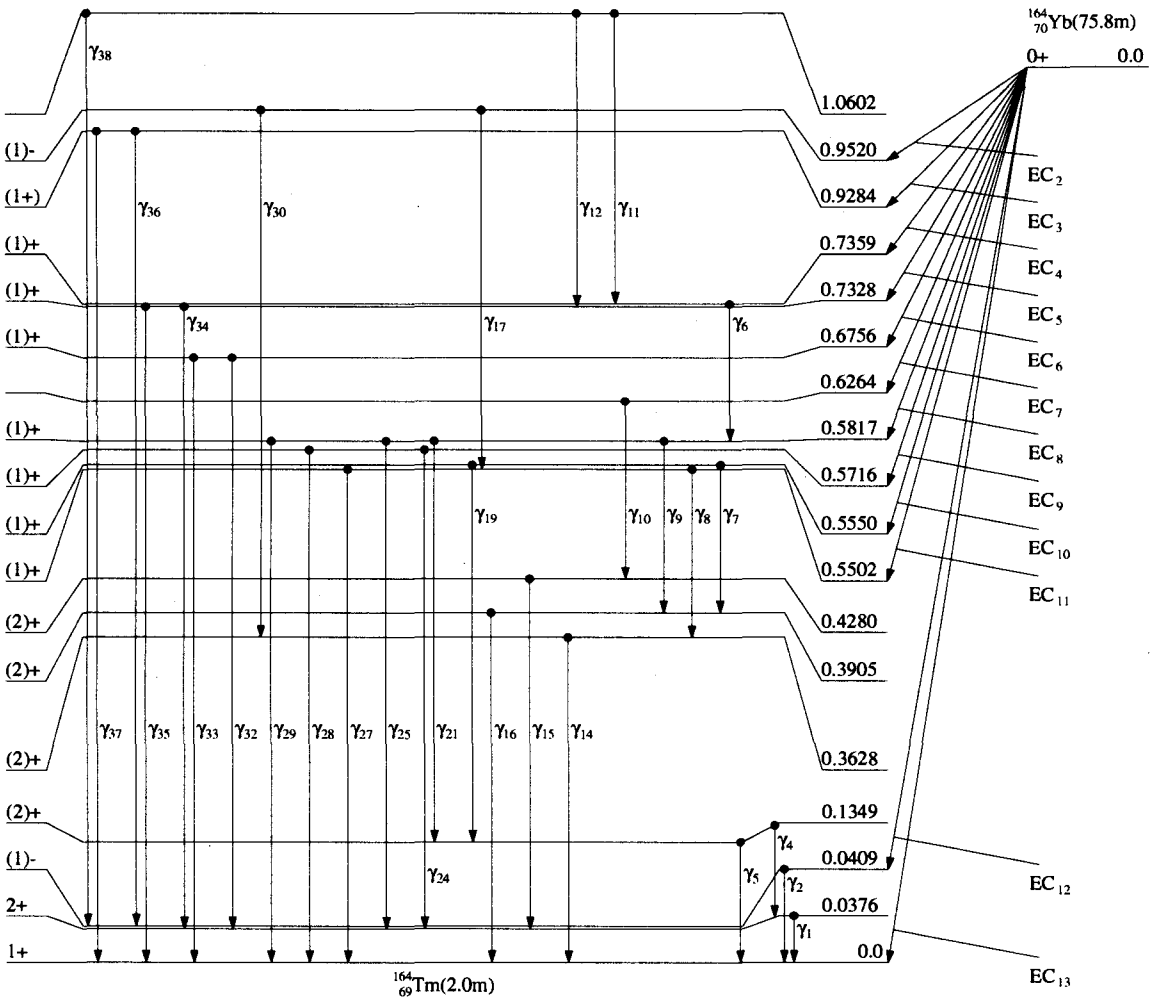
Half-life = 75.8 m
Decay mode(s): EC

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-L_1, γ 1	7.62E−03	2.746E−02	2.09E−04
ce-L_2, γ 1	1.03E−03	2.796E−02	2.88E−05
ce-L_3, γ 1	4.96E−04	2.892E−02	1.44E−05
ce-M, γ 1	2.05E−03	3.569E−02*	7.32E−05
ce-N^+, γ 1	6.24E−04	3.757E−02*	2.35E−05
γ 2	1.15E−02	4.093E−02	4.69E−04
ce-L_1, γ 2	2.80E−03	3.081E−02	8.64E−05
ce-L_2, γ 2	1.47E−03	3.131E−02	4.59E−05
ce-L_3, γ 2	1.96E−03	3.228E−02	6.33E−05
ce-M, γ 2	1.39E−03	3.904E−02*	5.44E−05
ce-N^+, γ 2	3.91E−04	4.093E−02*	1.60E−05
ce-K, γ 4	1.16E−03	3.795E−02	4.40E−05
ce-L_1, γ 4	1.59E−04	8.722E−02	1.39E−05
ce-K, γ 5	2.16E−04	7.561E−02	1.63E−05
γ 6	5.89E−04	1.542E−01	9.08E−05
ce-K, γ 6	3.85E−04	9.479E−02	3.65E−05
γ 7	1.23E−03	1.645E−01	2.02E−04
ce-K, γ 7	6.60E−04	1.051E−01	6.93E−05
ce-L_1, γ 7	9.06E−05	1.543E−01	1.40E−05
γ 8	8.99E−04	1.878E−01	1.69E−04
ce-K, γ 8	3.24E−04	1.284E−01	4.16E−05
γ 9	9.92E−04	1.908E−01	1.89E−04
ce-K, γ 9	1.87E−04	1.314E−01	2.46E−05
γ 10	3.87E−04	1.991E−01	7.72E−05
γ 11	2.79E−04	3.243E−01	9.05E−05
γ 12	2.79E−04	3.274E−01	9.14E−05
γ 13	3.72E−04	3.580E−01	1.33E−04
γ 14	2.10E−03	3.628E−01	7.64E−04
ce-K, γ 14	1.58E−04	3.035E−01	4.80E−05
γ 15	4.34E−04	3.906E−01	1.70E−04
γ 16	3.10E−03	3.906E−01	1.21E−03
ce-K, γ 16	1.92E−04	3.312E−01	6.36E−05
γ 17	9.30E−04	4.021E−01	3.74E−04
γ 18	1.10E−03	4.158E−01	4.58E−04
ce-K, γ 18	8.56E−05	3.564E−01	3.05E−05
γ 19	4.03E−04	4.195E−01	1.69E−04
γ 20	1.92E−03	4.446E−01	8.55E−04
ce-K, γ 20	1.38E−04	3.852E−01	5.32E−05
γ 21	2.79E−03	4.467E−01	1.25E−03
ce-K, γ 21	5.03E−05	3.874E−01	1.95E−05
γ 22	2.29E−04	4.759E−01	1.09E−04
γ 24	1.55E−04	5.340E−01	8.28E−05
γ 25	8.68E−04	5.436E−01	4.72E−04
γ 26	8.37E−04	5.469E−01	4.58E−04
γ 27	4.18E−04	5.498E−01	2.30E−04
γ 28	3.01E−04	5.716E−01	1.72E−04
γ 29	1.55E−04	5.816E−01	9.01E−05
γ 30	1.04E−03	5.891E−01	6.10E−04
γ 32	2.33E−03	6.381E−01	1.48E−03
ce-K, γ 32	2.74E−05	5.787E−01	1.59E−05
γ 33	3.81E−03	6.754E−01	2.58E−03
ce-K, γ 33	5.80E−05	6.160E−01	3.57E−05
γ 34	7.97E−04	6.952E−01	5.54E−04
γ 35	1.86E−04	7.327E−01	1.36E−04
γ 36	5.33E−04	8.873E−01	4.73E−04
ce-K, γ 37	6.87E−04	8.693E−01	5.97E−04
ce-L_1, γ 37	9.82E−05	9.186E−01	9.02E−05
ce-M, γ 37	2.01E−05	9.268E−01*	1.87E−05
γ 38	3.97E−04	1.019E+00	4.04E−04
K_{α_1} X-ray	3.95E−01	5.074E−02	2.00E−02
K_{α_2} X-ray	2.23E−01	4.977E−02	1.11E−02
K_{β_1} X-ray	8.08E−02	5.751E−02	4.65E−03
K_{β_2} X-ray	3.46E−02	5.907E−02	2.04E−03
K_{β_3} X-ray	4.19E−02	5.730E−02	2.40E−03
K_{β_5} X-ray	1.60E−03	5.790E−02	9.24E−05
L_α X-ray	8.14E−02	7.176E−03*	5.84E−04
L_β X-ray	8.01E−02	8.178E−03*	6.55E−04
L_γ X-ray	1.34E−02	9.541E−03*	1.28E−04
Auger-KLL	2.66E−02	4.039E−02*	1.07E−03
Auger-KLX	1.40E−02	4.807E−02*	6.72E−04
Auger-KXY	2.11E−03	5.557E−02*	1.17E−04
Auger-LMM	3.86E−01	5.712E−03*	2.21E−03
Auger-LMX	2.38E−01	7.390E−03*	1.76E−03
Auger-LXY	3.96E−02	8.690E−03*	3.44E−04
Auger-MXY	1.34E+00	1.713E−03*	2.30E−03
ΔE	3.17E−01	2.248E−04*	7.12E−05

Listed X, γ and $\gamma^{\pm}$ radiations	5.63E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.82E−04
Listed β, ce and Auger radiations	1.04E−02
Omitted β, ce and Auger radiations**	2.26E−04
Listed radiations	6.67E−02
Omitted radiations**	5.08E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Tm-164 daughter is radioactive.


$^{164}_{70}$Yb(75.8m)
0+
0.0
1.0602
0.9520
0.9284
0.7359
0.7328
0.6756
0.6264
0.5817
0.5716
0.5550
0.5502
0.4280
0.3905
0.3628
0.1349
0.0409
0.0376
0.0
(1)-
(1+)
(1)+
(1)+
(1)+
(1)+
(1)+
(1)+
(1)+
(2)+
(2)+
(2)+
(2)+
(1)-
2+
1+
γ_{38}
γ_{36}
γ_{30}
γ_{12}
γ_{11}
γ_{34}
γ_{17}
γ_6
γ_{19}
γ_{10}
γ_9
γ_8
γ_7
γ_{37}
γ_{35}
γ_{33}
γ_{32}
γ_{29}
γ_{28}
γ_{27}
γ_{25}
γ_{21}
γ_{16}
γ_{15}
γ_{14}
γ_{24}
γ_4
γ_5
γ_2
γ_1
EC_2
EC_3
EC_4
EC_5
EC_6
EC_7
EC_8
EC_9
EC_{10}
EC_{11}
EC_{12}
EC_{13}
$^{164}_{69}$Tm(2.0m)

70-Yb-165

16-MAR-92

Half-life = 9.9 m
Decay mode(s): EC, β^+

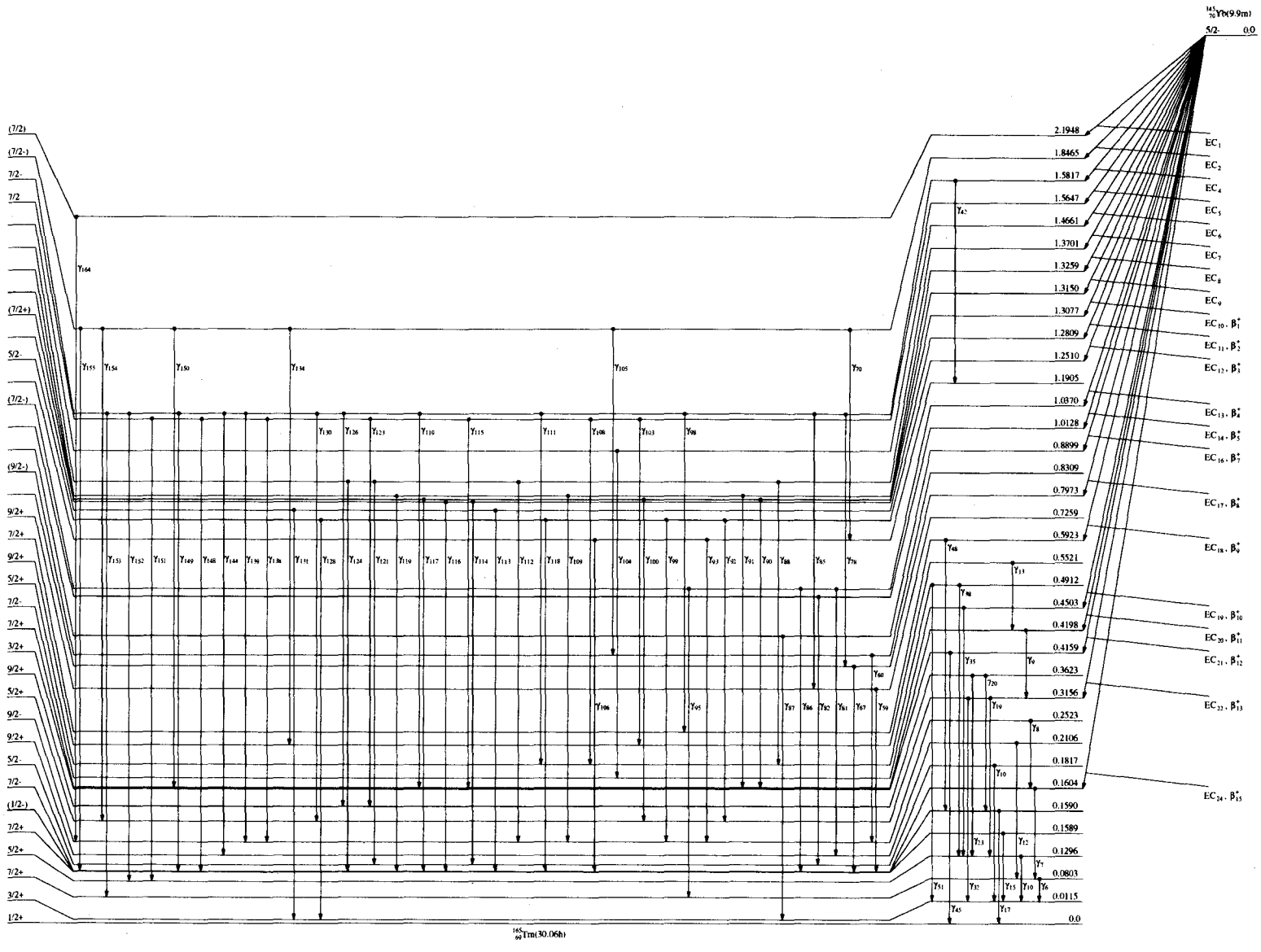
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 15	9.51E−02	7.166E−01*	6.81E−02
$\gamma^{\pm}$	1.92E−01	5.110E−01	9.79E−02
γ 6	5.83E−02	6.886E−02	4.01E−03
ce-K, γ 6	1.10E−01	9.470E−03	1.05E−03
ce-L_1, γ 6	1.22E−02	5.874E−02	7.16E−04
ce-L_2, γ 6	2.50E−01	5.924E−02	1.48E−02
ce-L_3, γ 6	2.65E−01	6.021E−02	1.59E−02
ce-M, γ 6	1.28E−01	6.698E−02*	8.61E−03
ce-N^+, γ 6	3.50E−02	6.886E−02*	2.41E−03
γ 7	3.10E−01	8.011E−02	2.49E−02
ce-K, γ 7	4.40E−01	2.072E−02	9.11E−03
ce-L_1, γ 7	8.47E−02	6.999E−02	5.93E−03
ce-L_2, γ 7	1.23E−02	7.049E−02	8.69E−04
ce-L_3, γ 7	2.32E−02	7.146E−02	1.66E−03
ce-M, γ 7	2.85E−02	7.823E−02*	2.23E−03
ce-N^+, γ 7	8.26E−03	8.011E−02*	6.62E−04
ce-L_2, γ 8	2.42E−03	8.235E−02	2.00E−04
ce-L_3, γ 8	2.36E−03	8.332E−02	1.97E−04
γ 10	1.53E−02	1.181E−01	1.80E−03
ce-K, γ 10	2.52E−02	5.867E−02	1.48E−03
ce-L_1, γ 10	3.47E−03	1.079E−01	3.75E−04
γ 15	6.60E−03	1.473E−01	9.72E−04
ce-K, γ 15	2.59E−03	8.790E−02	2.28E−04
γ 18	3.69E−03	1.702E−01	6.29E−04
γ 19	3.69E−03	1.859E−01	6.87E−04
γ 20	2.33E−03	2.033E−01	4.74E−04
γ 23	1.55E−03	2.326E−01	3.61E−04
γ 32	6.88E−03	3.040E−01	2.09E−03
γ 35	1.41E−03	3.207E−01	4.52E−04
γ 38	1.66E−03	3.616E−01	6.00E−04
γ 42	1.92E−03	3.914E−01	7.50E−04
γ 45	1.05E−03	4.160E−01	4.35E−04
γ 48	1.20E−03	4.333E−01	5.18E−04
γ 51	2.22E−03	4.797E−01	1.07E−03
γ 59	8.05E−04	5.669E−01	4.56E−04
ce-K, γ 59	3.17E−04	5.075E−01	1.61E−04
γ 67	1.23E−03	6.368E−01	7.82E−04
γ 70	2.40E−03	6.560E−01	1.57E−03
γ 78	1.33E−03	7.844E−01	1.04E−03
γ 81	1.20E−03	8.263E−01	9.88E−04
γ 82	7.80E−04	8.311E−01	6.48E−04
γ 84	5.64E−04	8.531E−01	4.81E−04
γ 85	6.39E−04	8.560E−01	5.47E−04
γ 86	6.39E−04	8.770E−01	5.60E−04
γ 87	8.47E−04	8.786E−01	7.44E−04
γ 88	8.47E−04	8.786E−01	7.44E−04
γ 90	8.80E−04	8.952E−01	7.88E−04
γ 91	4.15E−04	9.061E−01	3.76E−04
γ 92	2.66E−03	9.352E−01	2.49E−03
γ 93	5.89E−04	9.380E−01	5.53E−04
γ 95	6.93E−03	9.567E−01	6.63E−03
γ 96	5.81E−04	9.679E−01	5.62E−04
γ 97	3.57E−04	9.731E−01	3.47E−04
γ 98	5.06E−04	9.900E−01	5.01E−04
γ 99	8.30E−04	9.993E−01	8.29E−04
γ 100	3.24E−03	9.995E−01	3.24E−03
γ 103	3.90E−04	1.012E+00	3.95E−04
γ 104	6.39E−04	1.016E+00	6.49E−04
γ 105	6.39E−04	1.016E+00	6.49E−04
γ 106	4.32E−03	1.030E+00	4.45E−03
γ 108	1.99E−03	1.074E+00	2.14E−03
γ 109	3.98E−03	1.074E+00	4.28E−03
γ 110	2.81E−02	1.090E+00	3.07E−02
γ 111	5.81E−04	1.091E+00	6.34E−04
γ 112	1.29E−03	1.118E+00	1.44E−03
γ 113	1.06E−03	1.122E+00	1.19E−03
γ 114	1.04E−03	1.126E+00	1.17E−03
γ 115	6.97E−04	1.145E+00	7.99E−04
γ 116	1.24E−03	1.149E+00	1.42E−03
γ 117	2.92E−03	1.155E+00	3.37E−03
γ 118	6.14E−04	1.162E+00	7.14E−04
γ 119	1.58E−03	1.166E+00	1.84E−03
γ 121	8.71E−04	1.188E+00	1.04E−03
γ 122	4.98E−04	1.193E+00	5.94E−04
γ 123	8.05E−04	1.203E+00	9.68E−04
γ 124	4.32E−04	1.209E+00	5.22E−04
γ 125	5.23E−04	1.212E+00	6.34E−04
γ 126	3.24E−03	1.219E+00	3.95E−03
γ 128	1.89E−03	1.240E+00	2.35E−03
γ 130	1.38E−03	1.266E+00	1.74E−03
γ 131	9.46E−04	1.270E+00	1.20E−03
γ 132	1.01E−03	1.283E+00	1.30E−03
γ 134	4.90E−04	1.294E+00	6.34E−04
γ 136	1.39E−03	1.297E+00	1.81E−03
γ 137	2.99E−04	1.309E+00	3.91E−04
γ 138	8.96E−04	1.312E+00	1.18E−03
γ 139	2.34E−03	1.329E+00	3.11E−03
γ 142	2.66E−04	1.356E+00	3.60E−04
γ 143	9.38E−04	1.368E+00	1.28E−03
γ 144	9.30E−04	1.371E+00	1.27E−03
γ 146	5.89E−04	1.390E+00	8.19E−04
γ 147	5.64E−04	1.401E+00	7.91E−04
γ 148	2.49E−04	1.405E+00	3.50E−04
γ 149	2.04E−03	1.421E+00	2.90E−03
γ 150	7.88E−04	1.427E+00	1.13E−03
γ 151	6.72E−04	1.435E+00	9.65E−04
γ 152	1.83E−03	1.452E+00	2.65E−03
γ 153	3.77E−03	1.501E+00	5.66E−03
γ 154	5.39E−04	1.531E+00	8.26E−04
γ 155	3.90E−04	1.686E+00	6.58E−04
γ 156	2.32E−04	1.709E+00	3.97E−04
γ 157	2.66E−04	1.726E+00	4.58E−04
γ 158	2.41E−04	1.785E+00	4.30E−04
γ 159	3.07E−04	1.789E+00	5.49E−04
γ 163	2.07E−04	1.916E+00	3.98E−04
γ 164	3.32E−04	1.943E+00	6.45E−04
γ 165	3.65E−04	1.957E+00	7.15E−04
γ 167	1.66E−04	2.204E+00	3.66E−04
K_{α_1} X-ray	6.46E−01	5.074E−02	3.28E−02
K_{α_2} X-ray	3.65E−01	4.977E−02	1.82E−02
K_{β_1} X-ray	1.32E−01	5.751E−02	7.59E−03
K_{β_2} X-ray	5.65E−02	5.907E−02	3.34E−03
K_{β_3} X-ray	6.85E−02	5.730E−02	3.92E−03
L_α X-ray	1.84E−01	7.176E−03*	1.32E−03
L_β X-ray	1.84E−01	8.174E−03*	1.51E−03
Auger-KLL	4.34E−02	4.039E−02*	1.75E−03
Auger-KLX	2.28E−02	4.807E−02*	1.10E−03
Auger-KXY	3.45E−03	5.557E−02*	1.92E−04
Auger-LMM	8.78E−01	5.701E−03*	5.01E−03
Auger-LMX	5.39E−01	7.374E−03*	3.97E−03
Auger-LXY	8.98E−02	8.675E−03*	7.79E−04
Auger-MXY	3.06E+00	1.694E−03*	5.19E−03
ΔE	7.45E−01	2.286E−04*	1.70E−04

Listed X, γ and $\gamma^{\pm}$ radiations	3.32E−01
Omitted X, γ AND $\gamma^{\pm}$ radiations**	1.27E−02
Listed β, ce AND Auger radiations	1.53E−01
Omitted β, ce AND Auger radiations**	3.83E−03
Listed radiations	4.85E−01
Omitted radiations**	1.65E−02

* Average energy (MeV)
** Each omitted transition contributes

<0.100 % to $\sum y(i) \times E(i)$ in its category.

Tm-165 daughter is radioactive.



71-Lu-165

16-MAR-92

Half-life = 10.74 m
Decay mode(s): EC, β^+

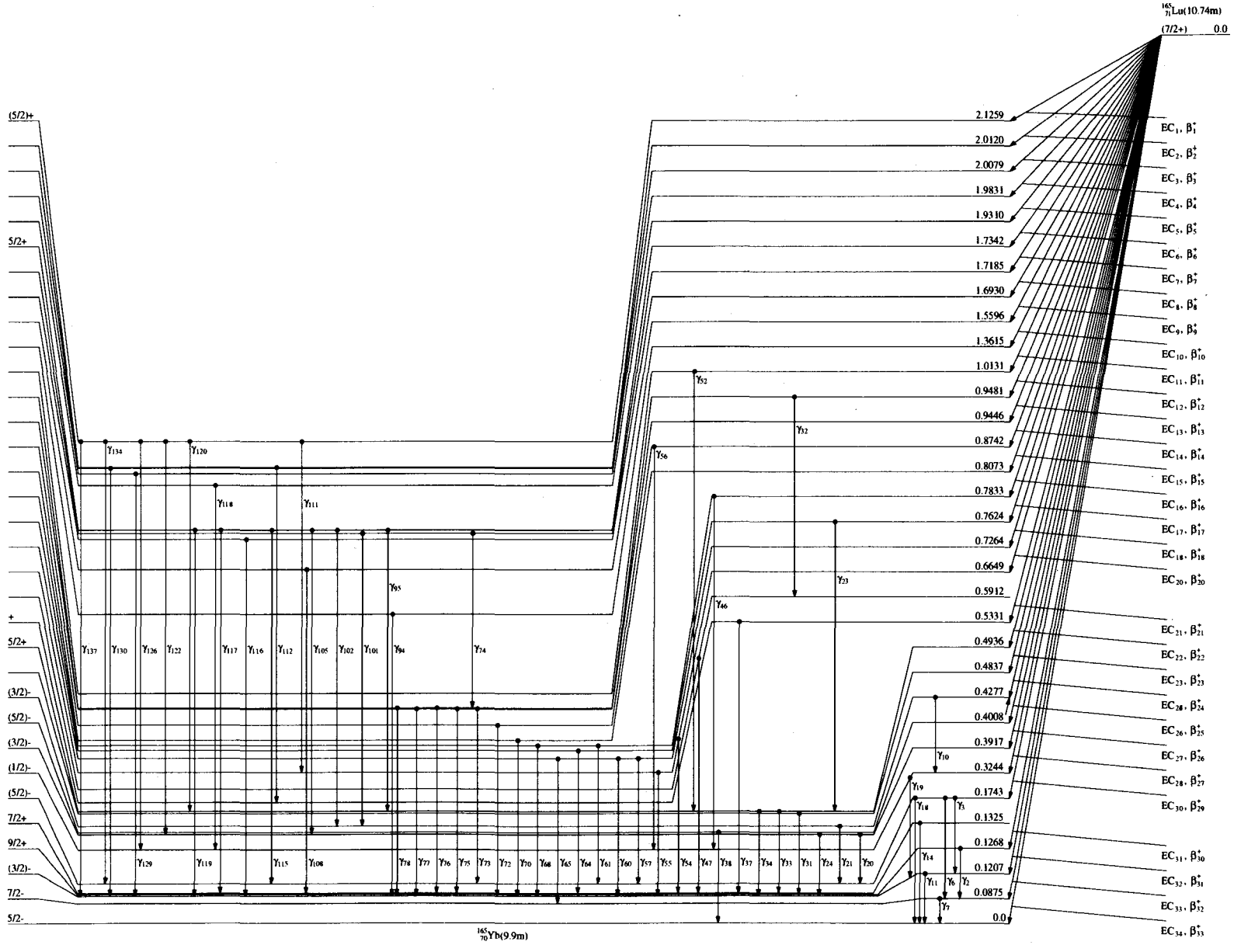
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 6	3.03E−03	5.334E−01*	1.61E−03
β^+ 11	1.41E−03	8.529E−01*	1.20E−03
β^+ 12	5.75E−03	8.820E−01*	5.07E−03
β^+ 13	3.03E−03	8.836E−01*	2.67E−03
β^+ 14	3.33E−03	9.151E−01*	3.05E−03
β^+ 15	3.83E−03	9.451E−01*	3.62E−03
β^+ 16	8.98E−03	9.559E−01*	8.58E−03
β^+ 17	4.24E−03	9.653E−01*	4.09E−03
β^+ 18	6.76E−03	9.814E−01*	6.63E−03
β^+ 20	2.72E−03	1.009E+00*	2.75E−03
β^+ 21	7.97E−03	1.068E+00*	8.52E−03
β^+ 22	1.11E−02	1.086E+00*	1.21E−02
β^+ 23	3.83E−03	1.091E+00*	4.18E−03
β^+ 24	1.31E−02	1.111E+00*	1.46E−02
β^+ 25	3.13E−03	1.128E+00*	3.53E−03
β^+ 26	1.31E−02	1.127E+00*	1.48E−02
β^+ 27	8.07E−03	1.172E+00*	9.46E−03
β^+ 28	3.03E−03	1.194E+00*	3.62E−03
β^+ 29	3.83E−02	1.231E+00*	4.72E−02
β^+ 30	3.33E−02	1.253E+00*	4.17E−02
β^+ 31	6.26E−02	1.245E+00*	7.79E−02
β^+ 32	2.32E−02	1.270E+00*	2.95E−02
β^+ 33	1.01E−02	1.310E+00*	1.32E−02
$\gamma^{\pm}$	5.54E−01	5.110E−01	2.83E−01
ce-L_1, γ 3	2.25E−02	4.317E−02	9.73E−04
ce-K, γ 6	3.54E−02	2.538E−02	8.98E−04
γ 7	3.45E−02	8.754E−02	3.02E−03
ce-K, γ 7	6.24E−02	2.621E−02	1.64E−03
ce-L_2, γ 7	4.44E−02	7.756E−02	3.45E−03
ce-L_3, γ 7	4.32E−02	7.860E−02	3.39E−03
ce-M, γ 7	2.32E−02	8.559E−02*	1.98E−03
ce-K, γ 10	4.92E−02	4.240E−02	2.09E−03
γ 11	1.50E−01	1.206E−01	1.81E−02
ce-K, γ 11	2.50E−01	5.927E−02	1.48E−02
ce-L_1, γ 11	3.44E−02	1.101E−01	3.79E−03
ce-M, γ 11	9.21E−03	1.187E−01*	1.09E−03
γ 14	1.50E−01	1.325E−01	1.99E−02
ce-K, γ 14	2.04E−02	7.116E−02	1.45E−03
γ 18	7.05E−02	1.743E−01	1.23E−02
ce-K, γ 18	3.85E−02	1.129E−01	4.34E−03
ce-L_1, γ 18	5.21E−03	1.638E−01	8.54E−04
γ 19	5.70E−02	2.037E−01	1.16E−02
ce-K, γ 19	2.21E−02	1.423E−01	3.15E−03
γ 20	3.00E−02	2.174E−01	6.52E−03
ce-K, γ 20	9.74E−03	1.561E−01	1.52E−03
γ 21	2.43E−02	2.534E−01	6.16E−03
ce-K, γ 21	5.19E−03	1.921E−01	9.96E−04
γ 23	9.00E−03	2.687E−01	2.42E−03
γ 24	2.97E−02	2.711E−01	8.05E−03
ce-K, γ 24	5.28E−03	2.098E−01	1.11E−03
γ 31	1.20E−02	3.569E−01	4.28E−03
γ 32	1.80E−02	3.569E−01	6.42E−03
γ 33	4.39E−02	3.611E−01	1.59E−02
γ 34	1.92E−02	3.730E−01	7.16E−03
γ 37	3.00E−02	4.006E−01	1.20E−02
γ 38	3.00E−02	4.006E−01	1.20E−02
γ 46	1.86E−02	4.588E−01	8.53E−03
γ 47	1.86E−02	4.588E−01	8.53E−03
γ 52	8.55E−03	5.195E−01	4.44E−03
γ 54	6.45E−03	5.328E−01	3.44E−03
γ 55	4.80E−03	5.440E−01	2.61E−03
γ 56	6.45E−03	5.498E−01	3.55E−03
γ 57	1.47E−02	5.521E−01	8.12E−03
γ 60	6.00E−03	6.058E−01	3.63E−03
γ 61	1.29E−02	6.090E−01	7.86E−03
γ 64	1.03E−02	6.299E−01	6.52E−03
γ 65	4.35E−03	6.385E−01	2.78E−03
γ 67	6.60E−03	6.595E−01	4.35E−03
γ 68	9.90E−03	6.627E−01	6.56E−03
γ 69	1.60E−02	6.711E−01	1.08E−02
γ 70	1.54E−02	6.865E−01	1.06E−02
γ 71	5.85E−03	7.269E−01	4.25E−03
γ 72	1.05E−02	7.536E−01	7.91E−03
γ 73	6.00E−03	7.703E−01	4.62E−03
γ 74	6.00E−03	7.703E−01	4.62E−03
γ 75	4.20E−03	8.118E−01	3.41E−03
γ 76	8.25E−03	8.153E−01	6.73E−03
γ 77	6.60E−03	8.241E−01	5.44E−03
γ 78	3.45E−03	8.276E−01	2.86E−03
γ 80	5.70E−03	8.752E−01	4.99E−03
γ 82	3.15E−03	8.962E−01	2.82E−03
γ 83	3.00E−03	9.307E−01	2.79E−03
γ 84	5.40E−03	9.435E−01	5.10E−03
γ 85	4.05E−03	9.632E−01	3.90E−03
γ 86	3.45E−03	9.787E−01	3.38E−03
γ 87	7.05E−03	1.051E+00	7.41E−03
γ 88	2.55E−03	1.115E+00	2.84E−03
γ 90	2.40E−03	1.131E+00	2.72E−03
γ 91	4.65E−03	1.145E+00	5.32E−03
γ 92	5.10E−03	1.182E+00	6.03E−03
γ 93	4.05E−03	1.188E+00	4.81E−03
γ 94	7.05E−03	1.241E+00	8.75E−03
γ 95	7.05E−03	1.241E+00	8.75E−03
γ 96	3.15E−03	1.249E+00	3.93E−03
γ 97	2.70E−03	1.265E+00	3.42E−03
γ 98	2.55E−03	1.268E+00	3.23E−03
γ 99	8.40E−03	1.281E+00	1.08E−02
γ 100	5.25E−03	1.289E+00	6.77E−03
γ 101	2.70E−03	1.291E+00	3.49E−03
γ 102	8.55E−03	1.307E+00	1.12E−02
γ 103	4.35E−03	1.330E+00	5.78E−03
γ 104	3.45E−03	1.335E+00	4.61E−03
γ 105	4.65E−03	1.342E+00	6.24E−03
γ 106	4.65E−03	1.368E+00	6.36E−03
γ 107	4.05E−03	1.392E+00	5.64E−03
γ 108	6.60E−03	1.427E+00	9.42E−03
γ 109	1.95E−03	1.439E+00	2.81E−03
γ 110	3.15E−03	1.454E+00	4.58E−03
γ 111	3.00E−03	1.461E+00	4.38E−03
γ 112	3.45E−03	1.479E+00	5.10E−03
γ 113	3.45E−03	1.519E+00	5.24E−03
γ 114	2.55E−03	1.539E+00	3.92E−03
γ 115	1.08E−02	1.560E+00	1.68E−02
γ 116	4.05E−03	1.572E+00	6.37E−03
γ 117	2.46E−02	1.601E+00	3.94E−02
γ 118	3.45E−03	1.607E+00	5.54E−03
γ 119	2.26E−02	1.613E+00	3.65E−02
γ 120	4.05E−03	1.632E+00	6.61E−03
γ 121	7.20E−03	1.672E+00	1.20E−02
γ 122	1.74E−02	1.734E+00	3.02E−02
γ 123	3.30E−03	1.746E+00	5.76E−03
γ 124	1.95E−03	1.779E+00	3.47E−03
γ 125	2.70E−03	1.790E+00	4.83E−03
γ 126	1.03E−02	1.801E+00	1.86E−02
γ 127	5.40E−03	1.808E+00	9.76E−03
γ 128	3.15E−03	1.833E+00	5.77E−03
γ 129	5.25E−03	1.862E+00	9.78E−03
γ 130	5.70E−03	1.887E+00	1.08E−02
γ 131	1.50E−03	1.908E+00	2.86E−03
γ 132	3.90E−03	1.923E+00	7.50E−03
γ 133	1.95E−03	1.944E+00	3.79E−03
γ 134	2.10E−03	1.952E+00	4.10E−03
γ 135	2.55E−03	1.981E+00	5.05E−03

γ 136	1.50E−03	1.989E+00	2.98E−03
γ 137	7.80E−03	2.005E+00	1.56E−02
γ 138	3.90E−03	2.033E+00	7.93E−03
γ 139	2.70E−03	2.154E+00	5.82E−03
K_{α_1} X-ray	5.53E−01	5.239E−02	2.90E−02
K_{α_2} X-ray	3.14E−01	5.135E−02	1.61E−02
K_{β_1} X-ray	1.15E−01	5.938E−02	6.80E−03
K_{β_2} X-ray	4.81E−02	6.101E−02	2.94E−03
K_{β_3} X-ray	5.92E−02	5.916E−02	3.50E−03
Auger-KLL	3.57E−02	4.164E−02*	1.49E−03
Auger-KLX	1.89E−02	4.960E−02*	9.35E−04
Auger-LMM	5.88E−01	5.904E−03*	3.47E−03
Auger-LMX	3.63E−01	7.642E−03*	2.77E−03
Auger-MXY	2.06E+00	1.774E−03*	3.66E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.07E+00
Omitted X, γ AND $\gamma^{\pm}$ radiations**	5.24E−02
Listed β, ce AND Auger radiations	3.79E−01
Omitted β, ce AND Auger radiations**	2.30E−02
Listed radiations	1.45E+00
Omitted radiations**	7.54E−02

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Yb-165 daughter is radioactive.


$^{165}_{71}$Lu(10.74m)
(7/2+) 0.0
2.1259
2.0120
2.0079
1.9831
1.9310
1.7342
1.7185
1.6930
1.5596
1.3615
1.0131
0.9481
0.9446
0.8742
0.8073
0.7833
0.7624
0.7264
0.6649
0.5912
0.5331
0.4936
0.4837
0.4277
0.4008
0.3917
0.3244
0.1743
0.1325
0.1268
0.1207
0.0875
0.0
(5/2)+
5/2+
+
5/2+
(3/2)-
(5/2)-
(3/2)-
(1/2)-
(5/2)-
7/2+
9/2+
(3/2)-
7/2-
5/2-
$^{165}_{70}$Yb(9.9m)
EC_1, β^+_1
EC_2, β^+_2
EC_3, β^+_3
EC_4, β^+_4
EC_5, β^+_5
EC_6, β^+_6
EC_7, β^+_7
EC_8, β^+_8
EC_9, β^+_9
EC_{10}, β^+_{10}
EC_{11}, β^+_{11}
EC_{12}, β^+_{12}
EC_{13}, β^+_{13}
EC_{14}, β^+_{14}
EC_{15}, β^+_{15}
EC_{16}, β^+_{16}
EC_{17}, β^+_{17}
EC_{18}, β^+_{18}
EC_{20}, β^+_{20}
EC_{21}, β^+_{21}
EC_{22}, β^+_{22}
EC_{23}, β^+_{23}
EC_{24}, β^+_{24}
EC_{26}, β^+_{25}
EC_{27}, β^+_{26}
EC_{28}, β^+_{27}
EC_{30}, β^+_{29}
EC_{31}, β^+_{30}
EC_{32}, β^+_{31}
EC_{33}, β^+_{32}
EC_{34}, β^+_{33}

71-Lu-167

20-FEB-90

Half-life = 51.5 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 8	6.62E−04	6.727E−01*	4.45E−04
β^+ 11	7.85E−04	7.060E−01*	5.54E−04
β^+ 12	1.80E−03	7.397E−01*	1.33E−03
β^+ 13	1.23E−03	7.560E−01*	9.29E−04
β^+ 14	2.36E−03	7.604E−01*	1.80E−03
β^+ 15	9.45E−04	7.654E−01*	7.24E−04
β^+ 16	2.17E−03	7.692E−01*	1.67E−03
β^+ 17	2.27E−03	8.149E−01*	1.85E−03
β^+ 18	1.23E−03	8.235E−01*	1.01E−03
β^+ 19	2.17E−03	8.284E−01*	1.80E−03
β^+ 20	1.04E−03	8.420E−01*	8.76E−04
β^+ 21	5.67E−03	8.458E−01*	4.80E−03
β^+ 22	4.35E−03	8.574E−01*	3.73E−03
β^+ 23	4.44E−03	8.727E−01*	3.88E−03
β^+ 24	1.42E−02	9.176E−01*	1.30E−02
β^+ 25	9.45E−03	9.377E−01*	8.86E−03
β^+ 26	9.45E−03	9.396E−01*	8.88E−03
β^+ 27	1.89E−02	9.529E−01*	1.80E−02
$\gamma^\pm$	1.72E−01	5.110E−01	8.81E−02
ce-N$^+$, γ 1	1.62E−01	4.250E−03*	6.88E−04
ce-L$_3$, γ 9	2.74E−02	1.994E−02	5.46E−04
ce-L$_1$, γ 10	7.23E−02	1.917E−02	1.39E−03
ce-L$_2$, γ 10	5.25E−02	1.968E−02	1.03E−03
ce-L$_3$, γ 10	7.31E−02	2.072E−02	1.51E−03
ce-M, γ 10	4.47E−02	2.771E−02*	1.24E−03
ce-N$^+$, γ 10	1.54E−02	2.966E−02*	4.58E−04
ce-L$_2$, γ 14	2.11E−02	2.772E−02	5.86E−04
ce-L$_3$, γ 14	2.51E−02	2.876E−02	7.23E−04
ce-K, γ 25	3.32E−02	1.700E−02	5.64E−04
ce-K, γ 26	2.67E−02	1.734E−02	4.63E−04
ce-L$_2$, γ 26	3.61E−02	6.869E−02	2.48E−03
ce-L$_3$, γ 26	3.66E−02	6.973E−02	2.55E−03
ce-M, γ 26	1.86E−02	7.672E−02*	1.43E−03
ce-K, γ 32	1.25E−02	4.075E−02	5.10E−04
ce-K, γ 37	7.70E−03	6.186E−02	4.76E−04
γ 50	2.77E−02	1.789E−01	4.96E−03
ce-K, γ 50	6.34E−03	1.175E−01	7.45E−04
ce-K, γ 54	4.15E−03	1.207E−01	5.01E−04
ce-K, γ 56	3.96E−03	1.273E−01	5.05E−04
γ 66	3.60E−02	2.132E−01	7.67E−03
ce-K, γ 66	1.23E−02	1.519E−01	1.87E−03
ce-K, γ 67	5.41E−03	1.615E−01	8.74E−04
γ 72	8.57E−02	2.392E−01	2.05E−02
ce-K, γ 72	9.94E−03	1.779E−01	1.77E−03
ce-K, γ 79	2.32E−03	2.005E−01	4.64E−04
γ 85	2.02E−02	2.789E−01	5.62E−03
γ 89	1.56E−02	3.176E−01	4.95E−03
ce-K, γ 89	1.81E−03	2.563E−01	4.63E−04
γ 114	2.66E−02	4.012E−01	1.07E−02
ce-K, γ 114	1.66E−03	3.399E−01	5.65E−04
γ 125	1.03E−02	4.456E−01	4.60E−03
γ 137	1.37E−02	5.103E−01	6.98E−03
γ 138	1.48E−02	5.131E−01	7.57E−03
γ 193	5.98E−03	7.638E−01	4.56E−03
γ 196	6.44E−03	7.848E−01	5.06E−03
γ 228	8.78E−03	9.884E−01	8.68E−03
γ 245	4.86E−03	1.085E+00	5.27E−03
γ 251	5.26E−03	1.127E+00	5.92E−03
γ 256	4.86E−03	1.161E+00	5.64E−03
γ 261	1.22E−02	1.189E+00	1.45E−02
γ 267	1.21E−02	1.227E+00	1.49E−02
γ 272	3.25E−02	1.267E+00	4.12E−02
γ 273	5.98E−03	1.275E+00	7.62E−03
γ 274	3.49E−03	1.280E+00	4.47E−03
γ 279	6.73E−03	1.305E+00	8.79E−03
γ 290	6.23E−03	1.376E+00	8.57E−03
γ 291	6.08E−03	1.380E+00	8.39E−03
γ 294	4.97E−03	1.394E+00	6.93E−03
γ 295	9.72E−03	1.398E+00	1.36E−02
γ 296	6.41E−03	1.404E+00	8.99E−03
γ 300	8.14E−03	1.427E+00	1.16E−02
γ 304	3.17E−03	1.470E+00	4.66E−03
γ 307	2.56E−02	1.507E+00	3.85E−02
γ 308	6.98E−03	1.510E+00	1.05E−02
γ 310	3.38E−03	1.522E+00	5.15E−03
γ 311	3.24E−03	1.532E+00	4.96E−03
γ 312	4.28E−03	1.535E+00	6.57E−03
γ 313	4.28E−03	1.535E+00	6.57E−03
γ 314	6.01E−03	1.542E+00	9.27E−03
γ 315	6.01E−03	1.542E+00	9.27E−03
γ 316	6.16E−03	1.548E+00	9.53E−03
γ 321	4.25E−03	1.579E+00	6.71E−03
γ 331	3.17E−03	1.630E+00	5.16E−03
γ 332	1.08E−02	1.634E+00	1.76E−02
γ 333	1.41E−02	1.644E+00	2.32E−02
γ 335	3.49E−03	1.656E+00	5.78E−03
γ 336	6.70E−03	1.665E+00	1.12E−02
γ 338	4.10E−03	1.676E+00	6.88E−03
γ 339	2.84E−03	1.678E+00	4.77E−03
γ 340	6.66E−03	1.681E+00	1.12E−02
γ 342	2.81E−03	1.696E+00	4.76E−03
γ 345	7.78E−03	1.714E+00	1.33E−02
γ 347	2.59E−03	1.731E+00	4.49E−03
γ 348	6.12E−03	1.735E+00	1.06E−02
γ 349	3.42E−03	1.740E+00	5.95E−03
γ 350	3.13E−03	1.747E+00	5.47E−03
γ 352	3.46E−03	1.759E+00	6.08E−03
γ 353	3.46E−03	1.759E+00	6.08E−03
γ 354	2.66E−03	1.771E+00	4.72E−03
γ 355	3.13E−03	1.779E+00	5.57E−03
γ 362	3.28E−03	1.833E+00	6.01E−03
γ 368	4.82E−03	1.868E+00	9.01E−03
γ 369	3.35E−03	1.873E+00	6.27E−03
γ 370	2.84E−03	1.879E+00	5.34E−03
γ 372	4.61E−03	1.890E+00	8.71E−03
γ 373	2.88E−03	1.893E+00	5.45E−03
γ 374	5.76E−03	1.895E+00	1.09E−02
γ 375	4.57E−03	1.900E+00	8.69E−03
γ 376	2.34E−03	1.911E+00	4.47E−03
γ 377	5.98E−03	1.918E+00	1.15E−02
γ 378	2.52E−03	1.921E+00	4.84E−03
γ 379	3.02E−03	1.927E+00	5.83E−03
γ 380	4.79E−03	1.934E+00	9.26E−03
γ 381	5.36E−03	1.937E+00	1.04E−02
γ 382	1.42E−02	1.941E+00	2.76E−02
γ 385	4.82E−03	1.951E+00	9.41E−03
γ 388	8.17E−03	1.961E+00	1.60E−02
γ 389	3.85E−03	1.965E+00	7.57E−03
γ 390	1.25E−02	1.974E+00	2.46E−02
γ 391	1.25E−02	1.974E+00	2.46E−02
γ 392	9.29E−03	1.980E+00	1.84E−02
γ 393	2.45E−03	1.983E+00	4.86E−03
γ 394	7.13E−03	1.989E+00	1.42E−02
γ 398	1.26E−02	2.013E+00	2.54E−02
γ 425	3.38E−03	2.198E+00	7.44E−03
γ 426	2.34E−03	2.204E+00	5.16E−03
γ 439	4.50E−03	2.266E+00	1.02E−02
γ 441	6.88E−03	2.272E+00	1.56E−02
K$_{\alpha_1}$ X-ray	4.79E−01	5.239E−02	2.51E−02
K$_{\alpha_2}$ X-ray	2.72E−01	5.135E−02	1.40E−02
K$_{\beta_1}$ X-ray	9.92E−02	5.938E−02	5.89E−03
Auger-KLL	3.09E−02	4.164E−02*	1.29E−03
Auger-KLX	1.63E−02	4.960E−02*	8.10E−04

Auger-LMM	7.08E−01	5.934E−03*	4.20E−03
Auger-LMX	4.38E−01	7.674E−03*	3.36E−03
Auger-LXY	7.26E−02	9.009E−03*	6.54E−04
Auger-MXY	2.50E+00	1.758E−03*	4.39E−03

Listed X, γ and $\gamma^{\pm}$ radiations	9.73E−01
Omitted X, γ AND $\gamma^{\pm}$ radiations**	5.08E−01
Listed β, ce AND Auger radiations	1.13E−01
Omitted β, ce AND Auger radiations**	3.18E−02
Listed radiations	1.09E+00
Omitted radiations**	5.40E−01

* Average energy (MeV)
** Each omitted transition contributes <0.300 % to $\sum y(i) \times E(i)$ in its category.

Yb-167 daughter is radioactive.

72-Hf-174

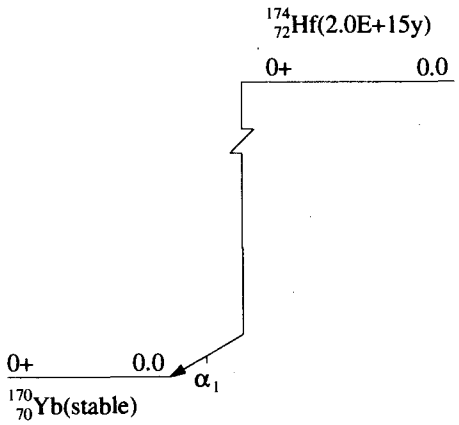
29-JAN-96

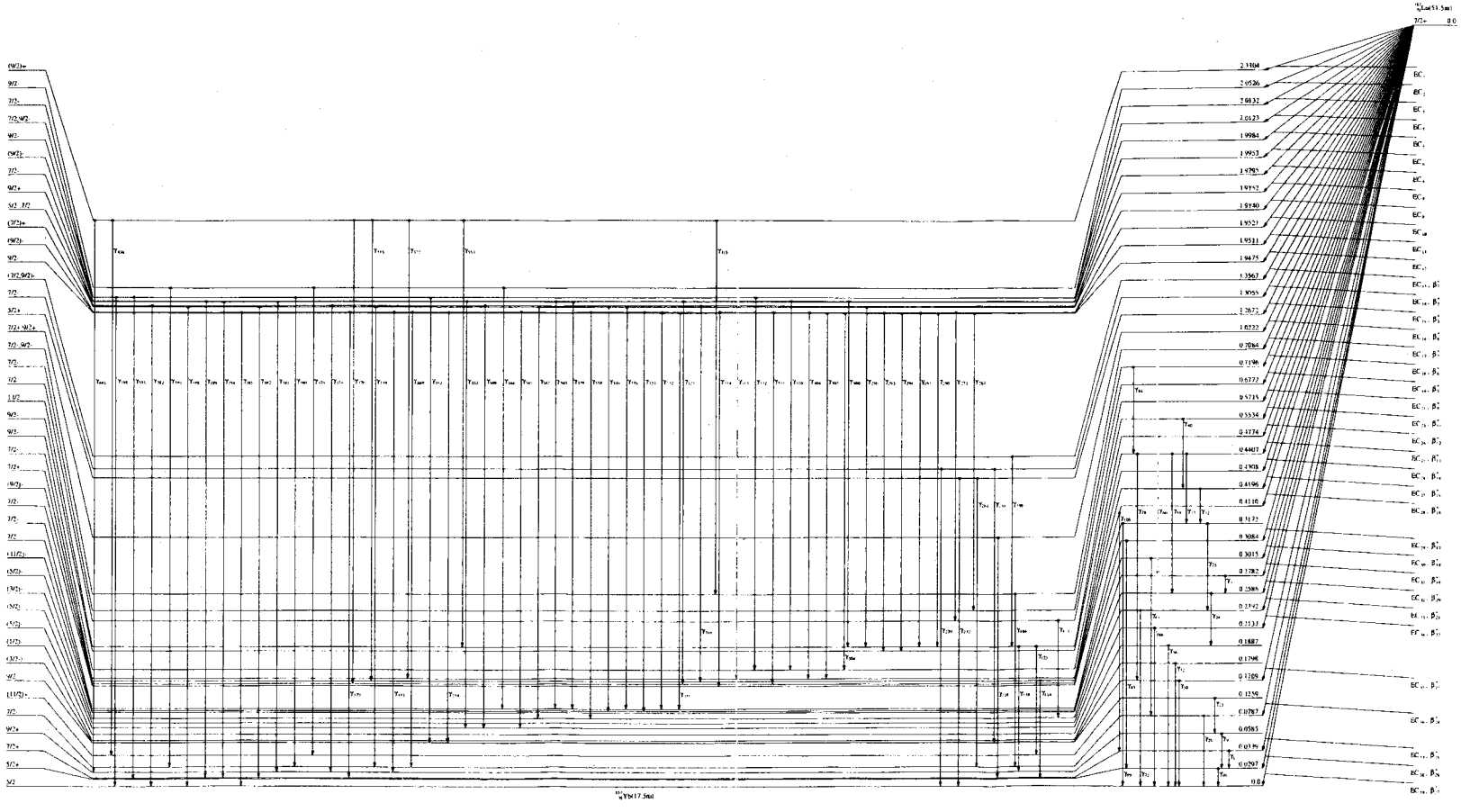
Half-life = 2.0E+15 y
Decay mode(s): α

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E+00	2.437E+00	2.44E+00
α recoil	1.00E+00	5.739E−02	5.74E−02

Listed α and α recoil radiations	2.49E+00
Listed radiations	2.49E+00

Yb-170 daughter is stable.





73-Ta-171

13-MAY-92

Half-life = 23.3 m
Decay mode(s): EC, β^+

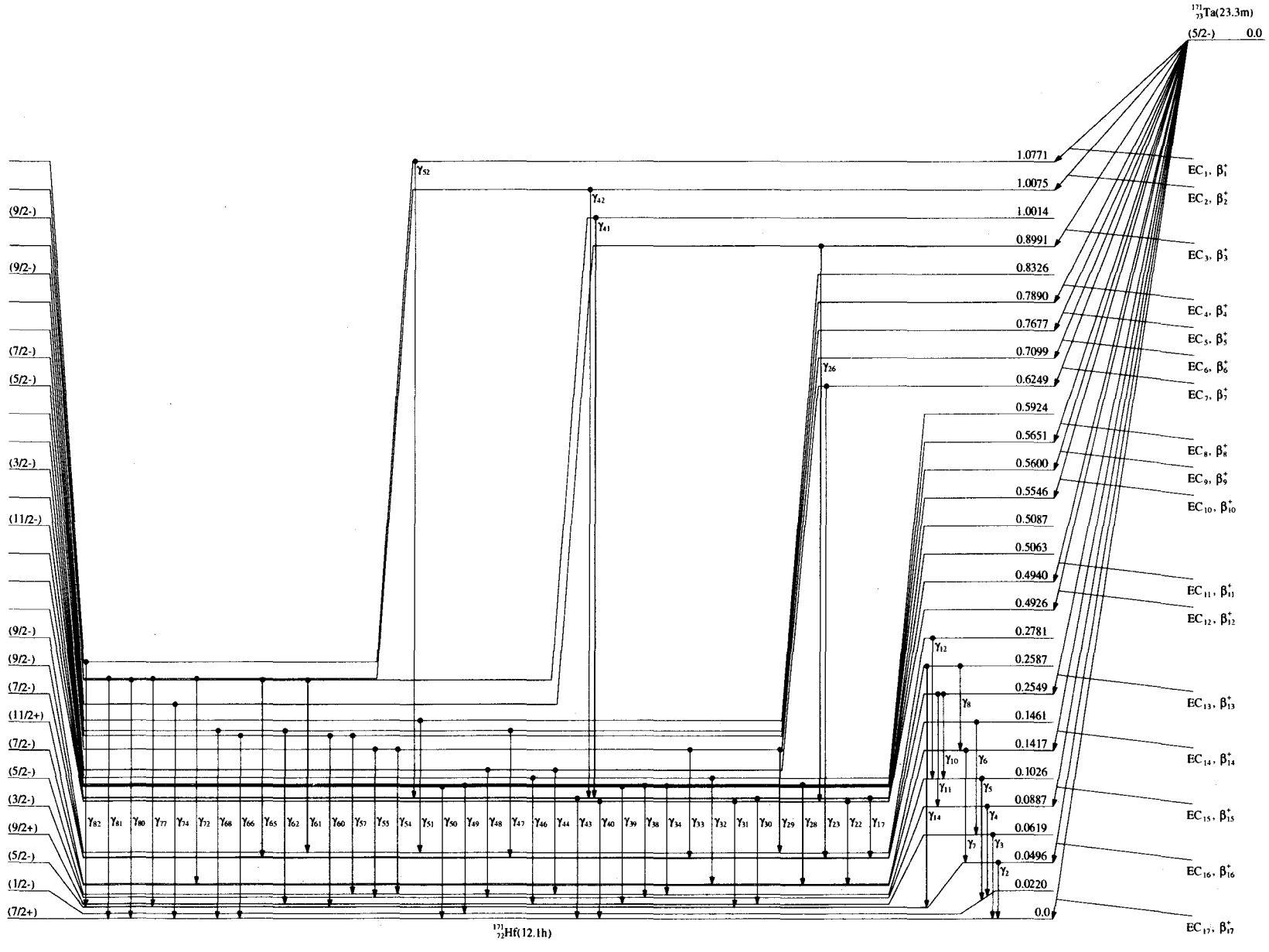
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.24E−03	7.273E−01*	8.99E−04
β^+ 2	7.06E−03	7.582E−01*	5.35E−03
β^+ 3	2.12E−03	8.063E−01*	1.71E−03
β^+ 4	5.30E−03	8.554E−01*	4.53E−03
β^+ 5	5.30E−03	8.649E−01*	4.58E−03
β^+ 6	6.18E−03	8.906E−01*	5.50E−03
β^+ 7	9.71E−03	9.286E−01*	9.02E−03
β^+ 8	1.85E−03	9.554E−01*	1.77E−03
β^+ 9	1.77E−02	9.577E−01*	1.69E−02
β^+ 10	1.06E−02	9.601E−01*	1.02E−02
β^+ 11	1.06E−02	9.873E−01*	1.05E−02
β^+ 12	5.30E−03	9.879E−01*	5.23E−03
β^+ 13	2.38E−02	1.095E+00*	2.61E−02
β^+ 14	3.35E−02	1.146E+00*	3.84E−02
β^+ 15	1.77E−02	1.170E+00*	2.07E−02
β^+ 16	5.30E−02	1.187E+00*	6.29E−02
β^+ 17	2.65E−02	1.210E+00*	3.20E−02
$\gamma^{\pm}$	4.75E−01	5.110E−01	2.43E−01
γ 2	3.20E−01	4.960E−02	1.59E−02
ce-L_1, γ 2	5.28E−02	3.833E−02	2.03E−03
ce-L_2, γ 2	2.62E−02	3.886E−02	1.02E−03
ce-L_3, γ 2	3.32E−02	4.004E−02	1.33E−03
ce-M, γ 2	2.54E−02	4.749E−02*	1.21E−03
ce-N^+, γ 2	7.10E−03	4.960E−02*	3.52E−04
γ 3	2.91E−02	6.190E−02	1.80E−03
ce-L_1, γ 3	5.49E−02	5.063E−02	2.78E−03
ce-L_2, γ 3	1.55E−02	5.116E−02	7.92E−04
ce-L_3, γ 3	1.16E−02	5.234E−02	6.05E−04
ce-M, γ 3	1.90E−02	5.979E−02*	1.13E−03
ce-N^+, γ 3	5.51E−03	6.190E−02*	3.41E−04
γ 4	1.44E−02	6.670E−02	9.60E−04
ce-L_1, γ 4	2.71E−02	5.543E−02	1.50E−03
ce-M, γ 4	6.76E−03	6.459E−02*	4.37E−04
γ 5	1.34E−02	8.070E−02	1.08E−03
ce-L_2, γ 5	3.57E−02	6.996E−02	2.50E−03
ce-L_3, γ 5	3.49E−02	7.114E−02	2.48E−03
ce-M, γ 5	1.81E−02	7.859E−02*	1.42E−03
ce-N^+, γ 5	5.12E−03	8.070E−02*	4.13E−04
ce-K, γ 6	2.80E−02	1.895E−02	5.31E−04
γ 7	3.49E−02	9.220E−02	3.22E−03
ce-K, γ 7	1.51E−01	2.685E−02	4.06E−03
ce-L_1, γ 7	2.14E−02	8.093E−02	1.73E−03
ce-M, γ 7	5.31E−03	9.009E−02*	4.79E−04
γ 8	1.76E−02	1.171E−01	2.06E−03
ce-K, γ 8	3.80E−02	5.175E−02	1.97E−03
ce-L_1, γ 8	5.37E−03	1.058E−01	5.69E−04
γ 10	1.86E−02	1.524E−01	2.83E−03
ce-K, γ 10	1.91E−02	8.705E−02	1.67E−03
ce-L_1, γ 10	2.71E−03	1.411E−01	3.82E−04
γ 11	6.14E−02	1.663E−01	1.02E−02
ce-K, γ 11	1.72E−02	1.009E−01	1.74E−03
ce-L_2, γ 11	6.00E−03	1.556E−01	9.34E−04
ce-L_3, γ 11	4.59E−03	1.567E−01	7.19E−04
ce-M, γ 11	3.05E−03	1.642E−01*	5.01E−04
γ 12	5.12E−02	1.755E−01	8.99E−03
ce-K, γ 12	1.24E−02	1.101E−01	1.36E−03
ce-L_2, γ 12	3.94E−03	1.648E−01	6.49E−04
ce-L_3, γ 12	2.95E−03	1.659E−01	4.89E−04
ce-M, γ 12	2.01E−03	1.734E−01*	3.49E−04
γ 14	9.28E−03	2.092E−01	1.94E−03
γ 17	4.16E−03	2.538E−01	1.06E−03
γ 22	9.92E−03	3.524E−01	3.50E−03
γ 23	4.16E−03	3.701E−01	1.54E−03
γ 25	2.56E−03	3.929E−01	1.01E−03
γ 26	1.47E−02	4.067E−01	5.99E−03
γ 28	1.12E−02	4.234E−01	4.74E−03
γ 29	3.84E−03	4.321E−01	1.66E−03
γ 30	4.99E−02	4.444E−01	2.22E−02
ce-K, γ 30	9.99E−04	3.790E−01	3.79E−04
γ 31	4.99E−02	4.444E−01	2.22E−02
ce-K, γ 31	9.99E−04	3.790E−01	3.79E−04
γ 32	1.09E−02	4.465E−01	4.86E−03
γ 33	1.44E−02	4.547E−01	6.55E−03
γ 34	6.08E−03	4.575E−01	2.78E−03
γ 35	6.40E−03	4.616E−01	2.95E−03
γ 38	2.88E−02	4.713E−01	1.36E−02
ce-K, γ 38	1.39E−03	4.059E−01	5.64E−04
γ 39	4.22E−02	4.927E−01	2.08E−02
γ 40	4.22E−02	4.927E−01	2.08E−02
γ 41	4.80E−03	4.927E−01	2.36E−03
γ 42	7.23E−02	5.018E−01	3.63E−02
ce-K, γ 42	1.08E−03	4.364E−01	4.71E−04
γ 43	1.73E−01	5.064E−01	8.75E−02
ce-K, γ 43	2.53E−03	4.410E−01	1.11E−03
γ 44	3.52E−02	5.223E−01	1.84E−02
ce-K, γ 44	1.30E−03	4.569E−01	5.94E−04
γ 45	5.44E−03	5.262E−01	2.86E−03
γ 46	1.25E−02	5.304E−01	6.62E−03
γ 47	1.25E−02	5.304E−01	6.62E−03
γ 48	2.46E−02	5.360E−01	1.32E−02
ce-K, γ 48	8.52E−04	4.706E−01	4.01E−04
γ 49	4.77E−02	5.380E−01	2.57E−02
ce-K, γ 49	1.63E−03	4.726E−01	7.71E−04
γ 50	2.21E−02	5.545E−01	1.22E−02
γ 51	2.21E−02	5.545E−01	1.22E−02
ce-K, γ 51	6.99E−04	4.891E−01	3.42E−04
γ 52	1.02E−02	5.709E−01	5.85E−03
γ 54	1.25E−02	6.068E−01	7.57E−03
γ 55	1.15E−02	6.217E−01	7.16E−03
γ 56	8.00E−03	6.305E−01	5.04E−03
γ 57	8.00E−03	6.650E−01	5.32E−03
γ 58	9.28E−03	6.784E−01	6.30E−03
γ 59	4.80E−03	7.028E−01	3.37E−03
γ 60	7.36E−03	7.182E−01	5.29E−03
γ 61	8.00E−03	7.233E−01	5.79E−03
γ 62	1.31E−02	7.271E−01	9.54E−03
γ 63	4.80E−03	7.316E−01	3.51E−03
γ 64	4.16E−03	7.369E−01	3.07E−03
γ 65	1.38E−02	7.467E−01	1.03E−02
γ 66	2.88E−02	7.676E−01	2.21E−02
γ 67	6.72E−03	7.823E−01	5.26E−03
γ 68	1.44E−02	7.889E−01	1.14E−02
γ 69	1.06E−02	7.967E−01	8.41E−03
γ 70	1.06E−02	8.023E−01	8.47E−03
γ 71	5.76E−03	8.368E−01	4.82E−03
γ 72	5.44E−03	8.614E−01	4.69E−03
γ 73	5.44E−03	8.768E−01	4.77E−03
γ 74	5.12E−03	8.990E−01	4.60E−03
γ 75	6.40E−03	9.067E−01	5.80E−03
γ 76	3.84E−03	9.201E−01	3.53E−03
γ 77	5.76E−03	9.578E−01	5.52E−03
γ 78	2.75E−02	9.871E−01	2.72E−02
γ 79	9.92E−03	9.970E−01	9.89E−03
γ 80	8.64E−03	1.001E+00	8.65E−03
γ 81	1.09E−02	1.008E+00	1.10E−02
γ 82	5.76E−03	1.027E+00	5.92E−03
K_{α_1} X-ray	5.43E−01	5.579E−02	3.03E−02
K_{α_2} X-ray	3.11E−01	5.461E−02	1.70E−02
K_{β_1} X-ray	1.15E−01	6.324E−02	7.28E−03
K_{β_2} X-ray	4.62E−02	6.500E−02	3.00E−03
K_{β_3} X-ray	5.97E−02	6.299E−02	3.76E−03
L_α X-ray	1.52E−01	7.894E−03*	1.20E−03
L_β X-ray	1.58E−01	9.090E−03*	1.43E−03

Auger-KLL	3.19E−02	4.419E−02*	1.41E−03
Auger-KLX	1.71E−02	5.274E−02*	9.01E−04
Auger-LMM	6.12E−01	6.307E−03*	3.86E−03
Auger-LMX	3.81E−01	8.178E−03*	3.11E−03
Auger-LXY	6.23E−02	9.619E−03*	5.99E−04
Auger-MXY	2.20E+00	1.927E−03*	4.24E−03

Listed X, γ and $\gamma^{\pm}$ radiations	9.46E−01
Omitted X, γ AND $\gamma^{\pm}$ radiations**	4.87E−03
Listed β, ce AND Auger radiations	3.14E−01
Omitted β, ce AND Auger radiations**	1.02E−02
Listed radiations	1.26E+00
Omitted radiations**	1.51E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Hf-171 daughter is radioactive.


$^{171}_{73}$Ta(23.3m)
(5/2-) 0.0
1.0771
1.0075
1.0014
0.8991
0.8326
0.7890
0.7677
0.7099
0.6249
0.5924
0.5651
0.5600
0.5546
0.5087
0.5063
0.4940
0.4926
0.2781
0.2587
0.2549
0.1461
0.1417
0.1026
0.0887
0.0619
0.0496
0.0220
0.0
EC1, β1+
EC2, β2+
EC3, β3+
EC4, β4+
EC5, β5+
EC6, β6+
EC7, β7+
EC8, β8+
EC9, β9+
EC10, β10+
EC11, β11+
EC12, β12+
EC13, β13+
EC14, β14+
EC15, β15+
EC16, β16+
EC17, β17+
(9/2-)
(9/2-)
(7/2-)
(5/2-)
(3/2-)
(11/2-)
(9/2-)
(9/2-)
(7/2-)
(11/2+)
(7/2-)
(5/2-)
(3/2-)
(9/2+)
(5/2-)
(1/2-)
(7/2+)
γ52 γ42 γ41 γ26 γ12 γ8 γ10 γ6 γ11 γ5 γ14 γ4 γ7 γ3 γ2
γ82 γ81 γ80 γ77 γ74 γ72 γ68 γ66 γ65 γ62 γ61 γ60 γ57 γ55 γ54 γ51 γ50 γ49 γ48 γ47 γ46 γ44 γ43 γ40 γ39 γ38 γ34 γ33 γ32 γ31 γ30 γ29 γ28 γ23 γ22 γ17
$^{171}_{72}$Hf(12.1h)

74-W-179m

14-DEC-94

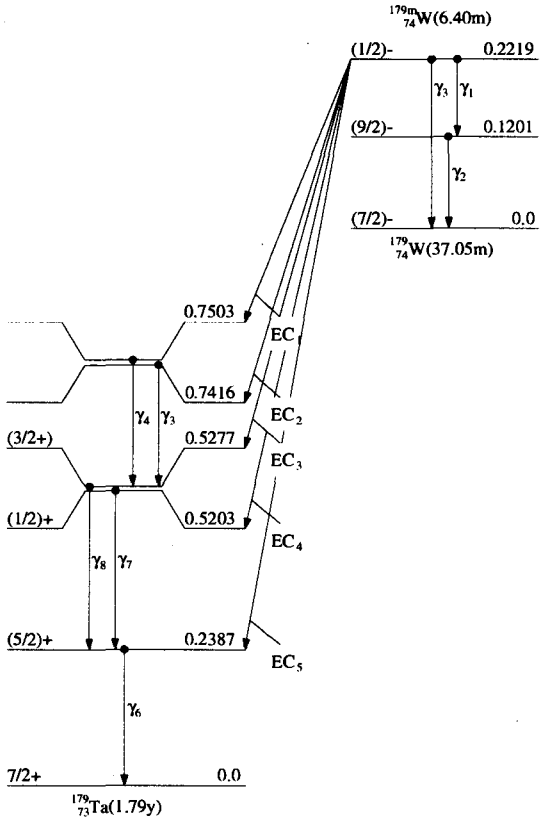
Half-life = 6.4 m
Decay mode(s): EC, IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 3	5.68E−04	2.139E−01	1.21E−04
γ 4	5.68E−04	2.225E−01	1.26E−04
γ 6	2.18E−03	2.387E−01	5.21E−04
γ 7	1.86E−03	2.817E−01	5.23E−04
γ 8	2.84E−04	2.889E−01	8.20E−05
K_{α_1} X-ray	1.50E−03	5.754E−02	8.62E−05
ce-L_2, γ 1	3.99E−03	9.006E−02	3.59E−04
ce-L_3, γ 1	2.93E−03	9.139E−02	2.68E−04
ce-M, γ 1	2.16E−03	9.932E−02*	2.15E−04
γ 2	3.21E−03	1.201E−01	3.86E−04
γ 3	8.57E−02	2.215E−01	1.90E−02
ce-K, γ 3	5.67E−01	1.520E−01	8.62E−02
ce-L_1, γ 3	1.52E−01	2.094E−01	3.19E−02
ce-L_2, γ 3	2.90E−02	2.100E−01	6.08E−03
ce-L_3, γ 3	6.62E−02	2.113E−01	1.40E−02
ce-M, γ 3	6.32E−02	2.192E−01*	1.38E−02
ce-N^+, γ 3	1.94E−02	2.215E−01*	4.29E−03
K_{α_1} X-ray	2.73E−01	5.932E−02	1.62E−02
K_{α_2} X-ray	1.57E−01	5.798E−02	9.13E−03
K_{β_1} X-ray	5.90E−02	6.724E−02	3.97E−03
K_{β_2} X-ray	2.35E−02	6.913E−02	1.62E−03
K_{β_3} X-ray	3.06E−02	6.695E−02	2.05E−03
K_{β_5} X-ray	1.38E−03	6.769E−02	9.32E−05
L_α X-ray	9.02E−02	8.391E−03*	7.57E−04
L_β X-ray	8.64E−02	9.740E−03*	8.41E−04
L_γ X-ray	1.47E−02	1.140E−02*	1.68E−04
Auger-KLL	1.51E−02	4.682E−02*	7.06E−04
Auger-KLX	8.16E−03	5.599E−02*	4.57E−04
Auger-LMM	3.07E−01	6.678E−03*	2.05E−03
Auger-LMX	1.92E−01	8.693E−03*	1.67E−03
Auger-LXY	3.12E−02	1.024E−02*	3.19E−04
Auger-MXY	1.14E+00	2.097E−03*	2.38E−03

Listed X, γ and $\gamma^{\pm}$ radiations	5.57E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.82E−04
Listed β, ce and Auger radiations	1.65E−01
Omitted β, ce and Auger radiations**	1.10E−03
Listed radiations	2.20E−01
Omitted radiations**	1.28E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ta-179 daughter, yield 2.8E−03, is radioactive.
W-179 daughter, yield 9.972E−01, is radioactive.



74-W-190

14-DEC-90

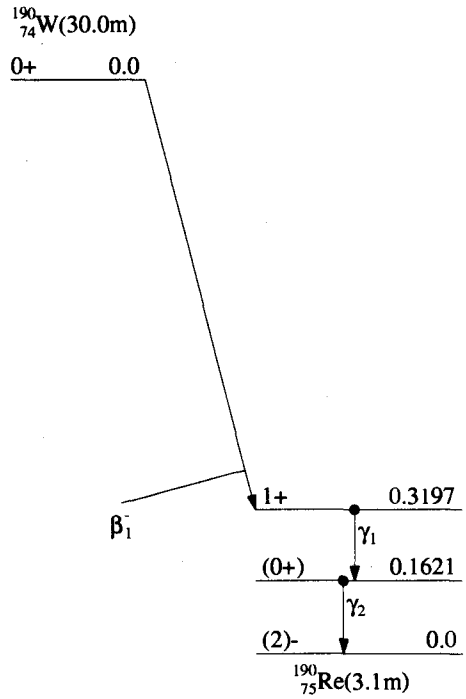
Half-life = 30 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.00E+00	3.134E−01*	3.13E−01
γ 1	3.90E−01	1.576E−01	6.15E−02
ce-K, γ 1	4.69E−01	8.592E−02	4.03E−02
ce-L_1, γ 1	6.84E−02	1.451E−01	9.92E−03
ce-L_2, γ 1	6.39E−03	1.456E−01	9.31E−04
ce-M, γ 1	1.72E−02	1.552E−01*	2.67E−03
ce-N^+, γ 1	5.25E−03	1.576E−01*	8.27E−04
γ 2	1.10E−01	1.621E−01	1.78E−02
ce-K, γ 2	6.56E−01	9.042E−02	5.93E−02
ce-L_1, γ 2	1.38E−01	1.496E−01	2.07E−02
ce-L_2, γ 2	1.79E−02	1.501E−01	2.69E−03
ce-L_3, γ 2	1.97E−02	1.516E−01	2.99E−03
ce-M, γ 2	4.28E−02	1.597E−01*	6.83E−03
ce-N^+, γ 2	1.33E−02	1.621E−01*	2.16E−03
K_{α_1} X-ray	5.39E−01	6.114E−02	3.29E−02
K_{α_2} X-ray	3.11E−01	5.972E−02	1.86E−02
K_{β_1} X-ray	1.18E−01	6.931E−02	8.18E−03
K_{β_2} X-ray	4.66E−02	7.127E−02	3.32E−03
K_{β_3} X-ray	6.12E−02	6.899E−02	4.22E−03
K_{β_5} X-ray	2.82E−03	6.976E−02	1.97E−04
L_α X-ray	1.53E−01	8.646E−03*	1.32E−03
L_β X-ray	1.48E−01	1.007E−02*	1.49E−03
L_γ X-ray	2.52E−02	1.179E−02*	2.97E−04
Auger-KLL	2.83E−02	4.817E−02*	1.36E−03
Auger-KLX	1.54E−02	5.766E−02*	8.88E−04
Auger-LMM	4.86E−01	6.844E−03*	3.33E−03
Auger-LMX	3.05E−01	8.930E−03*	2.72E−03
Auger-LXY	4.97E−02	1.054E−02*	5.24E−04
Auger-MXY	1.81E+00	2.200E−03*	3.99E−03

Listed X, γ and $\gamma^\pm$ radiations	1.50E−01
Omitted X, γ and $\gamma^\pm$ radiations**	7.45E−05
Listed β, ce and Auger radiations	4.76E−01
Omitted β, ce and Auger radiations**	4.02E−04
Listed radiations	6.25E−01
Omitted radiations**	4.77E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Re-190 daughter is radioactive.



75-Re-179

14-DEC-94

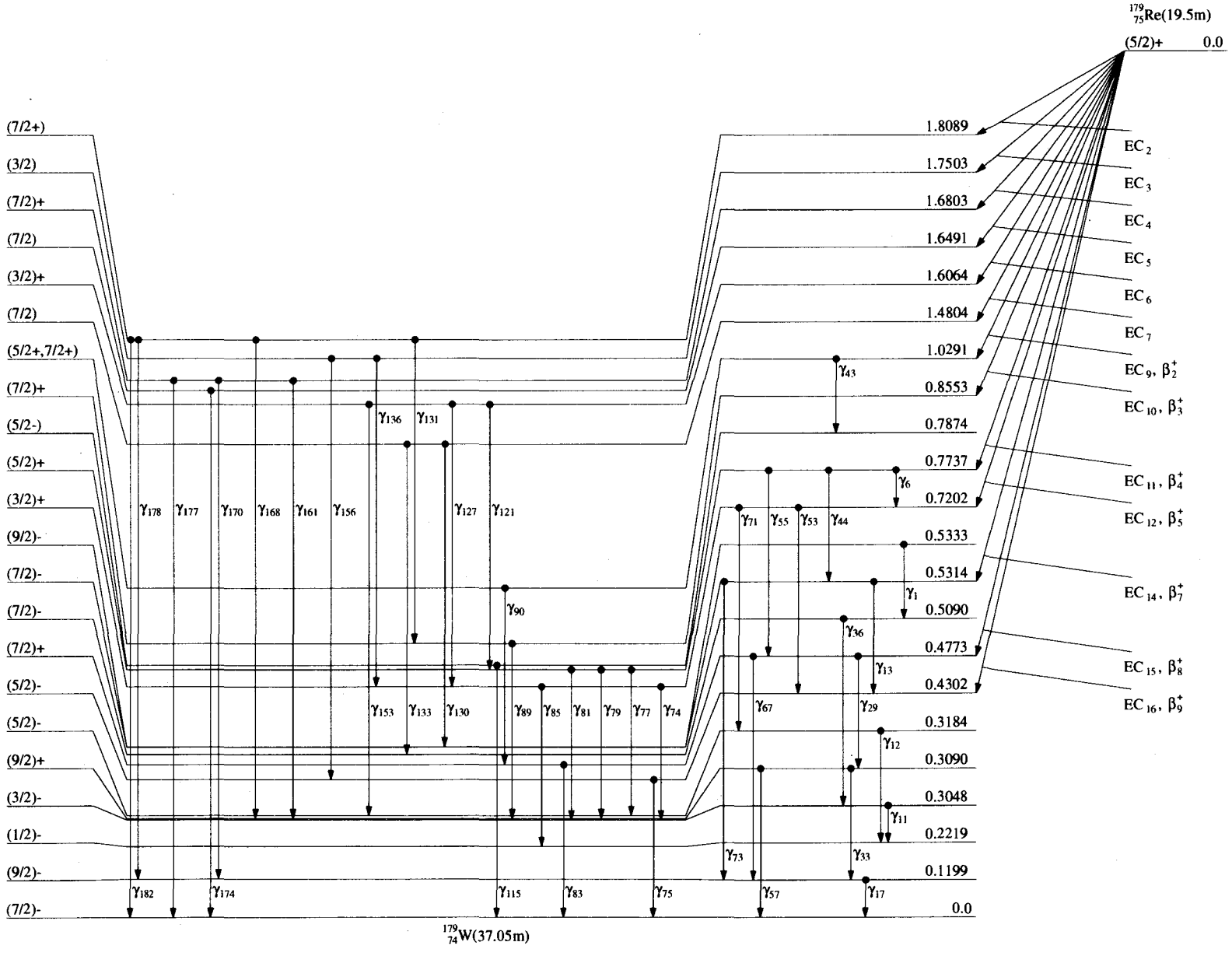
Half-life = 19.5 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 4	2.38E−03	4.261E−01*	1.01E−03
β^+ 5	6.47E−03	4.496E−01*	2.91E−03
β^+ 8	5.71E−04	5.562E−01*	3.17E−04
β^+ 9	6.66E−04	5.769E−01*	3.84E−04
$\gamma^\pm$	2.17E−02	5.110E−01	1.11E−02
ce-L$_1$, γ 1	4.17E−02	1.220E−02	5.09E−04
ce-L$_2$, γ 2	2.86E−01	2.066E−02	5.90E−03
ce-L$_3$, γ 2	3.34E−01	2.199E−02	7.35E−03
ce-M, γ 2	1.56E−01	2.992E−02*	4.65E−03
ce-N$^+$, γ 2	4.97E−02	3.220E−02*	1.60E−03
ce-L$_2$, γ 3	1.89E−01	2.351E−02	4.45E−03
ce-L$_3$, γ 3	2.19E−01	2.484E−02	5.44E−03
ce-M, γ 3	1.02E−01	3.277E−02*	3.35E−03
ce-N$^+$, γ 3	3.18E−02	3.505E−02*	1.12E−03
ce-L$_1$, γ 4	1.09E−02	2.620E−02	2.84E−04
ce-L$_2$, γ 5	1.36E−01	4.091E−02	5.56E−03
ce-L$_3$, γ 5	1.45E−01	4.224E−02	6.12E−03
ce-M, γ 5	7.11E−02	5.017E−02*	3.57E−03
ce-N$^+$, γ 5	2.06E−02	5.245E−02*	1.08E−03
ce-L$_1$, γ 6	1.75E−02	4.135E−02	7.22E−04
ce-L$_2$, γ 6	2.10E−02	4.191E−02	8.81E−04
ce-L$_3$, γ 6	2.08E−02	4.324E−02	8.98E−04
ce-M, γ 6	1.44E−02	5.117E−02*	7.38E−04
ce-L$_1$, γ 7	6.05E−03	5.175E−02	3.13E−04
ce-L$_2$, γ 8	4.56E−03	6.041E−02	2.75E−04
ce-L$_3$, γ 8	4.49E−03	6.174E−02	2.77E−04
ce-L$_2$, γ 11	4.09E−02	7.127E−02	2.91E−03
ce-L$_3$, γ 11	3.87E−02	7.260E−02	2.81E−03
ce-M, γ 11	2.06E−02	8.053E−02*	1.66E−03
ce-N$^+$, γ 11	5.99E−03	8.281E−02*	4.96E−04
ce-L$_2$, γ 12	8.32E−03	8.491E−02	7.07E−04
ce-L$_3$, γ 12	7.51E−03	8.624E−02	6.47E−04
ce-M, γ 12	4.14E−03	9.417E−02*	3.89E−04
ce-K, γ 13	9.01E−03	3.165E−02	2.85E−04
γ 17	4.79E−02	1.199E−01	5.74E−03
ce-K, γ 17	4.09E−02	5.038E−02	2.06E−03
ce-L$_1$, γ 17	4.88E−03	1.078E−01	5.26E−04
ce-L$_2$, γ 17	2.15E−02	1.084E−01	2.33E−03
ce-L$_3$, γ 17	1.79E−02	1.097E−01	1.96E−03
ce-M, γ 17	1.11E−02	1.176E−01*	1.30E−03
ce-N$^+$, γ 17	3.26E−03	1.199E−01*	3.90E−04
γ 29	2.24E−02	1.684E−01	3.77E−03
ce-K, γ 29	1.73E−02	9.886E−02	1.72E−03
ce-L$_1$, γ 29	2.45E−03	1.563E−01	3.83E−04
γ 33	7.50E−02	1.891E−01	1.42E−02
ce-K, γ 33	4.52E−03	1.196E−01	5.41E−04
γ 43	9.52E−03	2.417E−01	2.30E−03
γ 44	1.68E−02	2.424E−01	4.07E−03
γ 53	2.69E−01	2.900E−01	7.79E−02
ce-K, γ 53	5.59E−03	2.204E−01	1.23E−03
γ 55	8.90E−02	2.963E−01	2.64E−02
ce-K, γ 55	1.72E−02	2.268E−01	3.91E−03
ce-L$_1$, γ 55	2.46E−03	2.842E−01	7.00E−04
γ 57	3.30E−02	3.089E−01	1.02E−02
γ 58	1.46E−02	3.093E−01	4.50E−03
γ 67	1.34E−02	3.573E−01	4.80E−03
γ 70	1.12E−02	4.004E−01	4.48E−03
ce-K, γ 70	9.72E−04	3.309E−01	3.22E−04
γ 71	7.20E−02	4.018E−01	2.89E−02
γ 73	1.12E−02	4.115E−01	4.61E−03
ce-K, γ 73	9.05E−04	3.420E−01	3.09E−04
γ 74	1.06E−01	4.154E−01	4.41E−02
ce-K, γ 74	9.53E−04	3.459E−01	3.30E−04
γ 75	2.80E−01	4.302E−01	1.20E−01
ce-K, γ 75	2.01E−02	3.607E−01	7.26E−03
ce-L$_1$, γ 75	2.86E−03	4.181E−01	1.20E−03
ce-M, γ 75	7.05E−04	4.280E−01*	3.02E−04
γ 77	1.48E−02	4.553E−01	6.76E−03
γ 79	3.75E−02	4.647E−01	1.74E−02
ce-K, γ 79	7.18E−04	3.952E−01	2.84E−04
γ 81	5.32E−03	4.688E−01	2.49E−03
γ 82	8.40E−03	4.765E−01	4.00E−03
γ 83	9.24E−02	4.773E−01	4.41E−02
γ 85	5.68E−02	4.983E−01	2.83E−02
γ 89	9.80E−03	5.461E−01	5.35E−03
γ 90	5.04E−03	5.518E−01	2.78E−03
γ 111	3.75E−03	7.449E−01	2.79E−03
γ 115	6.89E−03	7.874E−01	5.42E−03
γ 118	5.49E−03	8.121E−01	4.46E−03
γ 120	2.94E−03	8.276E−01	2.43E−03
γ 121	3.00E−02	8.326E−01	2.49E−02
ce-K, γ 121	3.96E−04	7.631E−01	3.02E−04
γ 122	3.64E−03	8.365E−01	3.04E−03
γ 125	3.64E−03	8.626E−01	3.14E−03
γ 127	2.52E−02	8.862E−01	2.23E−02
γ 128	5.04E−03	9.031E−01	4.55E−03
γ 129	3.36E−03	9.352E−01	3.14E−03
γ 130	6.72E−03	9.471E−01	6.36E−03
γ 131	2.52E−03	9.536E−01	2.40E−03
γ 133	5.18E−03	9.714E−01	5.03E−03
γ 136	2.66E−03	1.030E+00	2.74E−03
γ 153	2.24E−03	1.288E+00	2.89E−03
γ 156	2.04E−03	1.320E+00	2.70E−03
γ 161	1.08E−02	1.371E+00	1.47E−02
γ 168	1.99E−03	1.500E+00	2.98E−03
γ 170	3.22E−02	1.560E+00	5.02E−02
γ 174	4.56E−03	1.649E+00	7.53E−03
γ 177	1.30E−01	1.680E+00	2.18E−01
γ 178	4.37E−03	1.689E+00	7.38E−03
γ 181	1.68E−03	1.805E+00	3.03E−03
γ 182	2.24E−02	1.809E+00	4.05E−02
K$_{\alpha_1}$ X-ray	4.69E−01	5.932E−02	2.78E−02
K$_{\alpha_2}$ X-ray	2.70E−01	5.798E−02	1.57E−02
K$_{\beta_1}$ X-ray	1.01E−01	6.724E−02	6.82E−03
K$_{\beta_2}$ X-ray	4.04E−02	6.913E−02	2.79E−03
K$_{\beta_3}$ X-ray	5.26E−02	6.695E−02	3.52E−03
L$_\alpha$ X-ray	3.09E−01	8.391E−03*	2.60E−03
L$_\beta$ X-ray	3.28E−01	9.731E−03*	3.19E−03
Auger-KLL	2.59E−02	4.682E−02*	1.21E−03
Auger-KLX	1.40E−02	5.599E−02*	7.84E−04
Auger-LMM	1.08E+00	6.666E−03*	7.22E−03
Auger-LMX	6.71E−01	8.669E−03*	5.82E−03
Auger-LXY	1.09E−01	1.022E−02*	1.11E−03
Auger-MXY	4.03E+00	2.054E−03*	8.28E−03
ΔE	1.04E+00	3.183E−04*	3.30E−04

Listed X, γ and $\gamma^\pm$ radiations	9.84E−01
Omitted X, γ and $\gamma^\pm$ radiations**	1.03E−01
Listed β, ce and Auger radiations	1.22E−01
Omitted β, ce and Auger radiations**	1.27E−02
Listed radiations	1.11E+00
Omitted radiations**	1.16E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum$y(i)×E(i) in its category.

W-179m daughter, yield 2.386E−01, is radioactive.
W-179 daughter, yield 7.614E−01, is radioactive.


179 75 Re(19.5m)
(5/2)+ 0.0
EC 2
EC 3
EC 4
EC 5
EC 6
EC 7
EC 9, β+ 2
EC 10, β+ 3
EC 11, β+ 4
EC 12, β+ 5
EC 14, β+ 7
EC 15, β+ 8
EC 16, β+ 9
1.8089
1.7503
1.6803
1.6491
1.6064
1.4804
1.0291
0.8553
0.7874
0.7737
0.7202
0.5333
0.5314
0.5090
0.4773
0.4302
0.3184
0.3090
0.3048
0.2219
0.1199
0.0
(7/2+)
(3/2)
(7/2)+
(7/2)
(3/2)+
(7/2)
(5/2+,7/2+)
(7/2)+
(5/2-)
(5/2)+
(3/2)+
(9/2)-
(7/2)-
(7/2)-
(7/2)+
(5/2)-
(5/2)-
(9/2)+
(3/2)-
(1/2)-
(9/2)-
(7/2)-
179 74 W(37.05m)

75-Re-183

10-JUL-91

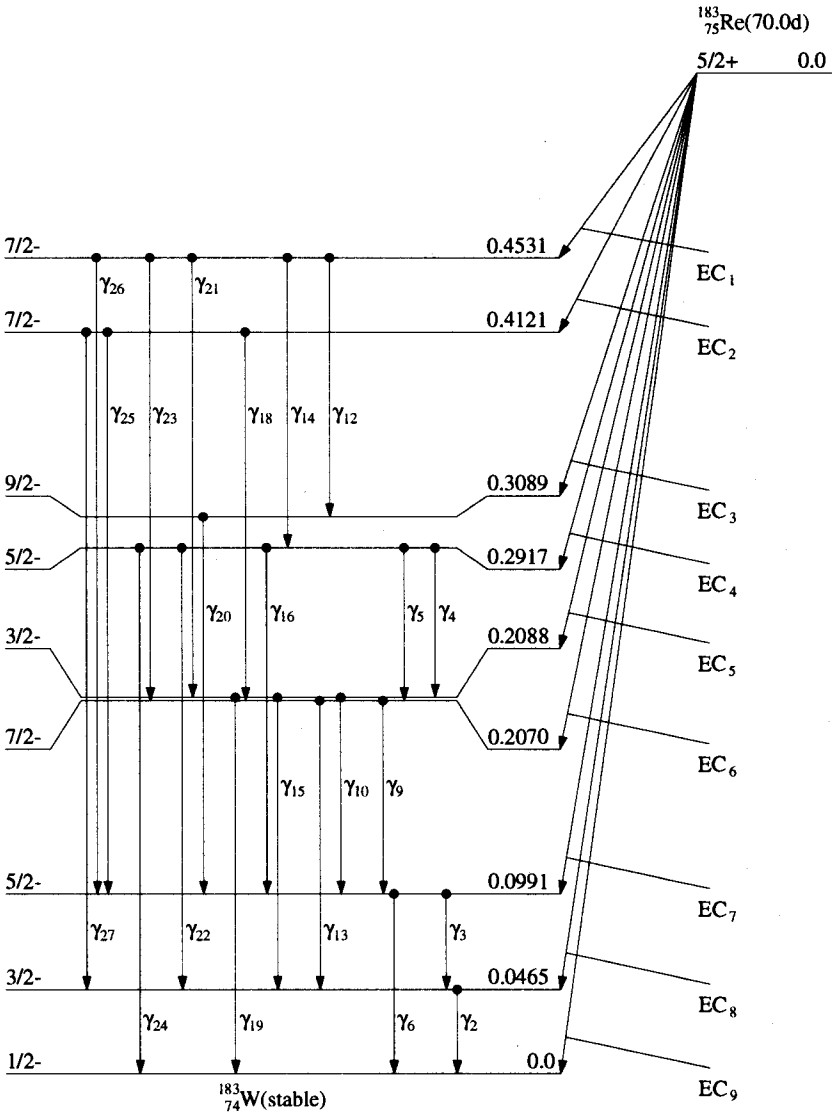
Half-life = 70 d
Decay mode(s): EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 2	7.97E−02	4.648E−02	3.70E−03
ce-L$_1$, γ 2	4.33E−01	3.438E−02	1.49E−02
ce-L$_2$, γ 2	6.40E−02	3.494E−02	2.24E−03
ce-L$_3$, γ 2	2.98E−02	3.628E−02	1.08E−03
ce-M, γ 2	1.21E−01	4.420E−02*	5.34E−03
ce-N$^+$, γ 2	3.67E−02	4.648E−02*	1.71E−03
γ 3	2.21E−02	5.260E−02	1.16E−03
ce-L$_1$, γ 3	8.30E−02	4.050E−02	3.36E−03
ce-L$_2$, γ 3	1.60E−02	4.105E−02	6.55E−04
ce-L$_3$, γ 3	9.52E−03	4.239E−02	4.03E−04
ce-M, γ 3	2.51E−02	5.032E−02*	1.26E−03
ce-N$^+$, γ 3	7.53E−03	5.260E−02*	3.96E−04
γ 4	2.94E−03	8.292E−02	2.43E−04
ce-K, γ 4	1.56E−02	1.339E−02	2.09E−04
ce-L$_1$, γ 4	2.23E−03	7.082E−02	1.58E−04
ce-L$_2$, γ 4	2.53E−03	7.137E−02	1.80E−04
ce-L$_3$, γ 4	2.23E−03	7.271E−02	1.62E−04
ce-M, γ 4	1.70E−03	8.064E−02*	1.37E−04
γ 5	9.74E−03	8.471E−02	8.25E−04
ce-K, γ 5	6.21E−02	1.519E−02	9.43E−04
ce-L$_1$, γ 5	8.96E−03	7.261E−02	6.51E−04
ce-L$_2$, γ 5	1.61E−03	7.317E−02	1.18E−04
ce-M, γ 5	2.63E−03	8.243E−02*	2.16E−04
γ 6	2.69E−02	9.908E−02	2.67E−03
ce-K, γ 6	2.45E−02	2.956E−02	7.23E−04
ce-L$_1$, γ 6	2.67E−03	8.698E−02	2.32E−04
ce-L$_2$, γ 6	3.30E−02	8.754E−02	2.89E−03
ce-L$_3$, γ 6	2.95E−02	8.887E−02	2.62E−03
ce-M, γ 6	1.64E−02	9.680E−02*	1.59E−03
ce-N$^+$, γ 6	4.80E−03	9.908E−02*	4.76E−04
γ 9	2.17E−02	1.079E−01	2.34E−03
ce-K, γ 9	6.60E−02	3.841E−02	2.54E−03
ce-L$_1$, γ 9	9.44E−03	9.583E−02	9.05E−04
ce-L$_2$, γ 9	2.44E−03	9.639E−02	2.35E−04
ce-L$_3$, γ 9	1.47E−03	9.773E−02	1.43E−04
ce-M, γ 9	3.10E−03	1.057E−01*	3.28E−04
γ 10	2.87E−02	1.097E−01	3.15E−03
ce-K, γ 10	8.79E−02	4.021E−02	3.53E−03
ce-L$_1$, γ 10	1.26E−02	9.763E−02	1.23E−03
ce-L$_2$, γ 10	1.66E−03	9.819E−02	1.63E−04
ce-M, γ 10	3.39E−03	1.074E−01*	3.64E−04
ce-N$^+$, γ 10	1.03E−03	1.097E−01*	1.14E−04
γ 12	1.17E−03	1.441E−01	1.68E−04
ce-K, γ 12	1.66E−03	7.461E−02	1.24E−04
γ 13	5.94E−03	1.605E−01	9.54E−04
ce-K, γ 13	1.81E−03	9.101E−02	1.65E−04
ce-L$_2$, γ 13	8.14E−04	1.490E−01	1.21E−04
γ 14	6.06E−03	1.613E−01	9.77E−04
ce-K, γ 14	6.13E−03	9.182E−02	5.63E−04
ce-L$_1$, γ 14	8.78E−04	1.492E−01	1.31E−04
γ 15	2.33E−01	1.623E−01	3.78E−02
ce-K, γ 15	2.14E−01	9.280E−02	1.99E−02
ce-L$_1$, γ 15	3.04E−02	1.502E−01	4.57E−03
ce-L$_2$, γ 15	7.07E−03	1.508E−01	1.07E−03
ce-L$_3$, γ 15	3.58E−03	1.521E−01	5.45E−04
ce-M, γ 15	9.52E−03	1.600E−01*	1.52E−03
ce-N$^+$, γ 15	2.87E−03	1.623E−01*	4.65E−04
γ 16	2.60E−03	1.926E−01	5.02E−04
ce-K, γ 16	1.12E−03	1.231E−01	1.38E−04
γ 18	1.10E−03	2.051E−01	2.25E−04
γ 19	2.95E−02	2.088E−01	6.16E−03
ce-K, γ 19	1.28E−02	1.393E−01	1.79E−03
ce-L$_1$, γ 19	1.81E−03	1.967E−01	3.57E−04
ce-M, γ 19	5.58E−04	2.065E−01*	1.15E−04
γ 20	2.61E−03	2.099E−01	5.48E−04
γ 21	4.08E−03	2.443E−01	9.96E−04
γ 22	2.45E−03	2.452E−01	6.00E−04
ce-K, γ 22	7.92E−04	1.757E−01	1.39E−04
γ 23	1.31E−02	2.461E−01	3.22E−03
ce-K, γ 23	4.19E−03	1.765E−01	7.39E−04
ce-L$_1$, γ 23	6.00E−04	2.340E−01	1.40E−04
γ 24	3.05E−02	2.917E−01	8.90E−03
ce-K, γ 24	1.88E−03	2.222E−01	4.19E−04
γ 25	4.15E−03	3.130E−01	1.30E−03
ce-K, γ 25	6.70E−04	2.435E−01	1.63E−04
γ 26	5.36E−03	3.540E−01	1.90E−03
ce-K, γ 26	6.24E−04	2.845E−01	1.78E−04
γ 27	7.88E−04	3.656E−01	2.88E−04
K$_{\alpha_1}$ X-ray	5.96E−01	5.932E−02	3.53E−02
K$_{\alpha_2}$ X-ray	3.43E−01	5.798E−02	1.99E−02
K$_{\beta_1}$ X-ray	1.29E−01	6.724E−02	8.66E−03
K$_{\beta_2}$ X-ray	5.13E−02	6.913E−02	3.54E−03
K$_{\beta_3}$ X-ray	6.67E−02	6.695E−02	4.47E−03
K$_{\beta_5}$ X-ray	3.00E−03	6.769E−02	2.03E−04
L$_\alpha$ X-ray	2.15E−01	8.391E−03*	1.81E−03
L$_\beta$ X-ray	2.65E−01	9.728E−03*	2.58E−03
L$_\gamma$ X-ray	5.08E−02	1.145E−02*	5.82E−04
Auger-KLL	3.29E−02	4.682E−02*	1.54E−03
Auger-KLX	1.78E−02	5.599E−02*	9.96E−04
Auger-KXY	2.77E−03	6.490E−02*	1.79E−04
Auger-LMM	8.51E−01	6.839E−03*	5.82E−03
Auger-LMX	5.39E−01	8.867E−03*	4.78E−03
Auger-LXY	8.69E−02	1.041E−02*	9.05E−04
Auger-MXY	3.14E+00	2.085E−03*	6.55E−03
ΔE	7.94E−01	3.172E−04*	2.52E−04

Listed X, γ and γ$^\pm$ radiations	1.56E−01
Omitted X, γ and γ$^\pm$ radiations**	3.54E−04
Listed β, ce and Auger radiations	1.07E−01
Omitted β, ce and Auger radiations**	1.88E−03
Listed radiations	2.62E−01
Omitted radiations**	2.23E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

W-183 daughter is stable.


183 75 Re(70.0d)
5/2+ 0.0
7/2- 0.4531
7/2- 0.4121
9/2- 0.3089
5/2- 0.2917
3/2- 0.2088
7/2- 0.2070
5/2- 0.0991
3/2- 0.0465
1/2- 0.0
183 74 W(stable)
EC1
EC2
EC3
EC4
EC5
EC6
EC7
EC8
EC9
γ26
γ21
γ25
γ23
γ18
γ14
γ12
γ20
γ16
γ5
γ4
γ15
γ10
γ9
γ27
γ22
γ13
γ3
γ24
γ19
γ6
γ2

75-Re-190

14-DEC-90

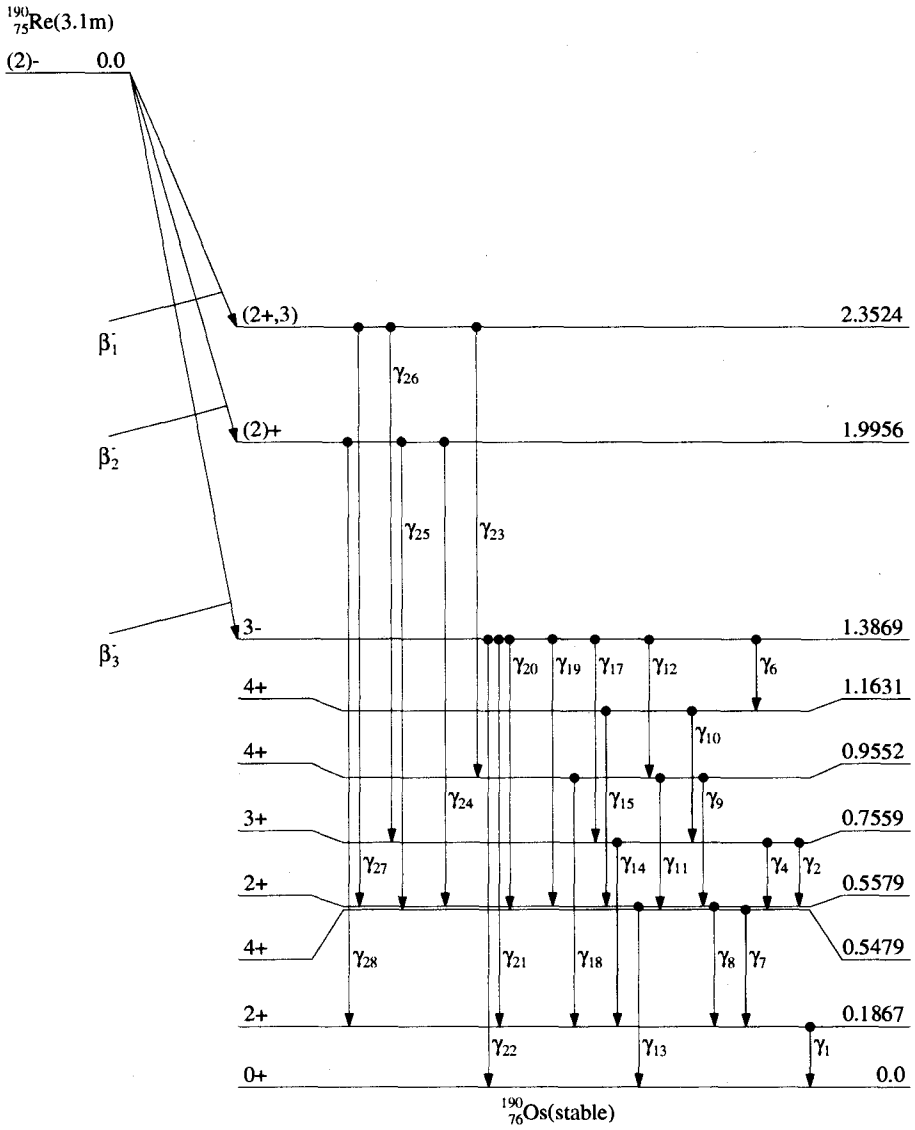
Half-life = 3.1 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	9.00E−03	2.515E−01*	2.26E−03
β^- 2	1.10E−02	3.886E−01*	4.27E−03
β^- 3	9.80E−01	6.386E−01*	6.26E−01
γ 1	4.84E−01	1.867E−01	9.04E−02
ce-K, γ 1	9.90E−02	1.128E−01	1.12E−02
ce-L_1, γ 1	1.16E−02	1.737E−01	2.01E−03
ce-L_2, γ 1	4.09E−02	1.743E−01	7.13E−03
ce-L_3, γ 1	2.80E−02	1.758E−01	4.93E−03
ce-M, γ 1	2.03E−02	1.842E−01*	3.74E−03
ce-N^+, γ 1	6.06E−03	1.867E−01*	1.13E−03
γ 2	1.67E−02	1.981E−01	3.31E−03
γ 4	1.01E−02	2.079E−01	2.10E−03
γ 6	2.60E−01	2.238E−01	5.81E−02
ce-K, γ 6	1.08E−02	1.499E−01	1.62E−03
γ 7	1.45E−01	3.611E−01	5.24E−02
ce-K, γ 7	5.42E−03	2.872E−01	1.56E−03
γ 8	2.16E−01	3.712E−01	8.00E−02
ce-K, γ 8	7.80E−03	2.974E−01	2.32E−03
γ 9	7.92E−02	3.974E−01	3.15E−02
ce-K, γ 9	2.34E−03	3.235E−01	7.56E−04
γ 10	9.68E−02	4.072E−01	3.94E−02
ce-K, γ 10	3.56E−03	3.333E−01	1.19E−03
γ 11	5.54E−02	4.072E−01	2.26E−02
γ 12	1.67E−01	4.316E−01	7.22E−02
γ 13	2.82E−01	5.580E−01	1.57E−01
ce-K, γ 13	3.78E−03	4.841E−01	1.83E−03
γ 14	2.51E−01	5.693E−01	1.43E−01
ce-K, γ 14	3.29E−03	4.954E−01	1.63E−03
γ 15	1.63E−01	6.051E−01	9.85E−02
ce-K, γ 15	1.83E−03	5.313E−01	9.72E−04
γ 17	1.76E−01	6.309E−01	1.11E−01
γ 18	2.68E−02	7.686E−01	2.06E−02
γ 19	2.29E−01	8.290E−01	1.90E−01
γ 20	7.92E−02	8.391E−01	6.65E−02
γ 21	3.17E−02	1.200E+00	3.80E−02
γ 22	1.32E−02	1.387E+00	1.83E−02
γ 23	1.54E−03	1.397E+00	2.15E−03
γ 24	6.60E−03	1.438E+00	9.49E−03
γ 25	2.29E−03	1.448E+00	3.31E−03
γ 26	1.45E−03	1.596E+00	2.32E−03
γ 27	5.28E−03	1.794E+00	9.47E−03
γ 28	1.76E−03	1.809E+00	3.18E−03
K_{α_1} X-ray	7.09E−02	6.300E−02	4.46E−03
K_{α_2} X-ray	4.11E−02	6.149E−02	2.53E−03
Auger-MXY	3.33E−01	2.258E−03*	7.52E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.33E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	6.06E−03
Listed β, ce and Auger radiations	6.75E−01
Omitted β, ce and Auger radiations**	1.11E−02
Listed radiations	2.01E+00
Omitted radiations**	1.72E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Os-190 daughter is stable.


190 75 Re(3.1m)
(2)- 0.0
β-1
β-2
β-3
(2+,3) 2.3524
(2)+ 1.9956
3- 1.3869
4+ 1.1631
4+ 0.9552
3+ 0.7559
2+ 0.5579
4+ 0.5479
2+ 0.1867
0+ 0.0
γ26
γ25
γ23
γ20
γ19
γ17
γ12
γ6
γ10
γ24
γ15
γ9
γ27
γ14
γ11
γ4
γ2
γ28
γ21
γ18
γ8
γ7
γ22
γ13
γ1
190 76 Os(stable)

76-Os-183m

10-JUL-91

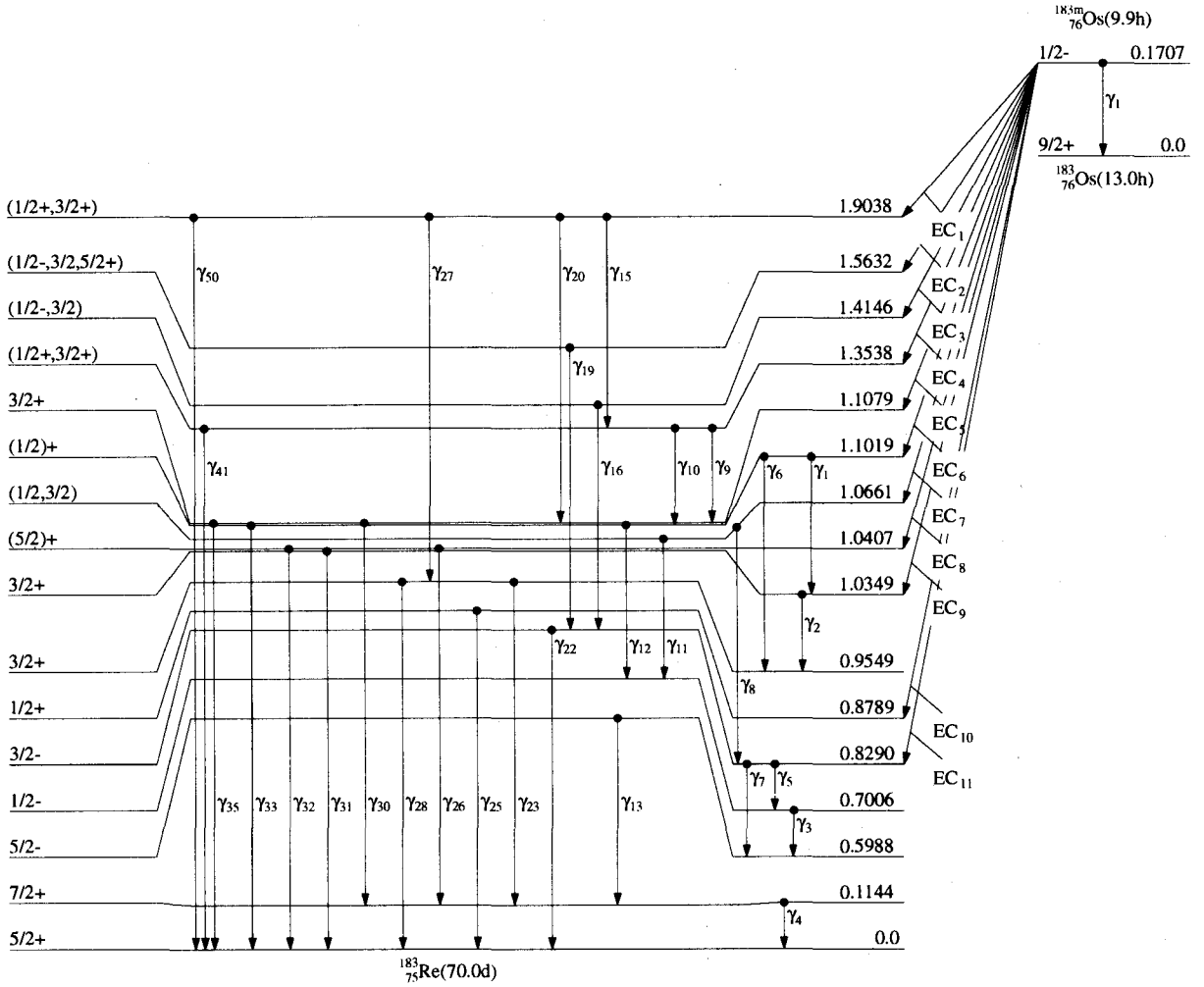
Half-life = 9.9 h
Decay mode(s): EC, IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-L$_1$, γ 1	1.74E−02	5.471E−02	9.50E−04
ce-L$_2$, γ 1	2.06E−03	5.528E−02	1.14E−04
ce-M, γ 1	4.59E−03	6.487E−02*	2.98E−04
ce-N$^+$, γ 1	1.38E−03	6.724E−02*	9.28E−05
ce-K, γ 2	7.01E−03	8.334E−03	5.84E−05
ce-L$_1$, γ 2	1.02E−03	6.748E−02	6.88E−05
ce-K, γ 3	1.71E−03	3.010E−02	5.14E−05
ce-L$_2$, γ 3	2.43E−03	8.982E−02	2.18E−04
ce-L$_3$, γ 3	2.12E−03	9.124E−02	1.94E−04
ce-M, γ 3	1.20E−03	9.941E−02*	1.19E−04
ce-K, γ 4	2.03E−02	4.267E−02	8.66E−04
ce-L$_1$, γ 4	2.94E−03	1.018E−01	3.00E−04
ce-L$_2$, γ 4	5.42E−04	1.024E−01	5.55E−05
ce-M, γ 4	8.65E−04	1.120E−01*	9.68E−05
ce-K, γ 5	2.96E−03	5.670E−02	1.68E−04
ce-L$_1$, γ 5	4.30E−04	1.159E−01	4.99E−05
ce-K, γ 6	6.52E−03	7.539E−02	4.92E−04
ce-L$_1$, γ 6	9.50E−04	1.345E−01	1.28E−04
ce-K, γ 7	1.46E−03	1.585E−01	2.32E−04
ce-L$_1$, γ 7	2.11E−04	2.176E−01	4.59E−05
ce-K, γ 8	9.49E−04	1.654E−01	1.57E−04
ce-K, γ 9	1.08E−03	1.742E−01	1.89E−04
ce-K, γ 10	1.29E−03	1.802E−01	2.32E−04
ce-L$_1$, γ 10	1.85E−04	2.393E−01	4.43E−05
ce-K, γ 11	2.00E−04	2.938E−01	5.86E−05
γ 12	4.16E−03	4.013E−01	1.67E−03
γ 13	2.21E−02	4.845E−01	1.07E−02
ce-K, γ 13	1.47E−04	4.128E−01	6.06E−05
γ 15	1.86E−03	5.500E−01	1.02E−03
γ 16	2.06E−03	5.856E−01	1.20E−03
γ 19	1.57E−03	7.341E−01	1.15E−03
γ 20	3.33E−03	7.959E−01	2.65E−03
γ 22	1.27E−03	8.290E−01	1.06E−03
γ 23	6.41E−03	8.405E−01	5.39E−03
γ 24	3.28E−03	8.534E−01	2.80E−03
γ 25	1.97E−02	8.789E−01	1.73E−02
ce-K, γ 25	9.86E−05	8.072E−01	7.96E−05
γ 26	1.27E−03	9.263E−01	1.18E−03
γ 27	2.30E−03	9.490E−01	2.18E−03
γ 28	1.38E−02	9.549E−01	1.32E−02
ce-K, γ 28	5.88E−05	8.832E−01	5.19E−05
γ 30	1.71E−03	9.936E−01	1.70E−03
γ 31	6.02E−02	1.035E+00	6.23E−02
ce-K, γ 31	3.53E−04	9.632E−01	3.40E−04
ce-L$_1$, γ 31	4.96E−05	1.022E+00	5.07E−05
γ 32	2.89E−03	1.041E+00	3.01E−03
γ 33	4.90E−01	1.102E+00	5.39E−01
ce-K, γ 33	1.58E−03	1.030E+00	1.63E−03
ce-L$_1$, γ 33	2.13E−04	1.089E+00	2.32E−04
ce-M, γ 33	4.65E−05	1.100E+00*	5.12E−05
γ 34	5.58E−03	1.105E+00	6.17E−03
γ 35	2.24E−01	1.108E+00	2.48E−01
ce-K, γ 35	1.56E−03	1.036E+00	1.62E−03
ce-L$_1$, γ 35	2.20E−04	1.095E+00	2.41E−04
ce-M, γ 35	4.90E−05	1.106E+00*	5.41E−05
γ 36	2.99E−03	1.110E+00	3.32E−03
γ 37	5.19E−03	1.161E+00	6.03E−03
γ 38	1.86E−03	1.174E+00	2.18E−03
γ 39	1.08E−03	1.283E+00	1.38E−03
γ 41	1.71E−03	1.354E+00	2.32E−03
γ 45	6.36E−04	1.626E+00	1.04E−03
γ 48	9.30E−04	1.807E+00	1.68E−03
γ 49	7.83E−04	1.826E+00	1.43E−03
γ 50	1.13E−03	1.904E+00	2.14E−03
K$_{\alpha_1}$ X-ray	3.52E−01	6.114E−02	2.15E−02
K$_{\alpha_2}$ X-ray	2.03E−01	5.972E−02	1.21E−02
K$_{\beta_1}$ X-ray	7.70E−02	6.931E−02	5.34E−03
K$_{\beta_2}$ X-ray	3.04E−02	7.127E−02	2.17E−03
K$_{\beta_3}$ X-ray	3.99E−02	6.899E−02	2.75E−03
Auger-KLL	1.85E−02	4.817E−02*	8.90E−04
Auger-KLX	1.01E−02	5.766E−02*	5.80E−04
Auger-KXY	1.57E−03	6.687E−02*	1.05E−04
Auger-LMM	3.14E−01	6.854E−03*	2.15E−03
Auger-LMX	1.97E−01	8.940E−03*	1.76E−03
Auger-LXY	3.22E−02	1.055E−02*	3.39E−04
Auger-MXY	1.17E+00	2.201E−03*	2.58E−03
ΔE	2.79E−01	3.251E−04*	9.08E−05
ce-K, γ 1	4.54E−02	9.684E−02	4.40E−03
ce-L$_1$, γ 1	2.76E−02	1.577E−01	4.35E−03
ce-L$_2$, γ 1	6.73E−03	1.583E−01	1.06E−03
ce-L$_3$, γ 1	4.12E−02	1.598E−01	6.58E−03
ce-M, γ 1	2.21E−02	1.683E−01*	3.71E−03
ce-N$^+$, γ 1	7.14E−03	1.707E−01*	1.22E−03
K$_{\alpha_1}$ X-ray	2.17E−02	6.300E−02	1.37E−03
Auger-KLL	1.09E−03	4.954E−02*	5.38E−05
Auger-LMM	4.59E−02	6.921E−03*	3.18E−04
Auger-LMX	2.91E−02	9.082E−03*	2.64E−04
Auger-LXY	4.78E−03	1.076E−02*	5.15E−05
Auger-MXY	1.78E−01	2.235E−03*	3.97E−04

Listed X, γ and $\gamma^{\pm}$ radiations	9.89E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.70E−02
Listed β, ce and Auger radiations	4.06E−02
Omitted β, ce and Auger radiations**	1.07E−03
Listed radiations	1.03E+00
Omitted radiations**	1.80E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Re-183 daughter, yield 8.50E−01, is radioactive.
Os-183 daughter, yield 1.50E−01, is radioactive.


$^{183m}_{76}$Os(9.9h)
1/2- 0.1707
γ_1
9/2+ 0.0
$^{183}_{76}$Os(13.0h)
(1/2+,3/2+) 1.9038
(1/2-,3/2,5/2+) 1.5632
(1/2-,3/2) 1.4146
(1/2+,3/2+) 1.3538
3/2+ 1.1079
(1/2)+ 1.1019
(1/2,3/2) 1.0661
(5/2)+ 1.0407
3/2+ 1.0349
3/2+ 0.9549
1/2+ 0.8789
3/2- 0.8290
1/2- 0.7006
5/2- 0.5988
7/2+ 0.1144
5/2+ 0.0
EC_1
EC_2
EC_3
EC_4
EC_5
EC_6
EC_7
EC_8
EC_9
EC_{10}
EC_{11}
γ_{50} γ_{27} γ_{20} γ_{15} γ_{19} γ_{41} γ_{16} γ_{10} γ_9 γ_6 γ_1 γ_2 γ_{22} γ_{12} γ_{11} γ_8 γ_7 γ_5 γ_3 γ_4
γ_{35} γ_{33} γ_{32} γ_{31} γ_{30} γ_{28} γ_{26} γ_{25} γ_{23} γ_{13}
$^{183}_{75}$Re(70.0d)

76-Os-183

10-JUL-91

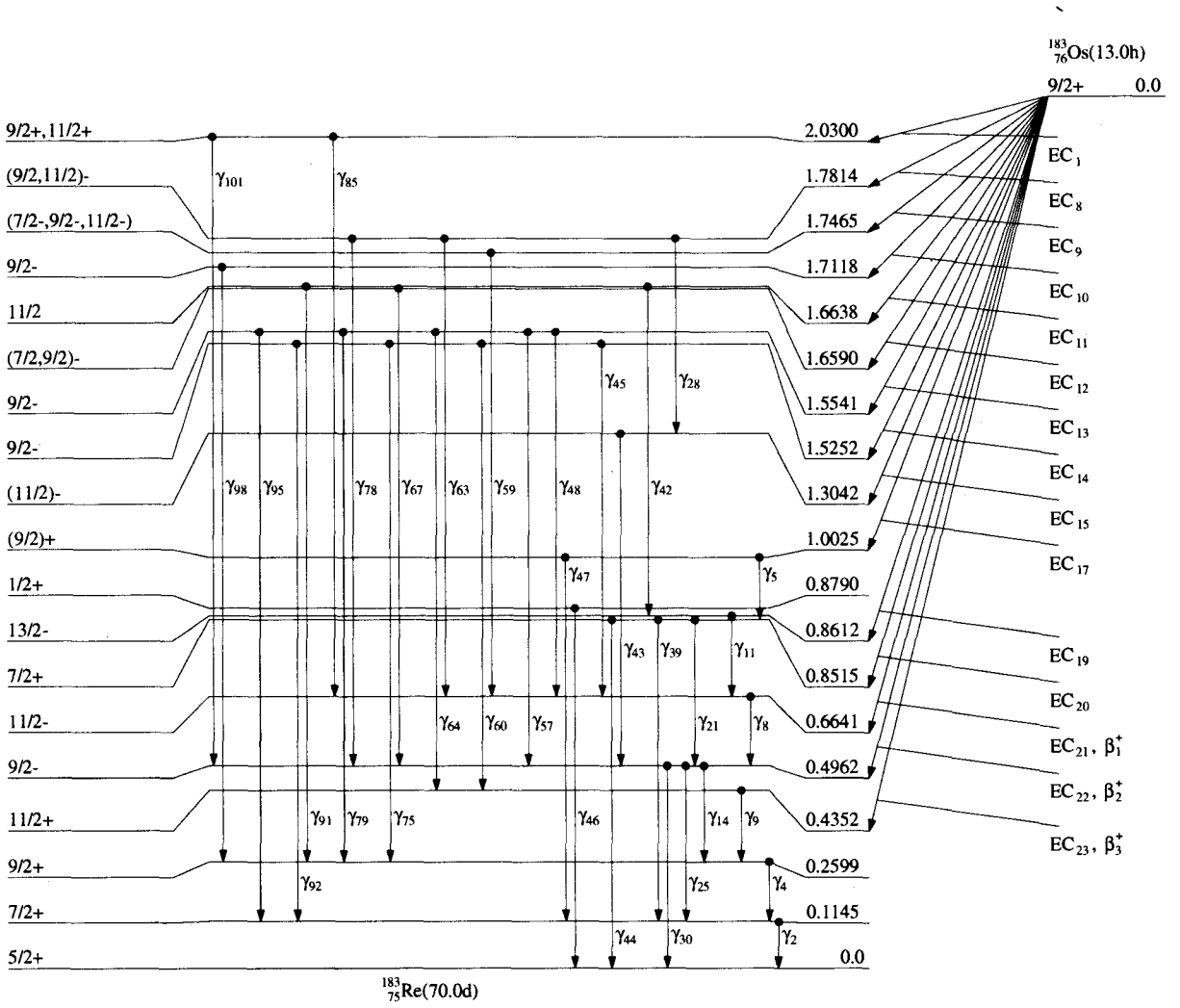
Half-life = 13 h
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 2	1.75E−03	2.936E−01*	5.15E−04
$\gamma^{\pm}$	3.75E−03	5.110E−01	1.91E−03
γ 2	2.06E−01	1.145E−01	2.36E−02
ce-K, γ 2	5.92E−01	4.279E−02	2.53E−02
ce-L_1, γ 2	8.58E−02	1.019E−01	8.75E−03
ce-L_2, γ 2	1.58E−02	1.025E−01	1.62E−03
ce-L_3, γ 2	7.41E−03	1.039E−01	7.70E−04
ce-M, γ 2	2.52E−02	1.121E−01*	2.83E−03
ce-N^+, γ 2	7.72E−03	1.145E−01*	8.84E−04
γ 4	1.53E−02	1.454E−01	2.23E−03
ce-K, γ 4	2.11E−02	7.372E−02	1.56E−03
ce-L_1, γ 4	3.05E−03	1.329E−01	4.05E−04
ce-L_2, γ 4	7.10E−04	1.334E−01	9.47E−05
ce-M, γ 4	9.60E−04	1.430E−01*	1.37E−04
ce-K, γ 5	1.91E−03	7.929E−02	1.51E−04
γ 8	8.81E−02	1.678E−01	1.48E−02
ce-K, γ 8	8.77E−02	9.617E−02	8.44E−03
ce-L_1, γ 8	1.27E−02	1.553E−01	1.98E−03
ce-L_2, γ 8	1.39E−03	1.559E−01	2.17E−04
ce-M, γ 8	3.29E−03	1.655E−01*	5.45E−04
ce-N^+, γ 8	1.00E−03	1.678E−01*	1.68E−04
ce-K, γ 9	1.61E−03	1.037E−01	1.67E−04
ce-K, γ 11	8.32E−04	1.254E−01	1.04E−04
γ 14	3.41E−02	2.364E−01	8.06E−03
ce-K, γ 14	1.21E−03	1.647E−01	1.99E−04
γ 21	6.50E−03	3.552E−01	2.31E−03
γ 23	3.32E−03	3.774E−01	1.25E−03
γ 24	1.11E−02	3.792E−01	4.21E−03
ce-K, γ 24	3.59E−04	3.075E−01	1.10E−04
γ 25	8.96E−01	3.818E−01	3.42E−01
ce-K, γ 25	1.01E−02	3.101E−01	3.13E−03
ce-L_1, γ 25	1.25E−03	3.692E−01	4.62E−04
ce-M, γ 25	3.48E−04	3.794E−01*	1.32E−04
γ 28	3.01E−03	4.772E−01	1.44E−03
γ 30	6.39E−03	4.962E−01	3.17E−03
ce-K, γ 30	1.01E−03	4.246E−01	4.28E−04
ce-L_1, γ 30	1.65E−04	4.837E−01	7.98E−05
γ 39	2.78E−03	7.370E−01	2.05E−03
γ 42	1.08E−03	8.026E−01	8.63E−04
γ 43	6.08E−03	8.080E−01	4.92E−03
γ 44	4.56E−02	8.515E−01	3.88E−02
ce-K, γ 44	6.15E−04	7.798E−01	4.80E−04
γ 45	9.32E−04	8.612E−01	8.02E−04
γ 46	2.51E−03	8.790E−01	2.21E−03
γ 47	7.48E−03	8.880E−01	6.64E−03
γ 48	9.50E−03	8.900E−01	8.45E−03
ce-K, γ 48	1.15E−04	8.183E−01	9.39E−05
γ 57	5.24E−03	1.058E+00	5.54E−03
γ 59	1.21E−03	1.082E+00	1.31E−03
γ 60	1.06E−03	1.090E+00	1.15E−03
γ 63	7.35E−04	1.117E+00	8.21E−04
γ 64	1.53E−03	1.119E+00	1.71E−03
γ 67	1.23E−02	1.163E+00	1.43E−02
ce-K, γ 67	7.63E−05	1.091E+00	8.33E−05
γ 75	1.11E−03	1.265E+00	1.41E−03
γ 78	1.11E−03	1.285E+00	1.43E−03
γ 79	9.14E−04	1.294E+00	1.18E−03
γ 83	6.18E−04	1.349E+00	8.34E−04
γ 85	6.00E−04	1.366E+00	8.20E−04
γ 91	4.93E−04	1.404E+00	6.92E−04
γ 92	1.63E−03	1.411E+00	2.30E−03
γ 95	5.99E−03	1.440E+00	8.62E−03
γ 98	6.81E−04	1.452E+00	9.89E−04
γ 101	2.29E−03	1.534E+00	3.52E−03
K_{α_1} X-ray	7.32E−01	6.114E−02	4.48E−02
K_{α_2} X-ray	4.23E−01	5.972E−02	2.53E−02
K_{β_1} X-ray	1.60E−01	6.931E−02	1.11E−02
K_{β_2} X-ray	6.33E−02	7.127E−02	4.51E−03
K_{β_3} X-ray	8.31E−02	6.899E−02	5.73E−03
L_α X-ray	2.00E−01	8.646E−03*	1.73E−03
L_β X-ray	1.93E−01	1.007E−02*	1.94E−03
Auger-KLL	3.85E−02	4.817E−02*	1.85E−03
Auger-KLX	2.09E−02	5.766E−02*	1.21E−03
Auger-KXY	3.27E−03	6.687E−02*	2.19E−04
Auger-LMM	6.34E−01	6.836E−03*	4.33E−03
Auger-LMX	3.97E−01	8.920E−03*	3.55E−03
Auger-LXY	6.48E−02	1.053E−02*	6.82E−04
Auger-MXY	2.36E+00	2.203E−03*	5.21E−03
ΔE	5.60E−01	3.241E−04*	1.81E−04

Listed X, γ and $\gamma^{\pm}$ radiations	6.11E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.55E−02
Listed β, ce and Auger radiations	7.71E−02
Omitted β, ce and Auger radiations**	1.82E−03
Listed radiations	6.89E−01
Omitted radiations**	1.74E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Re-183 daughter is radioactive.


$^{183}_{76}$Os(13.0h)
9/2+ 0.0
9/2+,11/2+
(9/2,11/2)-
(7/2-,9/2-,11/2-)
9/2-
11/2
(7/2,9/2)-
9/2-
9/2-
(11/2)-
(9/2)+
1/2+
13/2-
7/2+
11/2-
9/2-
11/2+
9/2+
7/2+
5/2+
2.0300
1.7814
1.7465
1.7118
1.6638
1.6590
1.5541
1.5252
1.3042
1.0025
0.8790
0.8612
0.8515
0.6641
0.4962
0.4352
0.2599
0.1145
0.0
EC1
EC8
EC9
EC10
EC11
EC12
EC13
EC14
EC15
EC17
EC19
EC20
EC21, β1+
EC22, β2+
EC23, β3+
γ101
γ85
γ45
γ28
γ98
γ95
γ78
γ67
γ63
γ59
γ48
γ42
γ47
γ5
γ43
γ39
γ11
γ64
γ60
γ57
γ21
γ8
γ91
γ79
γ75
γ46
γ14
γ9
γ92
γ25
γ4
γ44
γ30
γ2
$^{183}_{75}$Re(70.0d)

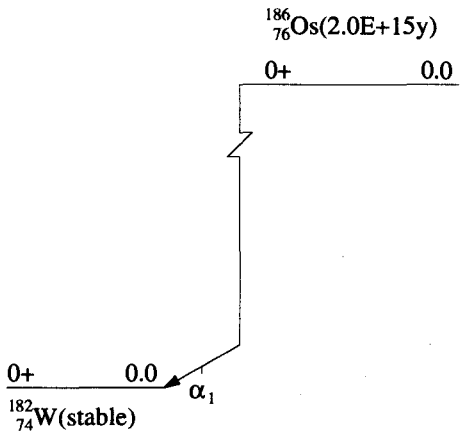
76-Os-186

22-MAR-95

Half-life = 2.0E+15 y
Decay mode(s): α

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E+00	2.761E+00	2.76E+00
α recoil	1.00E+00	6.073E−02	6.07E−02
Listed α and α recoil radiations			2.82E+00
Listed radiations			2.82E+00

W-182 daughter is stable.



76-Os-196

06-NOV-95

Half-life = 34.9 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	3.30E−02	1.967E−01*	6.49E−03
β^- 2	6.59E−02	2.380E−01*	1.57E−02
β^- 3	1.20E−02	3.133E−01*	3.76E−03
β^- 4	2.30E−01	3.445E−01*	7.92E−02
β^- 5	6.59E−01	3.940E−01*	2.60E−01
γ 1	5.30E−02	1.262E−01	6.69E−03
ce-K, γ 1	1.42E−01	5.009E−02	7.12E−03
ce-L_1, γ 1	2.11E−02	1.128E−01	2.38E−03
ce-M, γ 1	5.36E−03	1.236E−01*	6.62E−04
γ 2	5.60E−03	2.008E−01	1.12E−03
γ 3	2.40E−02	2.071E−01	4.97E−03
ce-K, γ 3	1.59E−02	1.310E−01	2.09E−03
ce-L_1, γ 3	2.35E−03	1.937E−01	4.55E−04
γ 4	2.30E−02	2.578E−01	5.93E−03
γ 5	4.30E−03	3.080E−01	1.32E−03
γ 6	2.50E−02	3.154E−01	7.88E−03
γ 7	5.90E−02	4.079E−01	2.41E−02
γ 8	7.80E−03	5.222E−01	4.07E−03
γ 9	5.90E−03	5.862E−01	3.46E−03
γ 10	1.60E−02	6.291E−01	1.01E−02
K_{α_1} X-ray	7.73E−02	6.490E−02	5.02E−03
K_{α_2} X-ray	4.49E−02	6.329E−02	2.84E−03
K_{β_1} X-ray	1.73E−02	7.356E−02	1.27E−03
K_{β_2} X-ray	6.88E−03	7.566E−02	5.20E−04
K_{β_3} X-ray	9.00E−03	7.320E−02	6.59E−04
L_α X-ray	2.29E−02	9.167E−03*	2.10E−04
L_β X-ray	2.19E−02	1.076E−02*	2.36E−04
Auger-LMM	6.30E−02	7.185E−03*	4.53E−04
Auger-MXY	2.42E−01	2.392E−03*	5.79E−04
Listed X, γ and $\gamma^\pm$ radiations			8.03E−02
Omitted X, γ and $\gamma^\pm$ radiations**			9.26E−05
Listed β, ce and Auger radiations			3.79E−01
Omitted β, ce and Auger radiations**			2.96E−03
Listed radiations			4.59E−01
Omitted radiations**			3.06E−03

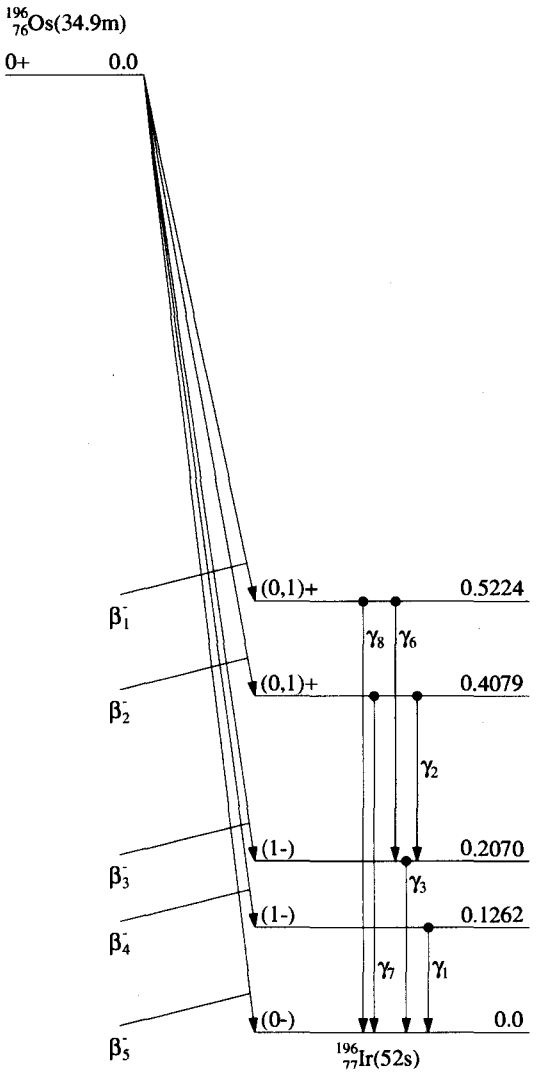
* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ir-196 daughter is radioactive.

77-Ir-183

10-JUL-91

Half-life = 58 m
Decay mode(s): EC, β^+



Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 15	1.26E−03	7.267E−01*	9.18E−04
β^+ 16	1.26E−03	7.406E−01*	9.36E−04
β^+ 20	9.03E−04	7.710E−01*	6.96E−04
β^+ 21	6.32E−04	7.809E−01*	4.94E−04
β^+ 22	1.90E−03	7.986E−01*	1.51E−03
β^+ 23	1.44E−03	8.048E−01*	1.16E−03
β^+ 24	9.12E−04	8.094E−01*	7.38E−04
β^+ 25	2.98E−03	8.200E−01*	2.44E−03
β^+ 26	2.53E−03	8.371E−01*	2.12E−03
β^+ 27	1.81E−03	8.471E−01*	1.53E−03
β^+ 28	2.89E−03	8.539E−01*	2.47E−03
β^+ 29	3.25E−03	8.678E−01*	2.82E−03
β^+ 30	1.99E−03	8.681E−01*	1.72E−03
β^+ 31	1.35E−03	8.677E−01*	1.18E−03
β^+ 32	6.32E−03	8.794E−01*	5.56E−03
β^+ 33	5.78E−03	8.945E−01*	5.17E−03
β^+ 34	2.44E−03	9.165E−01*	2.23E−03
β^+ 35	3.16E−03	9.214E−01*	2.91E−03
β^+ 36	2.71E−02	9.812E−01*	2.66E−02
β^+ 37	2.08E−03	1.060E+00*	2.20E−03
β^+ 38	7.31E−03	1.086E+00*	7.94E−03
$\gamma^\pm$	1.69E−01	5.110E−01	8.62E−02
γ 6	5.62E−02	8.750E−02	4.91E−03
ce-K, γ 6	2.16E−01	1.363E−02	2.94E−03
ce-L_1, γ 6	3.15E−02	7.453E−02	2.35E−03
ce-L_2, γ 6	7.90E−02	7.512E−02	5.94E−03
ce-L_3, γ 6	6.96E−02	7.663E−02	5.33E−03
ce-M, γ 6	4.51E−02	8.504E−02*	3.84E−03
ce-N^+, γ 6	1.36E−02	8.750E−02*	1.19E−03
ce-K, γ 8	3.03E−02	2.233E−02	6.76E−04
ce-L_2, γ 9	1.84E−02	8.982E−02	1.65E−03
ce-L_3, γ 9	1.59E−02	9.133E−02	1.46E−03
ce-M, γ 9	9.09E−03	9.974E−02*	9.06E−04
ce-K, γ 10	1.56E−02	3.373E−02	5.28E−04
ce-K, γ 15	8.61E−03	5.503E−02	4.74E−04
ce-K, γ 16	2.36E−02	6.293E−02	1.49E−03
ce-K, γ 20	7.44E−03	9.183E−02	6.84E−04
ce-K, γ 29	1.13E−02	1.208E−01	1.37E−03
γ 34	6.86E−02	2.286E−01	1.57E−02
ce-K, γ 34	1.15E−02	1.547E−01	1.78E−03
ce-L_2, γ 34	3.35E−03	2.162E−01	7.25E−04
γ 35	1.66E−02	2.368E−01	3.94E−03
γ 36	1.77E−02	2.399E−01	4.24E−03
ce-K, γ 36	7.20E−03	1.660E−01	1.20E−03
ce-K, γ 42	4.30E−03	1.810E−01	7.79E−04
γ 44	1.56E−02	2.713E−01	4.23E−03
ce-K, γ 44	4.53E−03	1.974E−01	8.94E−04
γ 48	4.89E−02	2.825E−01	1.38E−02
ce-K, γ 48	1.14E−02	2.086E−01	2.38E−03
ce-K, γ 49	2.56E−03	2.122E−01	5.43E−04
γ 56	2.18E−02	3.424E−01	7.48E−03
γ 58	2.60E−02	3.478E−01	9.04E−03
ce-K, γ 58	2.60E−03	2.739E−01	7.13E−04
γ 66	1.04E−01	3.925E−01	4.08E−02
γ 70	1.14E−02	4.115E−01	4.71E−03
γ 84	1.25E−02	4.985E−01	6.22E−03
γ 87	2.39E−02	5.125E−01	1.23E−02
γ 101	1.87E−02	6.177E−01	1.16E−02
γ 107	1.46E−02	6.554E−01	9.54E−03
γ 110	6.97E−03	6.712E−01	4.68E−03
γ 116	6.76E−03	6.919E−01	4.68E−03
γ 119	6.34E−03	7.141E−01	4.53E−03

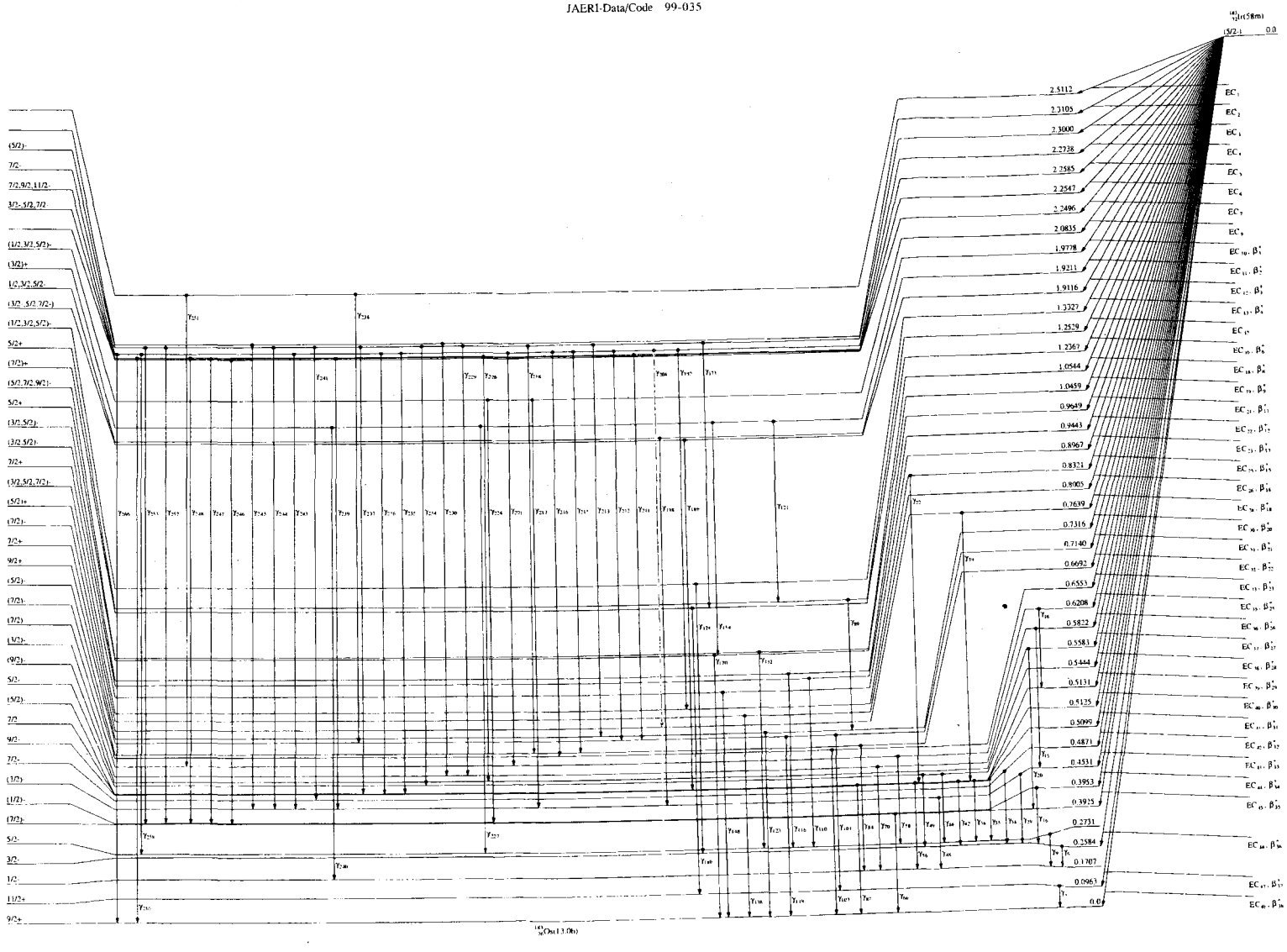
γ 121	8.84E−03	7.249E−01	6.41E−03
γ 123	2.91E−02	7.316E−01	2.13E−02
γ 133	1.35E−02	7.813E−01	1.06E−02
γ 138	2.81E−02	8.003E−01	2.25E−02
γ 148	1.56E−02	8.968E−01	1.40E−02
γ 154	6.24E−03	9.319E−01	5.82E−03
γ 165	4.06E−03	1.024E+00	4.15E−03
γ 167	3.85E−03	1.033E+00	3.97E−03
γ 170	1.04E−02	1.046E+00	1.09E−02
γ 173	9.88E−03	1.063E+00	1.05E−02
γ 174	5.30E−03	1.074E+00	5.70E−03
γ 176	3.43E−03	1.096E+00	3.76E−03
γ 180	3.43E−03	1.140E+00	3.91E−03
γ 182	3.12E−03	1.254E+00	3.91E−03
γ 183	3.22E−03	1.261E+00	4.06E−03
γ 189	4.78E−03	1.399E+00	6.69E−03
γ 195	3.12E−03	1.442E+00	4.50E−03
γ 198	5.62E−03	1.468E+00	8.24E−03
γ 200	3.95E−03	1.479E+00	5.84E−03
γ 204	4.68E−03	1.510E+00	7.07E−03
γ 211	2.39E−03	1.544E+00	3.69E−03
γ 212	1.14E−02	1.559E+00	1.78E−02
γ 213	4.99E−03	1.569E+00	7.83E−03
γ 214	2.39E−03	1.599E+00	3.82E−03
γ 215	2.50E−03	1.605E+00	4.00E−03
γ 216	3.02E−03	1.619E+00	4.88E−03
γ 217	3.12E−03	1.631E+00	5.09E−03
γ 218	1.77E−02	1.631E+00	2.88E−02
γ 221	1.56E−02	1.653E+00	2.58E−02
γ 222	3.02E−03	1.673E+00	5.05E−03
γ 223	2.70E−03	1.678E+00	4.54E−03
γ 224	2.50E−03	1.688E+00	4.21E−03
γ 225	2.18E−03	1.692E+00	3.70E−03
γ 226	5.93E−03	1.700E+00	1.01E−02
γ 227	4.89E−03	1.705E+00	8.34E−03
γ 229	4.37E−03	1.718E+00	7.50E−03
γ 230	2.60E−03	1.729E+00	4.49E−03
γ 231	3.95E−03	1.730E+00	6.84E−03
γ 232	3.54E−03	1.745E+00	6.17E−03
γ 234	1.14E−02	1.755E+00	2.01E−02
γ 235	9.26E−03	1.760E+00	1.63E−02
γ 236	2.39E−03	1.764E+00	4.22E−03
γ 237	1.04E−02	1.787E+00	1.86E−02
γ 238	2.29E−03	1.797E+00	4.11E−03
γ 239	2.70E−03	1.801E+00	4.87E−03
γ 240	3.02E−03	1.807E+00	5.45E−03
γ 241	3.54E−03	1.813E+00	6.41E−03
γ 242	2.29E−03	1.815E+00	4.15E−03
γ 243	2.81E−03	1.821E+00	5.11E−03
γ 244	2.60E−03	1.848E+00	4.80E−03
γ 245	3.12E−03	1.857E+00	5.79E−03
γ 246	3.64E−03	1.857E+00	6.76E−03
γ 247	4.68E−03	1.862E+00	8.72E−03
γ 248	2.70E−03	1.866E+00	5.05E−03
γ 249	2.60E−03	1.875E+00	4.88E−03
γ 251	2.60E−03	1.890E+00	4.92E−03
γ 252	3.64E−03	1.905E+00	6.93E−03
γ 253	1.14E−02	1.908E+00	2.18E−02
γ 254	3.43E−03	1.960E+00	6.73E−03
γ 255	8.22E−03	1.977E+00	1.62E−02
γ 256	2.50E−03	1.985E+00	4.96E−03
γ 257	1.98E−03	1.994E+00	3.94E−03
γ 258	1.87E−02	2.001E+00	3.75E−02
γ 259	9.05E−03	2.016E+00	1.82E−02
γ 260	2.29E−03	2.036E+00	4.66E−03
γ 261	5.41E−03	2.042E+00	1.10E−02
γ 262	2.81E−03	2.192E+00	6.16E−03
γ 263	3.85E−03	2.224E+00	8.56E−03
γ 265	3.95E−03	2.259E+00	8.93E−03
γ 266	3.22E−03	2.274E+00	7.33E−03
K_{α_1} X-ray	5.55E−01	6.300E−02	3.50E−02
K_{α_2} X-ray	3.22E−01	6.149E−02	1.98E−02
K_{β_1} X-ray	1.23E−01	7.141E−02	8.81E−03
K_{β_3} X-ray	6.39E−02	7.108E−02	4.54E−03
Auger-KLL	2.78E−02	4.954E−02*	1.38E−03
Auger-KLX	1.51E−02	5.937E−02*	8.99E−04
Auger-LMM	5.88E−01	7.051E−03*	4.14E−03
Auger-LMX	3.71E−01	9.205E−03*	3.41E−03
Auger-LXY	6.06E−02	1.088E−02*	6.60E−04
Auger-MXY	2.24E+00	2.273E−03*	5.08E−03

Listed X, γ and $\gamma^{\pm}$ radiations	9.36E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.52E−01
Listed β, ce and Auger radiations	1.29E−01
Omitted β, ce and Auger radiations**	2.63E−02
Listed radiations	1.07E+00
Omitted radiations**	2.78E−01

* Average energy (MeV)

** Each omitted transition contributes <0.300 % to $\sum y(i) \times E(i)$ in its category.

Os-183m daughter, yield 7.056E−01, is radioactive.
Os-183 daughter, yield 2.944E−01, is radioactive.


(5/2-) 0.0
2.5112
2.3105
2.3000
2.2738
2.2585
2.2547
2.2496
2.0835
1.9778
1.9211
1.9116
1.3327
1.2529
1.2367
1.0544
1.0459
0.9649
0.9443
0.8967
0.8321
0.8005
0.7639
0.7316
0.7140
0.6692
0.6553
0.6208
0.5822
0.5583
0.5444
0.5131
0.5125
0.5099
0.4871
0.4531
0.3953
0.3925
0.2731
0.2584
0.1707
0.0963
0.0
(5/2)-
7/2-
7/2,9/2,11/2-
3/2-,5/2,7/2
(1/2,3/2,5/2)-
(3/2)+
1/2,3/2,5/2
(3/2-,5/2,7/2-)
(1/2,3/2,5/2)-
5/2+
(7/2)+
(5/2,7/2,9/2)-
5/2+
(3/2,5/2)-
(3/2,5/2)-
7/2+
(3/2,5/2,7/2)-
(5/2)+
(7/2)-
7/2+
9/2+
(5/2)-
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(7/2)
(3/2)-
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5/2-
(5/2)-
7/2
9/2-
7/2-
(3/2)
(1/2)-
(7/2)-
5/2-
3/2-
1/2-
11/2+
9/2+

77-Ir-193m

03-FEB-97

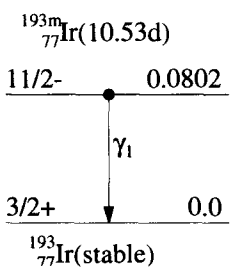
Half-life = 10.53 d
Decay mode(s): IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	4.54E−05	8.022E−02	3.64E−06
ce-L_1, γ 1	1.26E−01	6.680E−02	8.40E−03
ce-L_2, γ 1	2.25E−02	6.740E−02	1.52E−03
ce-L_3, γ 1	5.33E−01	6.900E−02	3.67E−02
ce-M, γ 1	2.35E−01	7.767E−02*	1.82E−02
ce-N^+, γ 1	7.93E−02	8.022E−02*	6.36E−03
K_{α_1} X-ray	2.37E−03	6.490E−02	1.54E−04
K_{α_2} X-ray	1.38E−03	6.329E−02	8.71E−05
K_{β_1} X-ray	5.30E−04	7.356E−02	3.90E−05
K_{β_2} X-ray	2.11E−04	7.566E−02	1.59E−05
K_{β_3} X-ray	2.76E−04	7.320E−02	2.02E−05
L_α X-ray	1.34E−01	9.167E−03*	1.23E−03
L_β X-ray	5.48E−02	1.083E−02*	5.93E−04
L_γ X-ray	5.99E−03	1.274E−02*	7.63E−05
L_η X-ray	2.61E−04	9.650E−03	2.52E−06
L_ℓ X-ray	4.95E−03	8.041E−03	3.98E−05
Auger-LMM	2.78E−01	6.834E−03*	1.90E−03
Auger-LMX	1.77E−01	9.069E−03*	1.61E−03
Auger-LXY	2.94E−02	1.081E−02*	3.18E−04
Auger-MXY	1.13E+00	2.287E−03*	2.59E−03
ΔE	3.24E−01	3.960E−04*	1.28E−04

Listed X, γ and $\gamma^\pm$ radiations	2.26E−03
Omitted X, γ and $\gamma^\pm$ radiations**	1.07E−06
Listed β, ce and Auger radiations	7.78E−02
Omitted β, ce and Auger radiations**	3.08E−05
Listed radiations	8.01E−02
Omitted radiations**	3.19E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ir-193 daughter is stable.



77-Ir-196m

06-NOV-95

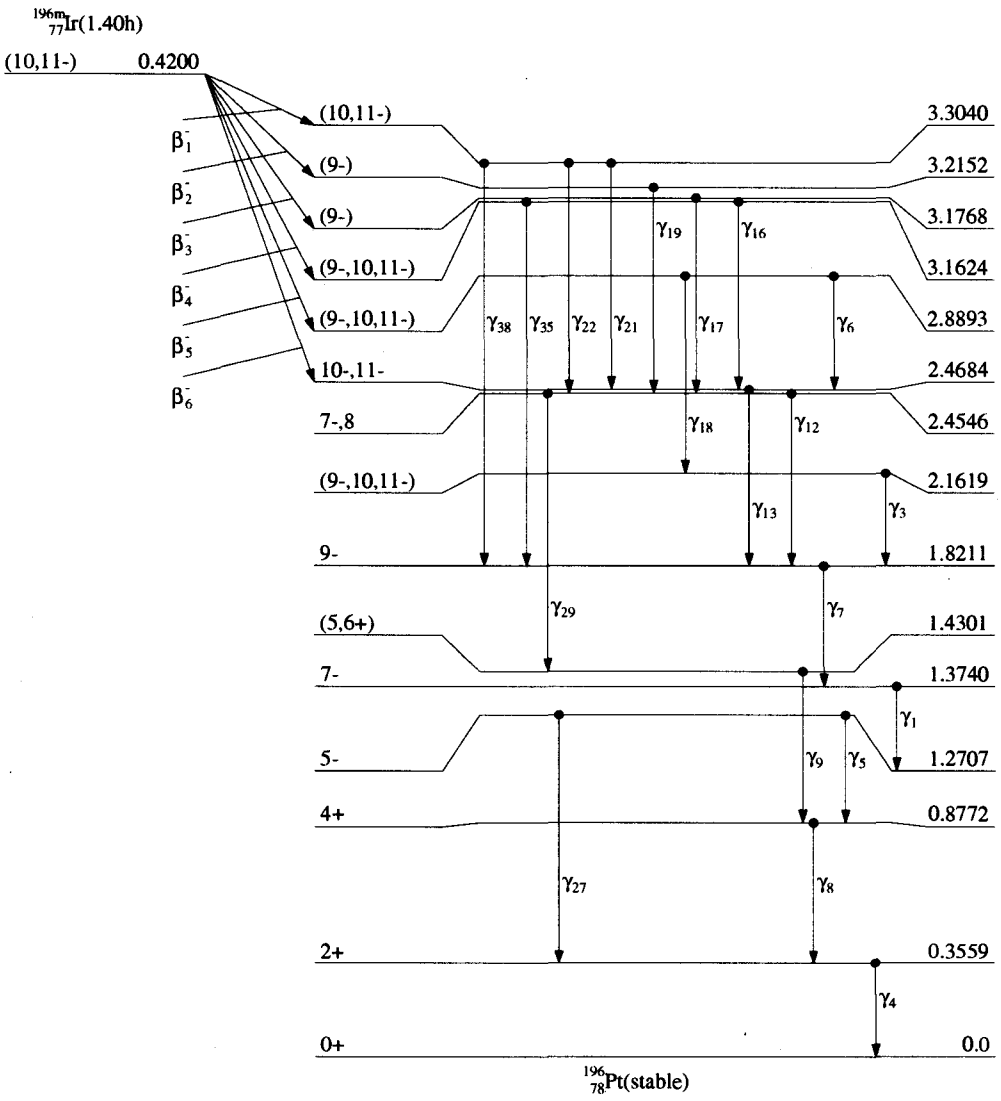
Half-life = 1.4 h
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	9.39E−02	9.226E−02*	8.66E−03
β^- 2	8.40E−03	1.206E−01*	1.01E−03
β^- 3	7.21E−03	1.332E−01*	9.61E−04
β^- 4	4.65E−02	1.380E−01*	6.41E−03
β^- 5	5.34E−02	2.335E−01*	1.25E−02
β^- 6	7.91E−01	3.939E−01*	3.11E−01
γ 1	1.63E−01	1.033E−01	1.69E−02
ce-K, γ 1	1.14E−01	2.491E−02	2.84E−03
ce-L_1, γ 1	1.53E−02	8.942E−02	1.37E−03
ce-L_2, γ 1	2.35E−01	9.003E−02	2.12E−02
ce-L_3, γ 1	1.96E−01	9.174E−02	1.80E−02
ce-M, γ 1	1.15E−01	1.007E−01*	1.16E−02
ce-N^+, γ 1	3.54E−02	1.033E−01*	3.65E−03
γ 3	1.54E−02	3.407E−01	5.23E−03
ce-K, γ 3	2.84E−03	2.623E−01	7.45E−04
γ 4	9.41E−01	3.559E−01	3.35E−01
ce-K, γ 4	3.81E−02	2.775E−01	1.06E−02
ce-L_1, γ 4	5.12E−03	3.420E−01	1.75E−03
ce-L_2, γ 4	6.28E−03	3.426E−01	2.15E−03
ce-L_3, γ 4	3.04E−03	3.443E−01	1.05E−03
ce-M, γ 4	3.57E−03	3.533E−01*	1.26E−03
γ 5	9.70E−01	3.935E−01	3.82E−01
ce-K, γ 5	1.13E−02	3.151E−01	3.56E−03
ce-L_1, γ 5	1.42E−03	3.796E−01	5.38E−04
γ 6	2.50E−02	4.209E−01	1.05E−02
ce-K, γ 6	2.62E−03	3.425E−01	8.99E−04
γ 7	9.41E−01	4.471E−01	4.21E−01
ce-K, γ 7	2.22E−02	3.687E−01	8.20E−03
ce-L_1, γ 7	3.05E−03	4.332E−01	1.32E−03
ce-L_2, γ 7	2.52E−03	4.338E−01	1.10E−03
ce-L_3, γ 7	1.10E−03	4.355E−01	4.77E−04
ce-M, γ 7	1.63E−03	4.445E−01*	7.25E−04
γ 8	9.60E−01	5.214E−01	5.01E−01
ce-K, γ 8	1.61E−02	4.430E−01	7.12E−03
ce-L_1, γ 8	2.22E−03	5.075E−01	1.13E−03
ce-L_2, γ 8	1.42E−03	5.081E−01	7.22E−04
ce-M, γ 8	1.02E−03	5.188E−01*	5.30E−04
γ 9	6.34E−03	5.530E−01	3.50E−03
γ 11	4.22E−03	6.159E−01	2.60E−03
γ 12	1.10E−02	6.335E−01	6.99E−03
γ 13	9.12E−01	6.473E−01	5.90E−01
ce-K, γ 13	9.63E−03	5.689E−01	5.48E−03
ce-L_1, γ 13	1.34E−03	6.334E−01	8.49E−04
γ 16	4.22E−02	6.939E−01	2.93E−02
ce-K, γ 16	1.21E−03	6.155E−01	7.44E−04
γ 17	6.43E−03	7.220E−01	4.64E−03
γ 18	2.59E−02	7.273E−01	1.89E−02
γ 19	7.49E−03	7.606E−01	5.70E−03
γ 21	6.34E−02	8.356E−01	5.29E−02
ce-K, γ 21	1.13E−03	7.572E−01	8.55E−04
γ 22	5.09E−03	8.494E−01	4.32E−03
γ 23	4.61E−03	8.681E−01	4.00E−03
γ 27	2.88E−03	9.146E−01	2.63E−03
γ 29	2.50E−03	1.025E+00	2.56E−03
γ 35	2.78E−03	1.342E+00	3.73E−03
γ 38	2.30E−02	1.482E+00	3.42E−02
K_{α_1} X-ray	1.05E−01	6.683E−02	7.03E−03
K_{α_2} X-ray	6.14E−02	6.512E−02	4.00E−03
Auger-LMM	2.51E−01	7.475E−03*	1.88E−03
Auger-LMX	1.59E−01	9.770E−03*	1.55E−03
Auger-MXY	1.00E+00	2.399E−03*	2.41E−03

Listed X, γ and $\gamma^{\pm}$ radiations	2.45E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.02E−02
Listed β, ce and Auger radiations	4.57E−01
Omitted β, ce and Auger radiations**	5.89E−03
Listed radiations	2.90E+00
Omitted radiations**	2.61E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Pt-196 daughter is stable.



77-Ir-196

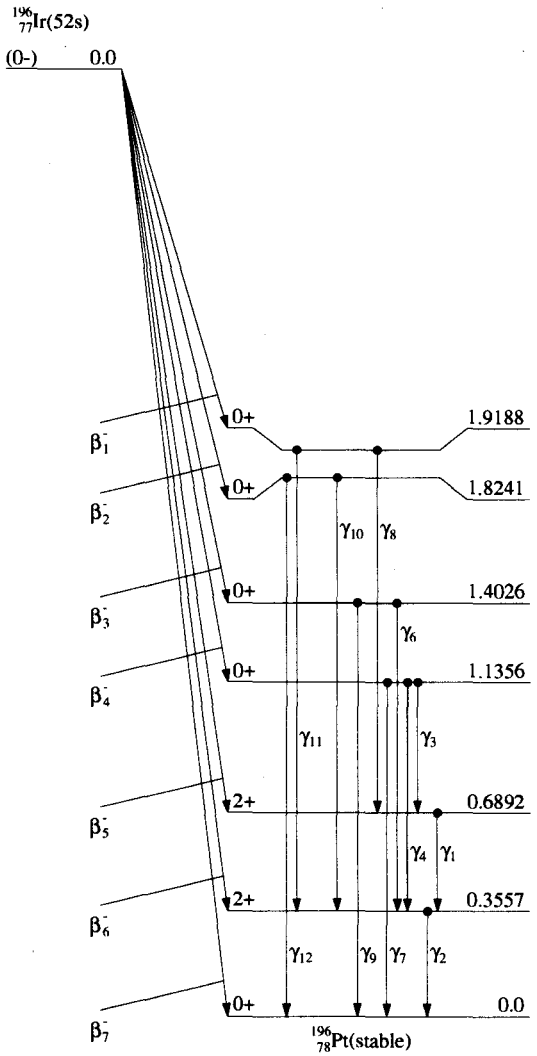
06-NOV-95

Half-life = 52 s
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.20E−02	4.455E−01*	5.33E−03
β^- 2	7.97E−03	4.838E−01*	3.86E−03
β^- 3	9.96E−03	6.584E−01*	6.56E−03
β^- 4	1.49E−01	7.716E−01*	1.15E−01
β^- 5	1.99E−03	9.370E−01*	1.87E−03
β^- 6	2.19E−02	1.079E+00*	2.36E−02
β^- 7	7.97E−01	1.265E+00*	1.01E+00
ce-K, γ 1	3.43E−02	2.545E−01	8.73E−03
ce-L_1, γ 1	5.59E−03	3.190E−01	1.78E−03
γ 2	1.80E−01	3.557E−01	6.40E−02
ce-K, γ 2	7.30E−03	2.773E−01	2.02E−03
γ 3	5.72E−02	4.468E−01	2.56E−02
γ 4	1.09E−01	7.796E−01	8.52E−02
γ 5	3.60E−03	1.006E+00	3.62E−03
γ 6	1.04E−02	1.047E+00	1.09E−02
ce-K, γ 7	1.51E−03	1.057E+00	1.60E−03
γ 8	3.42E−03	1.229E+00	4.20E−03
ce-K, γ 9	3.78E−03	1.324E+00	5.00E−03
γ 10	9.00E−03	1.468E+00	1.32E−02
γ 11	7.20E−03	1.564E+00	1.13E−02
ce-K, γ 12	2.27E−03	1.746E+00	3.96E−03
K_{α_1} X-ray	2.45E−02	6.683E−02	1.63E−03
K_{α_2} X-ray	1.43E−02	6.512E−02	9.28E−04
K_{β_1} X-ray	5.53E−03	7.575E−02	4.19E−04
Listed X, γ and $\gamma^{\pm}$ radiations			2.21E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**			5.80E−04
Listed β, ce and Auger radiations			1.19E+00
Omitted β, ce and Auger radiations**			6.20E−03
Listed radiations			1.41E+00
Omitted radiations**			6.78E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pt-196 daughter is stable.



78-Pt-184

α: 08-APR-94
EC, β^+: 12-FEB-90

Half-life = 17.3 m
Decay mode(s): α, EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.70E−05	4.502E+00	7.65E−05
α recoil	1.70E−05	1.001E−01	1.70E−06
$\gamma^{\pm}$	4.27E−03	5.110E−01	2.18E−03
ce-L$_1$, γ 4	5.11E−02	3.598E−02	1.84E−03
ce-M, γ 4	1.55E−02	4.685E−02*	7.24E−04
ce-L$_1$, γ 5	2.31E−02	3.898E−02	9.00E−04
ce-L$_1$, γ 6	2.33E−02	4.498E−02	1.05E−03
ce-L$_2$, γ 7	8.05E−03	5.388E−02	4.34E−04
ce-L$_3$, γ 7	7.80E−03	5.548E−02	4.33E−04
γ 8	5.05E−02	6.760E−02	3.42E−03
ce-L$_1$, γ 8	1.14E−01	5.418E−02	6.17E−03
ce-L$_2$, γ 8	4.82E−02	5.478E−02	2.64E−03
ce-L$_3$, γ 8	3.70E−02	5.638E−02	2.09E−03
ce-M, γ 8	4.77E−02	6.505E−02*	3.10E−03
ce-N$^+$, γ 8	1.45E−02	6.760E−02*	9.82E−04
γ 9	2.26E−01	7.070E−02	1.60E−02
ce-L$_1$, γ 9	4.80E−01	5.728E−02	2.75E−02
ce-L$_2$, γ 9	4.69E−02	5.788E−02	2.72E−03
ce-M, γ 9	1.22E−01	6.815E−02*	8.35E−03
ce-N$^+$, γ 9	3.78E−02	7.070E−02*	2.67E−03
ce-K, γ 11	5.31E−02	9.389E−03	4.99E−04
ce-L$_1$, γ 11	7.89E−03	7.208E−02	5.69E−04
γ 14	5.32E−02	9.270E−02	4.93E−03
ce-K, γ 14	3.46E−01	1.659E−02	5.74E−03
ce-L$_1$, γ 14	5.14E−02	7.928E−02	4.07E−03
ce-M, γ 14	1.31E−02	9.015E−02*	1.18E−03
γ 16	2.42E−02	1.170E−01	2.83E−03
ce-K, γ 16	1.45E−02	4.089E−02	5.93E−04
ce-L$_2$, γ 16	1.80E−02	1.042E−01	1.88E−03
ce-L$_3$, γ 16	1.46E−02	1.058E−01	1.55E−03
ce-M, γ 16	8.82E−03	1.144E−01*	1.01E−03
ce-K, γ 21	1.27E−02	6.299E−02	7.99E−04
ce-K, γ 22	1.52E−02	6.359E−02	9.65E−04
γ 24	1.01E−02	1.444E−01	1.46E−03
ce-K, γ 24	1.39E−02	6.829E−02	9.46E−04
γ 26	1.25E−02	1.493E−01	1.87E−03
ce-K, γ 26	1.75E−02	7.319E−02	1.28E−03
γ 27	3.06E−01	1.548E−01	4.74E−02
ce-K, γ 27	5.26E−02	7.869E−02	4.14E−03
ce-L$_1$, γ 27	8.13E−03	1.414E−01	1.15E−03
ce-M, γ 27	2.68E−03	1.522E−01*	4.08E−04
ce-K, γ 28	5.70E−03	7.869E−02	4.49E−04
ce-K, γ 29	5.70E−03	7.869E−02	4.49E−04
γ 30	1.46E−02	1.614E−01	2.36E−03
ce-K, γ 30	1.55E−02	8.529E−02	1.32E−03
γ 33	9.31E−03	1.698E−01	1.58E−03
γ 37	1.97E−02	1.827E−01	3.60E−03
ce-K, γ 37	1.86E−02	1.066E−01	1.98E−03
ce-L$_1$, γ 37	2.73E−03	1.693E−01	4.62E−04
ce-K, γ 38	4.74E−03	1.071E−01	5.08E−04
γ 39	2.66E−01	1.920E−01	5.11E−02
ce-K, γ 39	1.74E−01	1.159E−01	2.02E−02
ce-L$_1$, γ 39	2.52E−02	1.786E−01	4.51E−03
ce-L$_2$, γ 39	8.01E−03	1.792E−01	1.44E−03
ce-L$_3$, γ 39	4.04E−03	1.808E−01	7.31E−04
ce-M, γ 39	8.85E−03	1.894E−01*	1.68E−03
ce-N$^+$, γ 39	2.72E−03	1.920E−01*	5.22E−04
γ 43	1.60E−02	2.093E−01	3.34E−03
ce-K, γ 43	1.03E−02	1.332E−01	1.37E−03
γ 45	1.20E−02	2.117E−01	2.53E−03
ce-K, γ 45	5.14E−03	1.356E−01	6.96E−04
γ 47	2.66E−02	2.162E−01	5.75E−03
ce-K, γ 47	1.47E−02	1.401E−01	2.06E−03
ce-L$_1$, γ 47	2.16E−03	2.028E−01	4.38E−04
γ 48	2.42E−02	2.169E−01	5.25E−03
ce-K, γ 48	1.13E−02	1.408E−01	1.59E−03
γ 50	2.13E−02	2.258E−01	4.81E−03
ce-K, γ 50	4.73E−02	1.497E−01	7.08E−03
ce-L$_1$, γ 50	9.39E−03	2.124E−01	1.99E−03
ce-M, γ 50	2.82E−03	2.232E−01*	6.29E−04
γ 51	2.21E−02	2.307E−01	5.09E−03
ce-K, γ 51	1.06E−02	1.546E−01	1.63E−03
γ 57	9.84E−03	2.513E−01	2.47E−03
ce-K, γ 57	2.60E−03	1.752E−01	4.56E−04
γ 60	7.98E−03	2.613E−01	2.09E−03
γ 61	7.98E−03	2.620E−01	2.09E−03
γ 64	5.85E−03	2.703E−01	1.58E−03
γ 68	1.09E−02	2.783E−01	3.04E−03
ce-K, γ 68	2.16E−03	2.022E−01	4.37E−04
γ 72	5.05E−03	2.878E−01	1.45E−03
γ 77	5.59E−03	3.091E−01	1.73E−03
γ 78	8.78E−03	3.148E−01	2.76E−03
γ 79	5.05E−03	3.204E−01	1.62E−03
γ 81	1.12E−02	3.287E−01	3.67E−03
ce-K, γ 81	1.78E−03	2.526E−01	4.51E−04
γ 82	9.84E−03	3.364E−01	3.31E−03
γ 85	5.32E−03	3.558E−01	1.89E−03
γ 86	5.85E−03	3.645E−01	2.13E−03
γ 87	6.65E−03	3.664E−01	2.44E−03
γ 90	4.26E−03	3.791E−01	1.61E−03
γ 92	5.05E−02	3.943E−01	1.99E−02
ce-K, γ 92	5.84E−03	3.182E−01	1.86E−03
γ 93	9.31E−03	3.989E−01	3.71E−03
γ 95	3.72E−03	4.083E−01	1.52E−03
γ 96	1.09E−02	4.155E−01	4.53E−03
γ 97	3.72E−03	4.166E−01	1.55E−03
γ 98	3.46E−03	4.233E−01	1.46E−03
γ 99	3.46E−03	4.375E−01	1.51E−03
γ 101	5.05E−03	4.488E−01	2.27E−03
γ 105	3.99E−03	4.678E−01	1.87E−03
γ 106	1.60E−02	4.713E−01	7.52E−03
γ 107	9.84E−03	4.756E−01	4.68E−03
γ 108	3.46E−03	4.809E−01	1.66E−03
γ 110	3.72E−03	4.969E−01	1.85E−03
γ 111	1.49E−02	4.994E−01	7.44E−03
γ 112	4.26E−03	5.314E−01	2.26E−03
γ 113	1.17E−02	5.323E−01	6.23E−03
γ 115	2.31E−01	5.483E−01	1.27E−01
ce-K, γ 115	1.27E−03	4.722E−01	6.00E−04
γ 117	3.99E−03	5.694E−01	2.27E−03
γ 118	5.59E−03	5.808E−01	3.24E−03
γ 121	3.46E−02	6.105E−01	2.11E−02
γ 122	2.93E−03	6.128E−01	1.79E−03
γ 123	1.01E−02	6.316E−01	6.38E−03
γ 124	9.04E−03	6.326E−01	5.72E−03
γ 125	2.39E−03	6.369E−01	1.52E−03
γ 127	2.93E−03	7.078E−01	2.07E−03
γ 128	2.13E−02	7.098E−01	1.51E−02
γ 129	1.28E−01	7.312E−01	9.34E−02
γ 130	3.19E−03	7.405E−01	2.36E−03
γ 131	3.99E−03	8.106E−01	3.23E−03
γ 132	2.66E−03	8.233E−01	2.19E−03
K$_{\alpha_1}$ X-ray	8.49E−01	6.490E−02	5.51E−02
K$_{\alpha_2}$ X-ray	4.94E−01	6.329E−02	3.13E−02
K$_{\beta_1}$ X-ray	1.90E−01	7.356E−02	1.40E−02
K$_{\beta_2}$ X-ray	7.56E−02	7.566E−02	5.72E−03
K$_{\beta_3}$ X-ray	9.90E−02	7.320E−02	7.24E−03
L$_\alpha$ X-ray	3.55E−01	9.167E−03*	3.26E−03
L$_\beta$ X-ray	3.97E−01	1.075E−02*	4.26E−03
Auger-KLL	4.14E−02	5.094E−02*	2.11E−03
Auger-KLX	2.27E−02	6.111E−02*	1.39E−03
Auger-LMM	1.06E+00	7.310E−03*	7.76E−03

Auger-LMX	6.79E−01	9.550E−03*	6.48E−03
Auger-LXY	1.12E−01	1.129E−02*	1.26E−03
Auger-MXY	4.13E+00	2.356E−03*	9.73E−03

Listed X, γ and $\gamma^{\pm}$ radiations	6.77E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.86E−02
Listed β, ce and Auger radiations	1.73E−01
Omitted β, ce and Auger radiations**	3.04E−02
Listed α and α recoil radiations	7.82E−05
Listed radiations	8.50E−01
Omitted radiations**	7.90E−02

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum$y(i)×E(i) in its category.

Os-180 daughter, yield 1.7E−05, is radioactive.
Ir-184 daughter, yield 1.00E+00, is radioactive.

78-Pt-187

20-FEB-91

Half-life = 2.35 h
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 3	4.29E−04	4.367E−01*	1.87E−04
β^+ 5	2.95E−03	5.261E−01*	1.55E−03
β^+ 6	8.87E−04	5.275E−01*	4.68E−04
β^+ 7	9.17E−04	5.646E−01*	5.18E−04
β^+ 8	1.37E−03	6.723E−01*	9.18E−04
β^+ 9	3.22E−04	6.841E−01*	2.20E−04
β^+ 10	2.93E−03	7.152E−01*	2.09E−03
β^+ 11	1.03E−02	7.492E−01*	7.74E−03
β^+ 12	6.63E−04	7.630E−01*	5.06E−04
β^+ 13	8.19E−03	8.031E−01*	6.58E−03
β^+ 14	1.07E−02	8.383E−01*	8.99E−03
β^+ 15	8.97E−03	8.399E−01*	7.53E−03
β^+ 16	8.78E−03	8.871E−01*	7.79E−03
$\gamma^{\pm}$	1.16E−01	5.110E−01	5.92E−02
ce-L_1, γ 1	1.76E−02	6.267E−02	1.10E−03
ce-L_2, γ 1	7.45E−03	6.327E−02	4.71E−04
ce-L_3, γ 1	9.79E−03	6.487E−02	6.35E−04
ce-M, γ 1	9.16E−03	7.354E−02*	6.74E−04
ce-N^+, γ 1	2.89E−03	7.609E−02*	2.20E−04
γ 3	2.02E−02	8.305E−02	1.68E−03
ce-K, γ 3	1.77E−01	6.939E−03	1.23E−03
ce-L_1, γ 3	2.63E−02	6.963E−02	1.83E−03
ce-L_2, γ 3	4.18E−03	7.023E−02	2.93E−04
ce-M, γ 3	7.51E−03	8.050E−02*	6.05E−04
ce-N^+, γ 3	2.32E−03	8.305E−02*	1.93E−04
γ 4	7.66E−03	9.147E−02	7.00E−04
ce-K, γ 5	7.80E−03	2.142E−02	1.67E−04
ce-L_2, γ 5	2.95E−03	8.471E−02	2.50E−04
ce-L_3, γ 5	2.47E−03	8.631E−02	2.13E−04
ce-M, γ 5	1.65E−03	9.498E−02*	1.57E−04
γ 6	8.80E−02	1.064E−01	9.37E−03
ce-K, γ 6	6.20E−02	3.032E−02	1.88E−03
ce-L_1, γ 6	7.64E−03	9.301E−02	7.10E−04
ce-L_2, γ 6	1.01E−01	9.361E−02	9.48E−03
ce-L_3, γ 6	8.47E−02	9.521E−02	8.06E−03
ce-M, γ 6	4.96E−02	1.039E−01*	5.16E−03
ce-N^+, γ 6	1.51E−02	1.064E−01*	1.61E−03
γ 7	5.72E−02	1.101E−01	6.29E−03
ce-K, γ 7	1.68E−01	3.394E−02	5.72E−03
ce-L_1, γ 7	2.47E−02	9.663E−02	2.39E−03
ce-L_2, γ 7	1.97E−02	9.723E−02	1.92E−03
ce-L_3, γ 7	1.47E−02	9.883E−02	1.45E−03
ce-M, γ 7	1.45E−02	1.075E−01*	1.55E−03
ce-N^+, γ 7	4.46E−03	1.101E−01*	4.91E−04
γ 8	2.90E−02	1.220E−01	3.54E−03
ce-K, γ 8	8.31E−02	4.588E−02	3.81E−03
ce-L_1, γ 8	1.23E−02	1.086E−01	1.34E−03
ce-L_2, γ 8	1.87E−03	1.092E−01	2.05E−04
ce-M, γ 8	3.44E−03	1.194E−01*	4.11E−04
γ 10	4.05E−03	1.595E−01	6.46E−04
ce-K, γ 10	5.58E−03	8.338E−02	4.65E−04
γ 13	7.04E−03	1.750E−01	1.23E−03
ce-K, γ 13	4.91E−03	9.888E−02	4.85E−04
γ 14	1.32E−02	1.862E−01	2.46E−03
ce-K, γ 14	7.67E−03	1.101E−01	8.45E−04
ce-L_1, γ 14	1.67E−03	1.728E−01	2.89E−04
ce-L_2, γ 14	2.11E−02	1.734E−01	3.65E−03
ce-L_3, γ 14	1.16E−02	1.750E−01	2.03E−03
ce-M, γ 14	9.19E−03	1.836E−01*	1.69E−03
ce-N^+, γ 14	2.81E−03	1.862E−01*	5.23E−04
γ 15	3.87E−02	1.869E−01	7.24E−03
ce-K, γ 15	7.89E−03	1.108E−01	8.75E−04

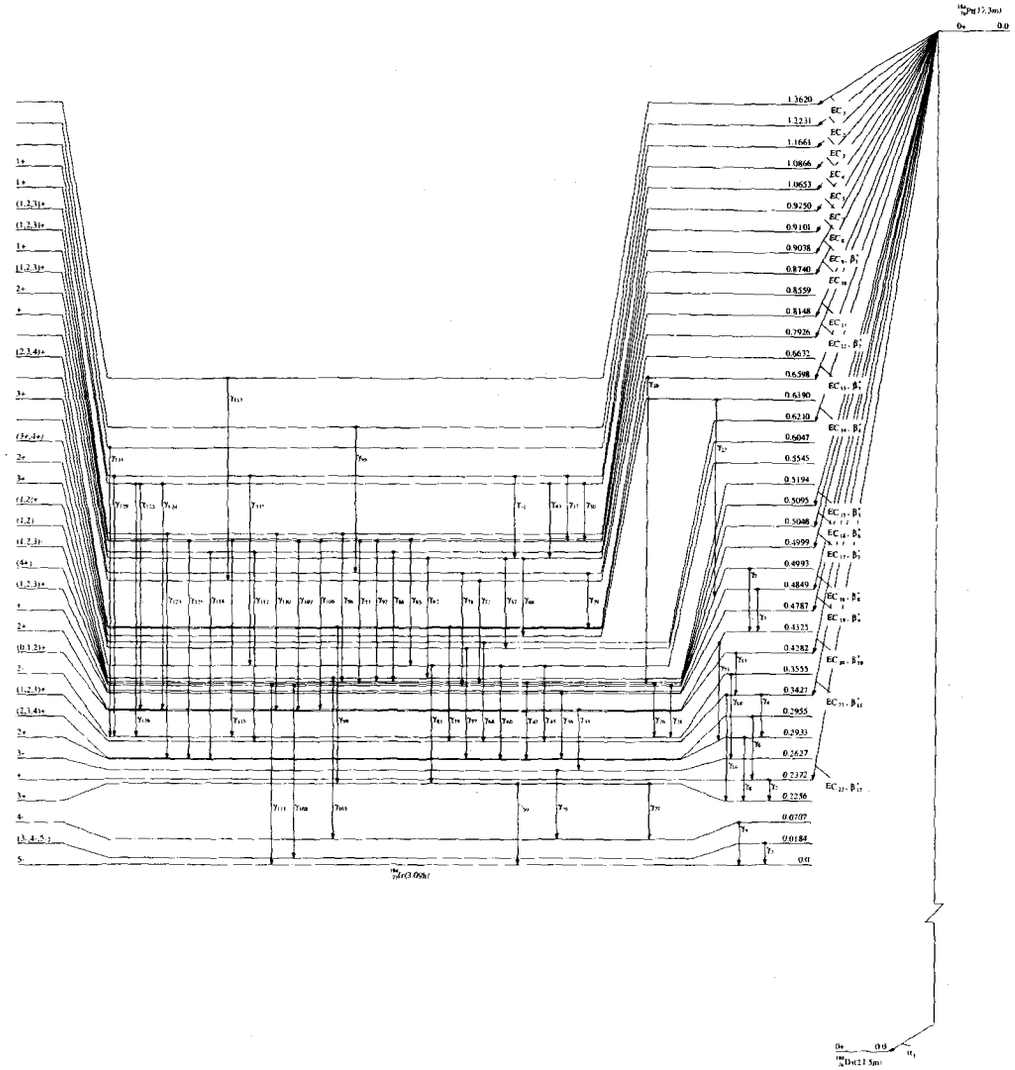
ce-L_1, γ 15	9.41E−04	1.735E−01	1.63E−04
ce-L_2, γ 15	3.55E−03	1.741E−01	6.18E−04
ce-L_3, γ 15	2.40E−03	1.757E−01	4.21E−04
ce-M, γ 15	1.75E−03	1.843E−01*	3.23E−04
γ 16	9.50E−03	1.896E−01	1.80E−03
ce-K, γ 16	6.44E−03	1.135E−01	7.31E−04
ce-L_1, γ 16	9.34E−04	1.762E−01	1.65E−04
γ 17	7.48E−03	1.992E−01	1.49E−03
γ 19	6.42E−02	2.015E−01	1.29E−02
ce-K, γ 19	3.57E−03	1.254E−01	4.47E−04
γ 20	6.86E−03	2.018E−01	1.39E−03
ce-K, γ 20	4.90E−03	1.257E−01	6.15E−04
γ 21	8.36E−03	2.052E−01	1.72E−03
ce-K, γ 21	1.35E−03	1.291E−01	1.74E−04
γ 22	8.80E−03	2.448E−01	2.15E−03
ce-K, γ 22	3.69E−03	1.687E−01	6.22E−04
γ 23	6.16E−03	2.451E−01	1.51E−03
ce-K, γ 23	2.57E−03	1.690E−01	4.35E−04
γ 24	3.70E−02	2.476E−01	9.15E−03
ce-K, γ 24	1.50E−02	1.715E−01	2.57E−03
ce-L_1, γ 24	2.21E−03	2.342E−01	5.17E−04
γ 25	4.40E−03	2.816E−01	1.24E−03
γ 26	2.38E−02	2.821E−01	6.70E−03
γ 27	1.67E−02	2.849E−01	4.76E−03
ce-K, γ 27	1.15E−03	2.088E−01	2.41E−04
γ 28	1.23E−02	2.849E−01	3.51E−03
ce-K, γ 28	3.40E−03	2.088E−01	7.10E−04
γ 29	2.64E−02	2.849E−01	7.52E−03
ce-K, γ 29	7.29E−03	2.088E−01	1.52E−03
ce-L_1, γ 29	1.07E−03	2.715E−01	2.91E−04
γ 30	1.10E−02	3.003E−01	3.30E−03
ce-K, γ 30	2.63E−03	2.242E−01	5.90E−04
γ 31	4.31E−02	3.047E−01	1.31E−02
ce-K, γ 31	2.50E−03	2.286E−01	5.72E−04
γ 32	1.85E−02	3.118E−01	5.76E−03
ce-K, γ 32	4.00E−03	2.356E−01	9.42E−04
ce-L_1, γ 32	5.87E−04	2.983E−01	1.75E−04
γ 33	7.04E−03	3.298E−01	2.32E−03
ce-K, γ 33	1.05E−03	2.537E−01	2.67E−04
γ 34	2.55E−03	3.329E−01	8.50E−04
γ 35	7.22E−03	3.613E−01	2.61E−03
ce-K, γ 35	1.05E−03	2.852E−01	3.00E−04
γ 37	3.61E−03	3.765E−01	1.36E−03
ce-K, γ 37	7.87E−04	3.004E−01	2.36E−04
γ 38	4.05E−03	3.851E−01	1.56E−03
γ 39	7.04E−03	3.888E−01	2.74E−03
γ 40	1.58E−02	4.008E−01	6.35E−03
γ 41	2.20E−02	4.272E−01	9.40E−03
ce-K, γ 41	2.05E−03	3.511E−01	7.21E−04
γ 42	1.14E−02	4.806E−01	5.50E−03
ce-K, γ 42	7.82E−04	4.045E−01	3.16E−04
γ 43	1.23E−02	4.866E−01	5.99E−03
γ 44	3.52E−03	4.920E−01	1.73E−03
γ 45	1.32E−02	5.078E−01	6.70E−03
ce-K, γ 45	7.81E−04	4.317E−01	3.37E−04
γ 46	1.41E−02	5.117E−01	7.20E−03
ce-K, γ 46	8.17E−04	4.356E−01	3.56E−04
γ 47	6.51E−03	5.300E−01	3.45E−03
ce-K, γ 47	3.45E−04	4.539E−01	1.56E−04
γ 48	5.54E−03	5.365E−01	2.97E−03
γ 49	1.32E−02	6.225E−01	8.22E−03
ce-K, γ 49	4.61E−04	5.464E−01	2.52E−04
γ 50	2.73E−02	6.296E−01	1.72E−02
ce-K, γ 50	9.25E−04	5.535E−01	5.12E−04
γ 51	8.80E−03	6.960E−01	6.12E−03
γ 52	5.19E−02	7.092E−01	3.68E−02
ce-K, γ 52	1.30E−03	6.331E−01	8.21E−04
γ 53	1.02E−02	7.126E−01	7.27E−03
ce-K, γ 53	2.52E−04	6.365E−01	1.60E−04
γ 54	5.28E−03	7.320E−01	3.86E−03
γ 55	8.80E−03	7.902E−01	6.95E−03
γ 56	1.14E−02	7.927E−01	9.07E−03
γ 57	8.80E−03	7.967E−01	7.01E−03
γ 58	1.06E−02	8.165E−01	8.62E−03
γ 59	3.70E−02	8.193E−01	3.03E−02
ce-K, γ 59	6.39E−04	7.432E−01	4.75E−04
γ 60	9.68E−03	8.611E−01	8.34E−03
γ 61	6.60E−03	8.918E−01	5.89E−03
γ 62	1.76E−02	8.954E−01	1.58E−02
γ 63	1.76E−02	9.127E−01	1.61E−02
γ 64	1.58E−02	9.779E−01	1.55E−02
γ 65	1.67E−02	1.145E+00	1.92E−02
γ 66	1.06E−02	1.149E+00	1.21E−02
γ 67	1.14E−02	1.157E+00	1.32E−02
γ 68	2.38E−02	1.255E+00	2.98E−02
ce-K, γ 68	1.41E−04	1.179E+00	1.67E−04
γ 69	9.68E−03	1.270E+00	1.23E−02
K_{α_1} X-ray	6.60E−01	6.490E−02	4.28E−02
K_{α_2} X-ray	3.84E−01	6.329E−02	2.43E−02
K_{β_1} X-ray	1.48E−01	7.356E−02	1.09E−02
K_{β_2} X-ray	5.87E−02	7.566E−02	4.44E−03
K_{β_3} X-ray	7.68E−02	7.320E−02	5.62E−03
L_α X-ray	2.31E−01	9.167E−03*	2.12E−03
L_β X-ray	2.38E−01	1.076E−02*	2.56E−03
Auger-KLL	3.21E−02	5.094E−02*	1.64E−03
Auger-KLX	1.76E−02	6.111E−02*	1.08E−03
Auger-KXY	2.79E−03	7.094E−02*	1.98E−04
Auger-LMM	6.56E−01	7.214E−03*	4.73E−03
Auger-LMX	4.15E−01	9.441E−03*	3.92E−03
Auger-LXY	6.82E−02	1.117E−02*	7.62E−04
Auger-MXY	2.54E+00	2.370E−03*	6.02E−03
ΔE	6.22E−01	3.705E−04*	2.30E−04

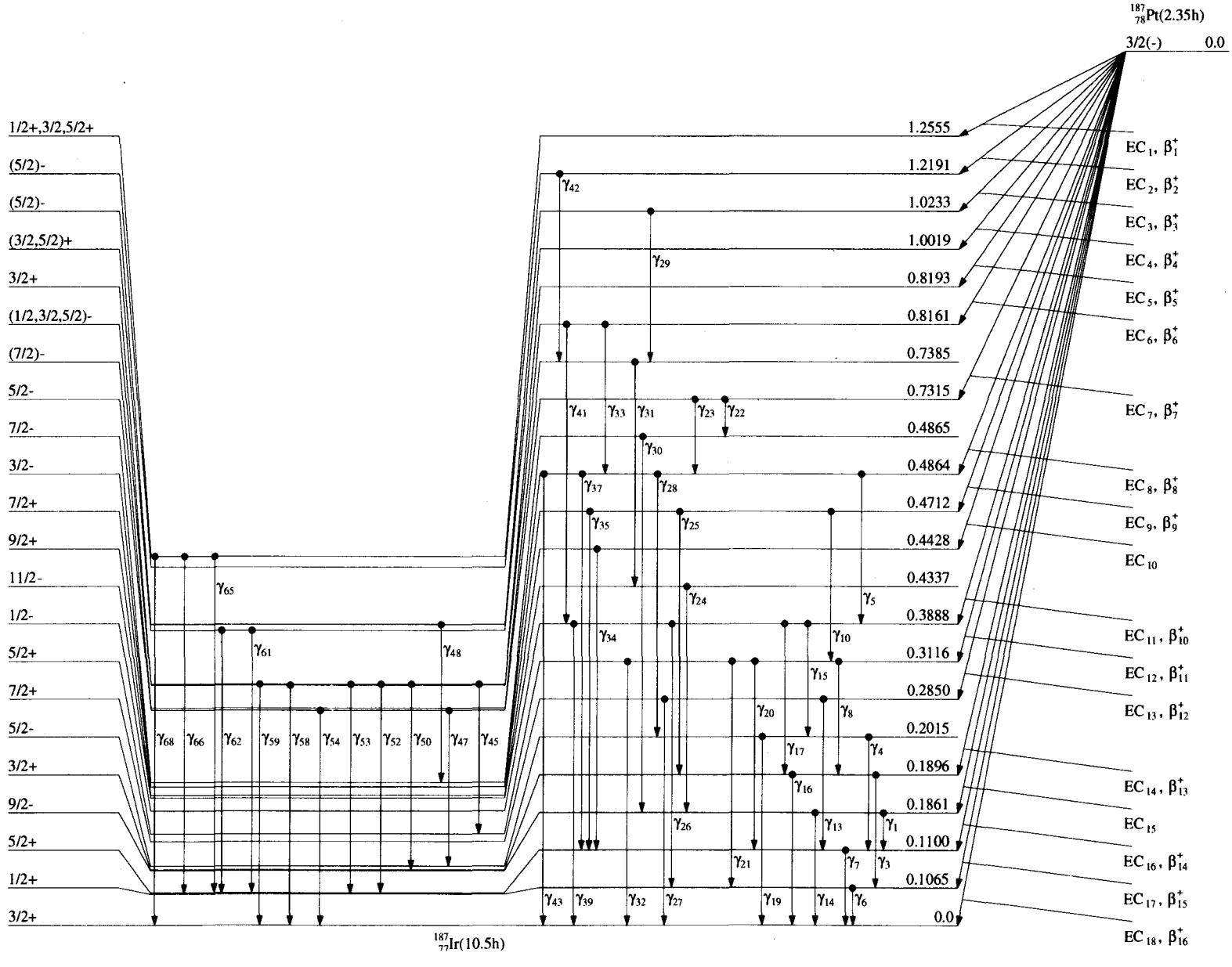
Listed X, γ and $\gamma^{\pm}$ radiations	6.14E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.81E−03
Listed β, ce and Auger radiations	1.47E−01
Omitted β, ce and Auger radiations**	7.91E−03
Listed radiations	7.60E−01
Omitted radiations**	9.72E−03

* Average energy (MeV)

** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Ir-187 daughter is radioactive.




$^{187}_{78}$Pt(2.35h)
3/2(-) 0.0
1/2+,3/2,5/2+
(5/2)-
(5/2)-
(3/2,5/2)+
3/2+
(1/2,3/2,5/2)-
(7/2)-
5/2-
7/2-
3/2-
7/2+
9/2+
11/2-
1/2-
5/2+
7/2+
5/2-
3/2+
9/2-
5/2+
1/2+
3/2+
1.2555
1.2191
1.0233
1.0019
0.8193
0.8161
0.7385
0.7315
0.4865
0.4864
0.4712
0.4428
0.4337
0.3888
0.3116
0.2850
0.2015
0.1896
0.1861
0.1100
0.1065
0.0
EC1, β1+
EC2, β2+
EC3, β3+
EC4, β4+
EC5, β5+
EC6, β6+
EC7, β7+
EC8, β8+
EC9, β9+
EC10
EC11, β10+
EC12, β11+
EC13, β12+
EC14, β13+
EC15
EC16, β14+
EC17, β15+
EC18, β16+
γ42
γ29
γ41 γ33 γ31 γ23 γ22
γ30
γ37 γ28
γ35 γ25
γ65
γ24
γ5
γ34
γ10
γ61
γ48
γ15
γ20
γ8
γ68 γ66 γ62 γ59 γ58 γ54 γ53 γ52 γ50 γ47 γ45
γ17
γ4
γ16
γ26
γ13
γ1
γ21
γ7
γ3
γ43 γ39 γ32 γ27 γ19 γ14 γ6
$^{187}_{77}$Ir(10.5h)

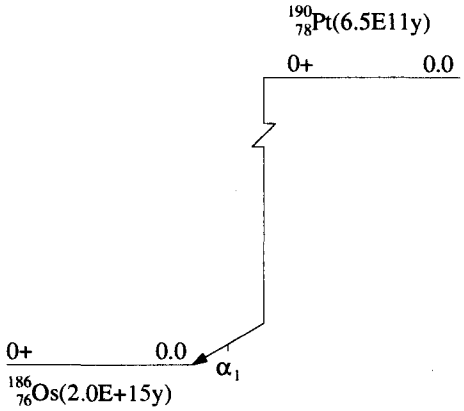
78-Pt-190

29-APR-91

Half-life = 6.5E+11 y
Decay mode(s): α

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E+00	3.181E+00	3.18E+00
α recoil	1.00E+00	6.844E−02	6.84E−02
Listed α and α recoil radiations			3.25E+00
Listed radiations			3.25E+00

Os-186 daughter is radioactive.



78-Pt-202

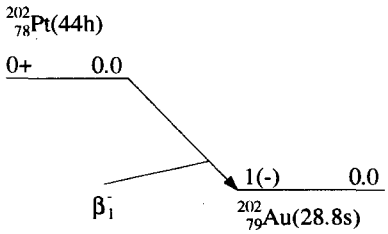
24-APR-97

Half-life = 44 h
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.00E+00	6.621E−01*	6.62E−01
Listed β, ce AND Auger radiations			6.62E−01
Listed radiations			6.62E−01

* Average energy (MeV)

Au-202 daughter is radioactive.



79-Au-186

28-FEB-89

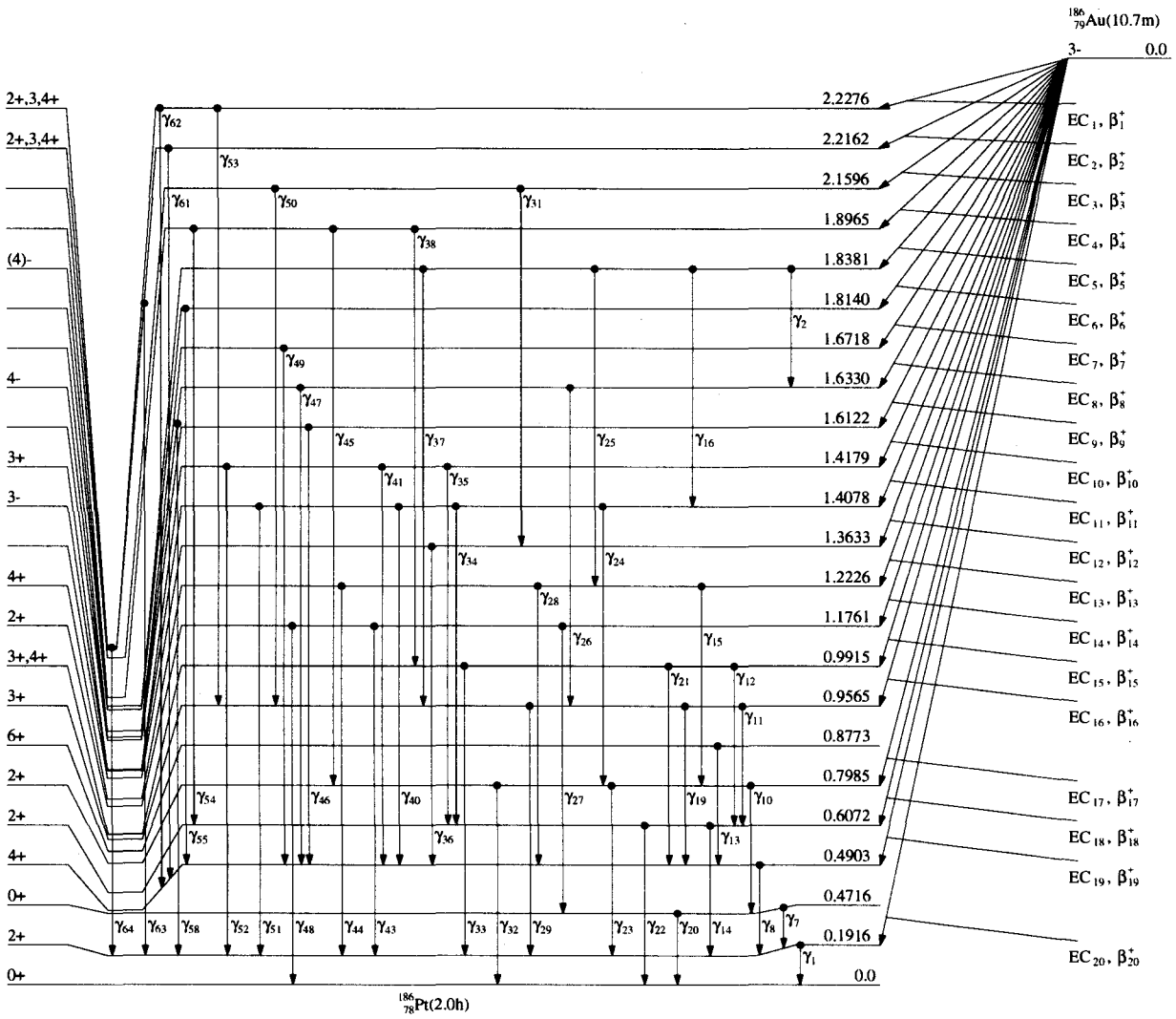
Half-life = 10.7 m
Decay mode(s): EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 1	1.44E−02	1.295E+00*	1.86E−02
β^+ 2	9.13E−03	1.300E+00*	1.19E−02
β^+ 3	3.49E−03	1.326E+00*	4.62E−03
β^+ 4	8.52E−03	1.445E+00*	1.23E−02
β^+ 5	2.98E−02	1.471E+00*	4.38E−02
β^+ 6	1.85E−03	1.482E+00*	2.74E−03
β^+ 7	2.46E−03	1.546E+00*	3.81E−03
β^+ 8	4.10E−03	1.564E+00*	6.42E−03
β^+ 9	1.74E−03	1.574E+00*	2.74E−03
β^+ 10	7.59E−03	1.662E+00*	1.26E−02
β^+ 11	1.95E−02	1.667E+00*	3.25E−02
β^+ 12	4.31E−03	1.687E+00*	7.27E−03
β^+ 13	1.39E−02	1.751E+00*	2.43E−02
β^+ 14	9.34E−03	1.773E+00*	1.66E−02
β^+ 15	2.05E−02	1.857E+00*	3.81E−02
β^+ 16	3.59E−02	1.873E+00*	6.73E−02
β^+ 17	3.28E−02	1.946E+00*	6.39E−02
β^+ 18	4.21E−02	2.034E+00*	8.56E−02
β^+ 19	9.03E−02	2.088E+00*	1.89E−01
β^+ 20	1.64E−01	2.226E+00*	3.66E−01
$\gamma^\pm$	1.03E+00	5.110E−01	5.27E−01
γ 1	6.20E−01	1.915E−01	1.19E−01
ce-K, γ 1	1.18E−01	1.131E−01	1.34E−02
ce-L_1, γ 1	1.45E−02	1.776E−01	2.58E−03
ce-L_2, γ 1	5.61E−02	1.782E−01	1.00E−02
ce-L_3, γ 1	3.68E−02	1.799E−01	6.63E−03
ce-M, γ 1	2.74E−02	1.889E−01*	5.17E−03
ce-N^+, γ 1	8.36E−03	1.915E−01*	1.60E−03
γ 2	2.05E−02	2.050E−01	4.19E−03
ce-K, γ 2	1.42E−02	1.266E−01	1.79E−03
γ 5	8.68E−03	2.579E−01	2.24E−03
γ 7	1.36E−02	2.797E−01	3.82E−03
γ 8	2.54E−01	2.986E−01	7.59E−02
ce-K, γ 8	1.58E−02	2.202E−01	3.49E−03
γ 10	8.06E−03	3.268E−01	2.63E−03
γ 11	1.30E−02	3.494E−01	4.55E−03
γ 12	1.86E−02	3.843E−01	7.15E−03
γ 13	1.05E−02	3.870E−01	4.08E−03
γ 14	8.49E−02	4.155E−01	3.53E−02
ce-K, γ 14	8.38E−03	3.371E−01	2.82E−03
γ 15	6.20E−03	4.239E−01	2.63E−03
γ 16	1.80E−02	4.303E−01	7.74E−03
γ 17	1.84E−02	4.403E−01	8.10E−03
γ 19	1.30E−02	4.663E−01	6.07E−03
ce-K, γ 20	8.20E−03	3.932E−01	3.22E−03
γ 21	2.17E−02	5.013E−01	1.09E−02
ce-K, γ 22	3.33E−02	5.288E−01	1.76E−02
ce-L_1, γ 22	5.34E−03	5.933E−01	3.17E−03
γ 23	1.24E−02	6.072E−01	7.53E−03
γ 24	1.49E−02	6.094E−01	9.07E−03
γ 25	3.10E−03	6.156E−01	1.91E−03
γ 26	3.29E−02	6.765E−01	2.22E−02
γ 27	5.58E−03	7.044E−01	3.93E−03
ce-K, γ 28	9.33E−03	6.540E−01	6.10E−03
γ 29	1.05E−01	7.654E−01	8.07E−02
γ 30	1.24E−02	7.910E−01	9.81E−03
γ 31	3.10E−03	7.964E−01	2.47E−03
γ 32	5.33E−02	7.987E−01	4.26E−02
γ 33	1.30E−02	7.999E−01	1.04E−02
γ 34	1.30E−02	8.002E−01	1.04E−02
γ 35	3.78E−03	8.107E−01	3.07E−03
γ 36	1.24E−02	8.731E−01	1.08E−02
γ 37	2.11E−02	8.816E−01	1.86E−02
γ 38	3.72E−03	9.051E−01	3.37E−03
γ 39	3.10E−03	9.077E−01	2.81E−03
γ 40	4.34E−03	9.175E−01	3.98E−03
γ 41	2.48E−03	9.273E−01	2.30E−03
γ 43	1.30E−02	9.845E−01	1.28E−02
γ 44	1.36E−02	1.031E+00	1.41E−02
γ 45	4.22E−03	1.098E+00	4.63E−03
γ 46	4.34E−03	1.122E+00	4.87E−03
γ 47	4.15E−03	1.143E+00	4.75E−03
γ 48	6.20E−03	1.176E+00	7.29E−03
γ 49	6.20E−03	1.181E+00	7.33E−03
γ 50	8.68E−03	1.203E+00	1.04E−02
γ 51	3.72E−02	1.216E+00	4.52E−02
γ 52	9.92E−03	1.226E+00	1.22E−02
γ 53	4.96E−03	1.271E+00	6.30E−03
γ 54	2.05E−02	1.289E+00	2.64E−02
γ 55	4.96E−03	1.324E+00	6.57E−03
γ 56	4.96E−03	1.345E+00	6.67E−03
γ 57	3.41E−03	1.400E+00	4.77E−03
γ 58	4.71E−03	1.441E+00	6.79E−03
γ 59	9.92E−03	1.533E+00	1.52E−02
γ 60	4.34E−03	1.589E+00	6.90E−03
γ 61	1.24E−02	1.726E+00	2.14E−02
γ 62	1.86E−02	1.738E+00	3.23E−02
γ 63	1.98E−02	2.025E+00	4.02E−02
γ 64	2.85E−02	2.036E+00	5.81E−02
K_{α_1} X-ray	2.92E−01	6.683E−02	1.95E−02
K_{α_2} X-ray	1.71E−01	6.512E−02	1.11E−02
K_{β_1} X-ray	6.61E−02	7.575E−02	5.01E−03
K_{β_2} X-ray	2.66E−02	7.792E−02	2.07E−03
K_{β_3} X-ray	3.45E−02	7.537E−02	2.60E−03
Auger-LMM	2.68E−01	7.395E−03*	1.98E−03
Auger-LMX	1.71E−01	9.697E−03*	1.66E−03
Auger-MXY	1.06E+00	2.471E−03*	2.61E−03

Listed X, γ and $\gamma^\pm$ radiations	1.46E+00
Omitted X, γ and $\gamma^\pm$ radiations**	7.41E−03
Listed β, ce and Auger radiations	1.09E+00
Omitted β, ce and Auger radiations**	1.61E−02
Listed radiations	2.56E+00
Omitted radiations**	2.35E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pt-186 daughter is radioactive.


186 79 Au(10.7m)
3- 0.0
2+,3,4+
2+,3,4+
(4)-
4-
3+
3-
4+
2+
3+,4+
3+
6+
2+
2+
4+
0+
2+
0+
2.2276
2.2162
2.1596
1.8965
1.8381
1.8140
1.6718
1.6330
1.6122
1.4179
1.4078
1.3633
1.2226
1.1761
0.9915
0.9565
0.8773
0.7985
0.6072
0.4903
0.4716
0.1916
0.0
EC1, β+1
EC2, β+2
EC3, β+3
EC4, β+4
EC5, β+5
EC6, β+6
EC7, β+7
EC8, β+8
EC9, β+9
EC10, β+10
EC11, β+11
EC12, β+12
EC13, β+13
EC14, β+14
EC15, β+15
EC16, β+16
EC17, β+17
EC18, β+18
EC19, β+19
EC20, β+20
186 78 Pt(2.0h)

79-Au-190

14-DEC-90

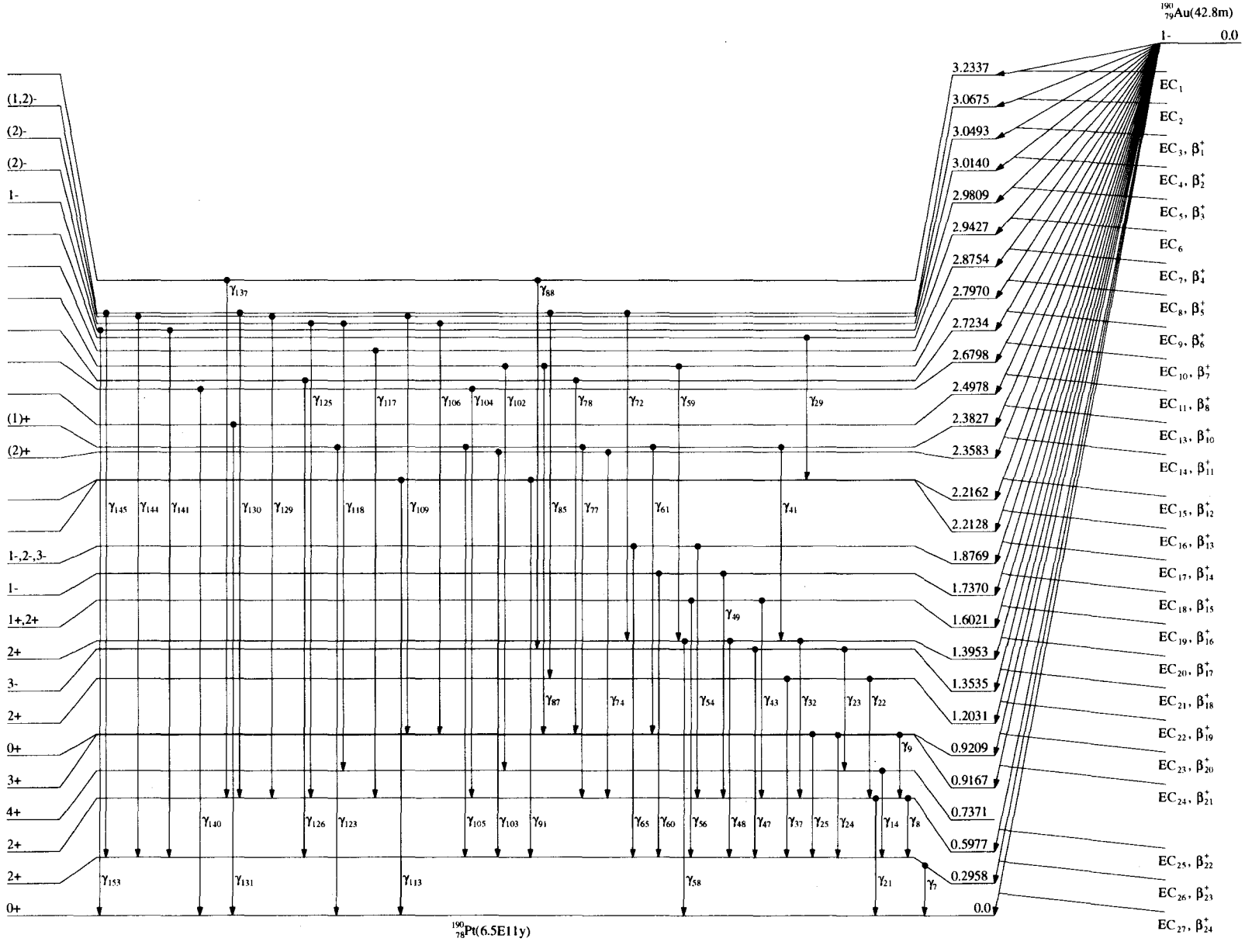
Half-life = 42.8 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 10	1.40E−03	4.822E−01*	6.74E−04
β^+ 14	9.28E−04	7.041E−01*	6.53E−04
β^+ 15	3.99E−03	7.657E−01*	3.06E−03
β^+ 16	1.19E−03	8.253E−01*	9.80E−04
β^+ 17	2.30E−03	9.168E−01*	2.10E−03
β^+ 18	5.29E−03	9.291E−01*	4.91E−03
β^+ 19	4.99E−03	1.002E+00*	5.00E−03
β^+ 20	4.59E−03	1.128E+00*	5.18E−03
β^+ 21	2.20E−03	1.115E+00*	2.45E−03
β^+ 22	2.99E−02	1.273E+00*	3.81E−02
β^+ 23	7.29E−02	1.410E+00*	1.03E−01
β^+ 24	3.99E−03	1.544E+00*	6.16E−03
$\gamma^{\pm}$	2.69E−01	5.110E−01	1.38E−01
γ 7	7.00E−01	2.958E−01	2.07E−01
ce-K, γ 7	4.46E−02	2.174E−01	9.70E−03
ce-L_1, γ 7	5.86E−03	2.819E−01	1.65E−03
ce-L_2, γ 7	9.99E−03	2.825E−01	2.82E−03
ce-L_3, γ 7	5.30E−03	2.843E−01	1.51E−03
ce-M, γ 7	5.28E−03	2.932E−01*	1.55E−03
γ 8	2.31E−01	3.018E−01	6.97E−02
ce-K, γ 8	1.40E−02	2.234E−01	3.13E−03
ce-L_2, γ 8	3.03E−03	2.885E−01	8.75E−04
γ 9	4.62E−02	3.190E−01	1.47E−02
ce-K, γ 9	2.44E−03	2.406E−01	5.88E−04
γ 14	3.68E−02	4.412E−01	1.62E−02
γ 21	9.31E−02	5.977E−01	5.56E−02
ce-K, γ 21	1.16E−03	5.193E−01	6.03E−04
γ 22	1.48E−02	6.052E−01	8.94E−03
γ 23	1.54E−02	6.162E−01	9.49E−03
γ 24	2.38E−02	6.209E−01	1.48E−02
γ 25	2.94E−02	6.251E−01	1.84E−02
ce-K, γ 28	2.01E−03	5.969E−01	1.20E−03
γ 29	8.82E−03	7.299E−01	6.44E−03
ce-K, γ 32	1.17E−03	7.191E−01	8.40E−04
ce-K, γ 37	1.26E−02	8.289E−01	1.05E−02
ce-L_1, γ 37	1.99E−03	8.934E−01	1.78E−03
γ 41	6.58E−03	9.874E−01	6.50E−03
γ 43	5.81E−03	1.005E+00	5.84E−03
γ 47	3.43E−02	1.058E+00	3.63E−02
ce-K, γ 48	8.17E−03	1.021E+00	8.34E−03
ce-L_1, γ 48	1.28E−03	1.086E+00	1.39E−03
γ 49	1.43E−02	1.139E+00	1.63E−02
γ 51	7.14E−03	1.161E+00	8.29E−03
γ 54	8.96E−03	1.280E+00	1.15E−02
γ 55	8.12E−03	1.305E+00	1.06E−02
γ 56	3.92E−03	1.308E+00	5.13E−03
γ 57	6.09E−03	1.346E+00	8.20E−03
γ 58	2.24E−02	1.395E+00	3.13E−02
γ 59	5.11E−03	1.402E+00	7.16E−03
γ 60	3.92E−02	1.441E+00	5.65E−02
γ 61	5.81E−03	1.462E+00	8.49E−03
γ 63	3.99E−03	1.501E+00	5.99E−03
ce-K, γ 64	2.01E−03	1.450E+00	2.92E−03
γ 65	7.00E−03	1.582E+00	1.11E−02
ce-K, γ 67	1.60E−03	1.545E+00	2.47E−03
ce-K, γ 69	9.99E−04	1.560E+00	1.56E−03
γ 70	4.76E−03	1.664E+00	7.92E−03
γ 72	5.88E−03	1.672E+00	9.83E−03
γ 73	8.40E−03	1.739E+00	1.46E−02
γ 74	7.84E−03	1.761E+00	1.38E−02
γ 77	2.04E−02	1.785E+00	3.64E−02
γ 78	4.62E−03	1.803E+00	8.33E−03
γ 82	8.54E−03	1.836E+00	1.57E−02
γ 83	3.29E−03	1.844E+00	6.07E−03
γ 84	3.01E−03	1.851E+00	5.57E−03
γ 85	9.80E−03	1.865E+00	1.83E−02
γ 86	2.59E−03	1.871E+00	4.85E−03
γ 87	6.09E−03	1.880E+00	1.14E−02
γ 88	6.09E−03	1.880E+00	1.14E−02
γ 90	2.80E−03	1.905E+00	5.33E−03
γ 91	1.05E−02	1.920E+00	2.02E−02
γ 92	2.45E−03	1.937E+00	4.75E−03
γ 96	3.08E−03	1.973E+00	6.08E−03
ce-K, γ 99	1.18E−03	1.947E+00	2.29E−03
γ 101	3.08E−03	2.040E+00	6.28E−03
γ 102	2.38E−03	2.061E+00	4.91E−03
ce-K, γ 103	2.01E−03	1.983E+00	3.99E−03
ce-L_1, γ 103	3.15E−04	2.047E+00	6.44E−04
γ 104	5.60E−03	2.082E+00	1.17E−02
γ 105	1.12E−02	2.087E+00	2.34E−02
γ 106	2.17E−02	2.097E+00	4.55E−02
γ 109	9.52E−03	2.132E+00	2.03E−02
γ 111	3.08E−03	2.150E+00	6.62E−03
γ 113	1.47E−02	2.213E+00	3.25E−02
γ 114	5.60E−03	2.243E+00	1.26E−02
γ 116	4.20E−03	2.271E+00	9.54E−03
γ 117	5.39E−03	2.278E+00	1.23E−02
γ 118	5.39E−03	2.278E+00	1.23E−02
γ 120	4.69E−03	2.315E+00	1.09E−02
γ 121	3.15E−03	2.325E+00	7.33E−03
γ 122	3.85E−03	2.334E+00	8.99E−03
γ 123	5.04E−02	2.383E+00	1.20E−01
γ 124	3.50E−03	2.401E+00	8.40E−03
γ 125	4.76E−02	2.416E+00	1.15E−01
γ 126	4.20E−03	2.428E+00	1.02E−02
γ 127	2.59E−03	2.436E+00	6.31E−03
ce-K, γ 128	4.51E−03	2.370E+00	1.07E−02
ce-L_1, γ 128	6.86E−04	2.435E+00	1.67E−03
γ 129	1.26E−02	2.452E+00	3.09E−02
γ 130	1.19E−02	2.470E+00	2.94E−02
γ 131	1.27E−02	2.498E+00	3.16E−02
γ 137	6.65E−03	2.636E+00	1.75E−02
γ 138	2.10E−03	2.643E+00	5.55E−03
γ 139	2.38E−02	2.658E+00	6.33E−02
γ 140	7.35E−03	2.680E+00	1.97E−02
γ 141	1.34E−02	2.685E+00	3.61E−02
γ 142	2.38E−03	2.697E+00	6.42E−03
γ 144	4.20E−02	2.753E+00	1.16E−01
γ 145	7.21E−03	2.771E+00	2.00E−02
γ 146	1.96E−03	2.843E+00	5.57E−03
γ 147	7.98E−03	2.875E+00	2.29E−02
γ 148	7.70E−03	2.881E+00	2.22E−02
γ 149	1.61E−03	2.921E+00	4.70E−03
γ 150	7.49E−03	2.942E+00	2.20E−02
γ 151	9.10E−03	2.957E+00	2.69E−02
γ 152	1.05E−02	2.960E+00	3.11E−02
γ 153	1.12E−02	2.981E+00	3.34E−02
γ 154	2.31E−03	3.024E+00	6.99E−03
γ 155	2.10E−03	3.036E+00	6.38E−03
γ 156	7.42E−03	3.082E+00	2.29E−02
γ 157	4.76E−03	3.095E+00	1.47E−02
γ 159	6.30E−03	3.178E+00	2.00E−02
γ 160	5.60E−03	3.200E+00	1.79E−02
γ 161	2.03E−03	3.207E+00	6.51E−03
γ 163	7.00E−03	3.356E+00	2.35E−02
K_{α_1} X-ray	3.84E−01	6.683E−02	2.56E−02
K_{α_2} X-ray	2.24E−01	6.512E−02	1.46E−02
K_{β_1} X-ray	8.67E−02	7.575E−02	6.57E−03
Auger-KLL	1.82E−02	5.236E−02*	9.53E−04
Auger-KLX	1.00E−02	6.288E−02*	6.32E−04
Auger-LMM	3.15E−01	7.372E−03*	2.32E−03
Auger-LMX	2.01E−01	9.676E−03*	1.94E−03
Auger-MXY	1.23E+00	2.486E−03*	3.07E−03

Listed X, γ and $\gamma^{\pm}$ radiations	2.18E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.43E−01
Listed β, ce and Auger radiations	2.54E−01
Omitted β, ce and Auger radiations**	1.36E−02
Listed radiations	2.44E+00
Omitted radiations**	1.57E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Pt-190 daughter is radioactive.


$^{190}_{79}$Au(42.8m)
1- 0.0
3.2337
3.0675
3.0493
3.0140
2.9809
2.9427
2.8754
2.7970
2.7234
2.6798
2.4978
2.3827
2.3583
2.2162
2.2128
1.8769
1.7370
1.6021
1.3953
1.3535
1.2031
0.9209
0.9167
0.7371
0.5977
0.2958
0.0
(1,2)-
(2)-
(2)-
1-
(1)+
(2)+
1-,2-,3-
1-
1+,2+
2+
3-
2+
0+
3+
4+
2+
2+
0+
EC_1
EC_2
EC_3, β^+_1
EC_4, β^+_2
EC_5, β^+_3
EC_6
EC_7, β^+_4
EC_8, β^+_5
EC_9, β^+_6
EC_{10}, β^+_7
EC_{11}, β^+_8
EC_{13}, β^+_{10}
EC_{14}, β^+_{11}
EC_{15}, β^+_{12}
EC_{16}, β^+_{13}
EC_{17}, β^+_{14}
EC_{18}, β^+_{15}
EC_{19}, β^+_{16}
EC_{20}, β^+_{17}
EC_{21}, β^+_{18}
EC_{22}, β^+_{19}
EC_{23}, β^+_{20}
EC_{24}, β^+_{21}
EC_{25}, β^+_{22}
EC_{26}, β^+_{23}
EC_{27}, β^+_{24}
γ_{137} γ_{68} γ_{125} γ_{117} γ_{106} γ_{104} γ_{102} γ_{78} γ_{72} γ_{59} γ_{29}
γ_{145} γ_{144} γ_{141} γ_{130} γ_{129} γ_{118} γ_{109} γ_{85} γ_{77} γ_{61} γ_{41}
γ_{49}
γ_{87} γ_{74} γ_{54} γ_{43} γ_{32} γ_{23} γ_{22}
γ_{9}
γ_{140} γ_{126} γ_{123} γ_{105} γ_{103} γ_{91} γ_{65} γ_{60} γ_{56} γ_{48} γ_{47} γ_{37} γ_{25} γ_{24} γ_{14} γ_{8}
γ_{153} γ_{131} γ_{113} γ_{58} γ_{21} γ_{7}
$^{190}_{78}$Pt(6.5E11y)

79-Au-191

22-JUN-95

Half-life = 3.18 h
Decay mode(s): EC, β^+

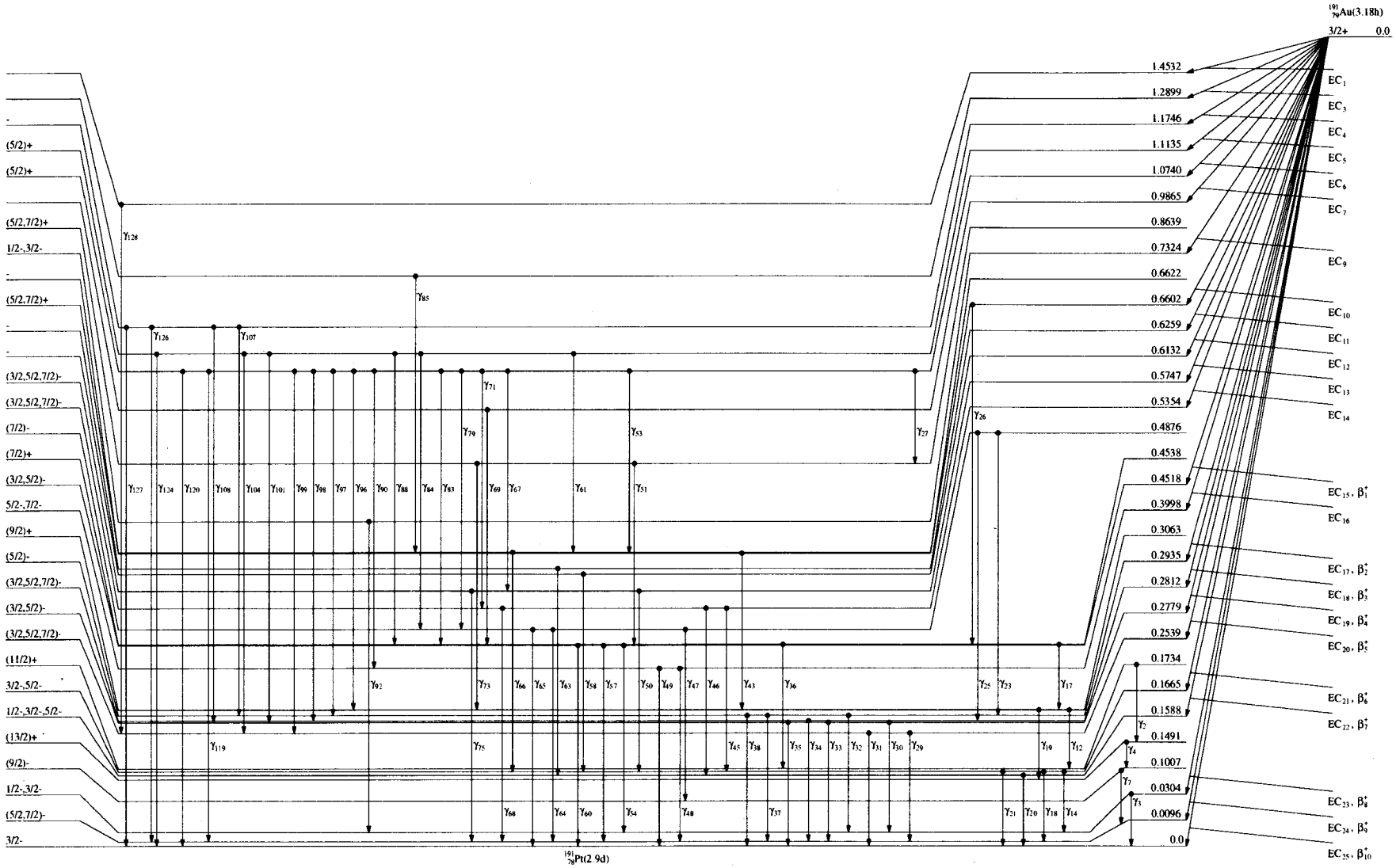
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
$\gamma^{\pm}$	2.66E−03	5.110E−01	1.36E−03
ce-M, γ 2	9.17E−03	2.174E−02*	1.99E−04
ce-L$_1$, γ 3	7.62E−02	1.652E−02	1.26E−03
ce-M, γ 3	2.04E−02	2.775E−02*	5.67E−04
ce-N$^+$, γ 3	7.11E−03	3.040E−02*	2.16E−04
ce-L$_1$, γ 4	3.50E−02	3.449E−02	1.21E−03
ce-L$_3$, γ 4	1.40E−02	3.681E−02	5.15E−04
ce-M, γ 4	1.36E−02	4.572E−02*	6.21E−04
ce-N$^+$, γ 4	4.45E−03	4.837E−02*	2.15E−04
ce-L$_2$, γ 5	7.58E−02	4.351E−02	3.30E−03
ce-L$_3$, γ 5	7.54E−02	4.522E−02	3.41E−03
ce-M, γ 5	3.93E−02	5.413E−02*	2.13E−03
ce-N$^+$, γ 5	1.19E−02	5.678E−02*	6.75E−04
γ 7	1.50E−02	9.111E−02	1.36E−03
ce-L$_2$, γ 7	3.84E−02	7.784E−02	2.99E−03
ce-L$_3$, γ 7	3.33E−02	7.955E−02	2.65E−03
ce-M, γ 7	1.90E−02	8.846E−02*	1.68E−03
ce-N$^+$, γ 7	5.80E−03	9.111E−02*	5.29E−04
ce-L$_2$, γ 11	1.69E−03	1.187E−01	2.00E−04
γ 12	1.22E−02	1.329E−01	1.63E−03
ce-K, γ 12	2.92E−02	5.450E−02	1.59E−03
ce-L$_1$, γ 12	4.37E−03	1.190E−01	5.20E−04
ce-K, γ 14	1.40E−02	5.770E−02	8.09E−04
ce-L$_1$, γ 14	2.09E−03	1.222E−01	2.55E−04
γ 17	8.67E−03	1.475E−01	1.28E−03
ce-K, γ 17	1.21E−02	6.910E−02	8.37E−04
ce-L$_1$, γ 17	1.82E−03	1.336E−01	2.43E−04
ce-K, γ 18	5.68E−03	7.858E−02	4.46E−04
ce-L$_2$, γ 19	1.46E−03	1.441E−01	2.11E−04
γ 20	1.48E−02	1.588E−01	2.35E−03
ce-K, γ 20	1.85E−02	8.044E−02	1.49E−03
ce-L$_1$, γ 20	2.74E−03	1.450E−01	3.97E−04
γ 21	3.31E−02	1.665E−01	5.52E−03
ce-K, γ 21	3.61E−02	8.811E−02	3.18E−03
ce-L$_1$, γ 21	5.35E−03	1.526E−01	8.16E−04
ce-L$_2$, γ 21	1.75E−03	1.532E−01	2.68E−04
ce-M, γ 21	1.91E−03	1.639E−01*	3.12E−04
γ 23	2.74E−02	1.941E−01	5.31E−03
ce-K, γ 23	2.13E−02	1.157E−01	2.46E−03
ce-L$_1$, γ 23	3.16E−03	1.802E−01	5.70E−04
γ 25	8.16E−03	2.064E−01	1.68E−03
ce-K, γ 25	4.03E−03	1.280E−01	5.16E−04
γ 26	1.39E−02	2.064E−01	2.88E−03
ce-K, γ 26	6.89E−03	1.280E−01	8.81E−04
ce-L$_1$, γ 26	1.03E−03	1.925E−01	1.98E−04
γ 27	5.95E−03	2.101E−01	1.25E−03
ce-K, γ 27	3.86E−03	1.317E−01	5.08E−04
γ 29	9.69E−03	2.444E−01	2.37E−03
ce-K, γ 29	3.45E−03	1.660E−01	5.73E−04
γ 30	7.48E−03	2.475E−01	1.85E−03
ce-K, γ 30	1.22E−03	1.691E−01	2.06E−04
γ 31	2.53E−02	2.539E−01	6.43E−03
ce-K, γ 31	2.36E−03	1.756E−01	4.15E−04
γ 32	1.55E−02	2.631E−01	4.07E−03
ce-K, γ 32	1.32E−03	1.847E−01	2.44E−04
γ 33	1.97E−02	2.683E−01	5.29E−03
ce-K, γ 33	6.53E−03	1.899E−01	1.24E−03
ce-L$_1$, γ 33	9.65E−04	2.545E−01	2.46E−04
γ 34	2.52E−02	2.716E−01	6.83E−03
ce-K, γ 34	5.29E−03	1.933E−01	1.02E−03
ce-L$_1$, γ 34	7.66E−04	2.578E−01	1.98E−04
γ 35	7.21E−02	2.779E−01	2.00E−02
ce-K, γ 35	2.32E−02	1.995E−01	4.62E−03
ce-L$_1$, γ 35	3.43E−03	2.640E−01	9.06E−04
ce-M, γ 35	8.70E−04	2.752E−01*	2.40E−04
γ 36	2.94E−02	2.804E−01	8.25E−03
ce-K, γ 36	2.14E−03	2.020E−01	4.33E−04
γ 37	6.73E−02	2.839E−01	1.91E−02
ce-K, γ 37	1.82E−02	2.055E−01	3.75E−03
ce-L$_1$, γ 37	2.69E−03	2.700E−01	7.27E−04
ce-M, γ 37	7.43E−04	2.813E−01*	2.09E−04
γ 38	2.84E−02	2.934E−01	8.33E−03
ce-K, γ 38	5.70E−03	2.151E−01	1.23E−03
ce-L$_1$, γ 38	8.32E−04	2.796E−01	2.33E−04
γ 42	5.44E−03	3.475E−01	1.89E−03
γ 43	3.11E−02	3.539E−01	1.10E−02
ce-K, γ 43	1.28E−03	2.755E−01	3.52E−04
γ 45	4.42E−03	3.687E−01	1.63E−03
γ 46	4.25E−03	3.766E−01	1.60E−03
γ 47	3.60E−02	3.869E−01	1.39E−02
ce-K, γ 47	2.39E−03	3.085E−01	7.38E−04
γ 48	2.72E−02	3.903E−01	1.06E−02
ce-K, γ 48	3.15E−03	3.119E−01	9.83E−04
γ 49	4.74E−02	3.998E−01	1.90E−02
ce-K, γ 49	1.45E−03	3.214E−01	4.68E−04
γ 50	9.18E−03	4.082E−01	3.75E−03
ce-K, γ 50	6.82E−04	3.298E−01	2.25E−04
γ 51	4.42E−03	4.102E−01	1.81E−03
γ 53	3.69E−02	4.137E−01	1.53E−02
ce-K, γ 53	3.64E−03	3.353E−01	1.22E−03
ce-L$_1$, γ 53	5.37E−04	3.999E−01	2.15E−04
γ 54	3.45E−02	4.214E−01	1.45E−02
ce-K, γ 54	2.37E−03	3.430E−01	8.11E−04
γ 57	5.95E−03	4.423E−01	2.63E−03
γ 58	3.57E−03	4.466E−01	1.59E−03
γ 60	1.34E−02	4.518E−01	6.07E−03
ce-K, γ 60	1.17E−03	3.735E−01	4.37E−04
γ 61	1.34E−02	4.518E−01	6.07E−03
γ 63	7.48E−03	4.670E−01	3.49E−03
ce-K, γ 63	5.98E−04	3.886E−01	2.32E−04
γ 64	3.94E−02	4.780E−01	1.89E−02
ce-K, γ 64	2.00E−03	3.996E−01	7.98E−04
γ 65	2.77E−02	4.876E−01	1.35E−02
ce-K, γ 65	5.38E−04	4.092E−01	2.20E−04
γ 66	5.78E−03	4.957E−01	2.87E−03
γ 67	4.59E−03	4.996E−01	2.29E−03
γ 68	8.67E−03	5.258E−01	4.56E−03
ce-K, γ 68	5.08E−04	4.474E−01	2.27E−04
γ 69	3.91E−03	5.326E−01	2.08E−03
γ 71	8.16E−03	5.387E−01	4.40E−03
γ 73	2.21E−03	5.575E−01	1.23E−03
γ 75	4.93E−03	5.651E−01	2.79E−03
γ 79	1.70E−01	5.864E−01	9.97E−02
ce-K, γ 79	8.43E−04	5.080E−01	4.28E−04
γ 80	3.40E−03	5.959E−01	2.03E−03
γ 82	3.74E−03	6.163E−01	2.30E−03
γ 83	1.09E−02	6.203E−01	6.75E−03
γ 84	9.01E−03	6.259E−01	5.64E−03
γ 85	2.04E−03	6.277E−01	1.28E−03
γ 88	2.89E−03	6.597E−01	1.91E−03
γ 90	6.83E−02	6.742E−01	4.61E−02
γ 92	5.44E−03	7.020E−01	3.82E−03
γ 96	2.04E−03	7.678E−01	1.57E−03
γ 97	2.55E−03	7.805E−01	1.99E−03
γ 98	7.14E−03	7.928E−01	5.66E−03
γ 99	3.57E−03	8.201E−01	2.93E−03
γ 101	6.80E−03	8.355E−01	5.68E−03
γ 104	3.06E−03	8.596E−01	2.63E−03
γ 107	1.87E−03	8.808E−01	1.65E−03
γ 108	1.36E−03	8.966E−01	1.22E−03
γ 117	1.19E−03	1.028E+00	1.22E−03
γ 119	1.53E−03	1.065E+00	1.63E−03
γ 120	1.70E−03	1.074E+00	1.83E−03

γ 122	1.19E−03	1.097E+00	1.31E−03
γ 123	1.36E−03	1.102E+00	1.50E−03
γ 124	2.55E−03	1.114E+00	2.84E−03
γ 125	1.87E−03	1.161E+00	2.17E−03
γ 126	2.04E−03	1.165E+00	2.38E−03
γ 127	1.36E−03	1.174E+00	1.60E−03
γ 128	1.53E−03	1.199E+00	1.83E−03
γ 129	2.89E−03	1.260E+00	3.64E−03
γ 130	1.53E−03	1.302E+00	1.99E−03
K_{α_1} X-ray	5.17E−01	6.683E−02	3.45E−02
K_{α_2} X-ray	3.01E−01	6.512E−02	1.96E−02
K_{β_1} X-ray	1.17E−01	7.575E−02	8.84E−03
K_{β_2} X-ray	4.70E−02	7.792E−02	3.66E−03
K_{β_3} X-ray	6.10E−02	7.537E−02	4.59E−03
L_α X-ray	2.18E−01	9.434E−03*	2.05E−03
L_β X-ray	2.26E−01	1.111E−02*	2.51E−03
Auger-KLL	2.45E−02	5.236E−02*	1.28E−03
Auger-KLX	1.35E−02	6.288E−02*	8.51E−04
Auger-LMM	5.78E−01	7.414E−03*	4.29E−03
Auger-LMX	3.69E−01	9.720E−03*	3.59E−03
Auger-LXY	6.09E−02	1.152E−02*	7.01E−04
Auger-MXY	2.28E+00	2.453E−03*	5.59E−03
ΔE	5.73E−01	3.959E−04*	2.27E−04

Listed X, γ and $\gamma^{\pm}$ radiations	5.67E−01
Omitted X, γ AND $\gamma^{\pm}$ radiations**	2.72E−02
Listed β, ce AND Auger radiations	7.92E−02
Omitted β, ce AND Auger radiations**	1.45E−02
Listed radiations	6.46E−01
Omitted radiations**	4.17E−02

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Pt-191 daughter is radioactive.


$^{191}_{79}$Au(3.18h)
3/2+ 0.0
1.4532
1.2899
1.1746
1.1135
1.0740
0.9865
0.8639
0.7324
0.6622
0.6602
0.6259
0.6132
0.5747
0.5354
0.4876
0.4538
0.4518
0.3998
0.3063
0.2935
0.2812
0.2779
0.2539
0.1734
0.1665
0.1588
0.1491
0.1007
0.0304
0.0096
0.0
EC1
EC3
EC4
EC5
EC6
EC7
EC9
EC10
EC11
EC12
EC13
EC14
EC15, β+1
EC16
EC17, β+2
EC18, β+3
EC19, β+4
EC20, β+5
EC21, β+6
EC22, β+7
EC23, β+8
EC24, β+9
EC25, β+10
(5/2)+
(5/2)+
(5/2,7/2)+
1/2-,3/2-
(5/2,7/2)+
(3/2,5/2,7/2)-
(3/2,5/2,7/2)-
(7/2)-
(7/2)+
(3/2,5/2)-
5/2-,7/2-
(9/2)+
(5/2)-
(3/2,5/2,7/2)-
(3/2,5/2)-
(3/2,5/2,7/2)-
(11/2)+
3/2-,5/2-
1/2-,3/2-,5/2-
(13/2)+
(9/2)-
1/2-,3/2-
(5/2,7/2)-
3/2-
$^{191}_{78}$Pt(2.9d)

79-Au-192

14-NOV-91

Half-life = 4.94 h
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 16	2.70E−03	8.534E−01*	2.31E−03
β^+ 17	1.63E−02	9.847E−01*	1.61E−02
β^+ 18	3.20E−02	1.126E+00*	3.61E−02
$\gamma^\pm$	1.04E−01	5.110E−01	5.33E−02
ce-K, γ 5	1.20E−03	1.714E−01	2.05E−04
γ 9	2.23E−01	2.960E−01	6.61E−02
ce-K, γ 9	1.47E−02	2.176E−01	3.19E−03
ce-L_1, γ 9	1.94E−03	2.821E−01	5.47E−04
ce-L_2, γ 9	3.16E−03	2.827E−01	8.92E−04
ce-L_3, γ 9	1.67E−03	2.844E−01	4.75E−04
ce-M, γ 9	1.69E−03	2.933E−01*	4.95E−04
γ 10	3.45E−02	3.085E−01	1.06E−02
ce-K, γ 10	2.10E−03	2.301E−01	4.83E−04
γ 11	5.80E−01	3.165E−01	1.84E−01
ce-K, γ 11	3.13E−02	2.381E−01	7.45E−03
ce-L_1, γ 11	4.15E−03	3.026E−01	1.25E−03
ce-L_2, γ 11	6.26E−03	3.032E−01	1.90E−03
ce-L_3, γ 11	3.21E−03	3.049E−01	9.79E−04
ce-M, γ 11	3.39E−03	3.139E−01*	1.06E−03
ce-N^+, γ 11	1.03E−03	3.165E−01*	3.25E−04
γ 22	1.75E−02	4.681E−01	8.17E−03
γ 23	1.08E−02	4.771E−01	5.15E−03
γ 38	2.68E−02	5.826E−01	1.56E−02
γ 40	7.83E−03	5.934E−01	4.65E−03
γ 42	1.01E−02	6.044E−01	6.10E−03
γ 43	4.34E−02	6.125E−01	2.66E−02
ce-K, γ 43	5.14E−04	5.341E−01	2.75E−04
γ 67	1.65E−02	7.591E−01	1.25E−02
ce-K, γ 67	3.76E−04	6.807E−01	2.56E−04
γ 92	8.18E−03	8.787E−01	7.19E−03
γ 104	5.34E−03	9.338E−01	4.98E−03
γ 105	5.22E−03	9.343E−01	4.88E−03
γ 126	9.28E−03	1.061E+00	9.85E−03
γ 140	1.10E−02	1.123E+00	1.24E−02
γ 141	1.46E−02	1.127E+00	1.65E−02
γ 142	1.46E−02	1.127E+00	1.65E−02
γ 144	2.61E−02	1.140E+00	2.98E−02
ce-K, γ 144	2.12E−04	1.062E+00	2.25E−04
γ 166	4.06E−03	1.282E+00	5.21E−03
γ 173	4.29E−03	1.313E+00	5.64E−03
γ 178	4.93E−03	1.337E+00	6.59E−03
γ 184	3.71E−03	1.387E+00	5.15E−03
γ 191	2.98E−02	1.423E+00	4.23E−02
γ 202	3.25E−03	1.477E+00	4.80E−03
γ 213	4.23E−03	1.537E+00	6.51E−03
γ 215	6.38E−03	1.559E+00	9.95E−03
γ 217	5.45E−03	1.567E+00	8.54E−03
γ 218	2.26E−02	1.577E+00	3.57E−02
γ 220	5.22E−03	1.580E+00	8.25E−03
γ 224	1.67E−02	1.624E+00	2.71E−02
γ 228	4.87E−03	1.645E+00	8.01E−03
γ 240	1.92E−02	1.707E+00	3.28E−02
γ 241	3.11E−02	1.723E+00	5.36E−02
γ 242	6.67E−03	1.731E+00	1.15E−02
γ 247	9.05E−03	1.763E+00	1.60E−02
γ 251	1.12E−02	1.787E+00	2.00E−02
γ 253	4.35E−03	1.814E+00	7.89E−03
γ 255	3.19E−02	1.833E+00	5.85E−02
γ 260	2.61E−03	1.872E+00	4.89E−03
γ 261	2.61E−03	1.875E+00	4.89E−03
γ 267	3.25E−02	1.921E+00	6.24E−02
γ 269	1.62E−02	1.941E+00	3.15E−02
γ 271	5.10E−03	1.951E+00	9.96E−03
γ 275	2.38E−03	1.973E+00	4.69E−03
γ 276	9.28E−03	1.980E+00	1.84E−02
γ 280	8.99E−03	2.003E+00	1.80E−02
γ 282	1.48E−02	2.019E+00	2.99E−02
γ 284	7.13E−03	2.035E+00	1.45E−02
γ 287	3.19E−03	2.059E+00	6.57E−03
γ 290	8.76E−03	2.083E+00	1.82E−02
γ 291	2.32E−03	2.092E+00	4.85E−03
γ 293	8.64E−03	2.107E+00	1.82E−02
γ 295	3.54E−03	2.130E+00	7.54E−03
γ 297	2.61E−03	2.137E+00	5.58E−03
γ 300	1.97E−03	2.156E+00	4.25E−03
γ 301	2.09E−03	2.167E+00	4.53E−03
γ 302	8.58E−03	2.172E+00	1.86E−02
γ 308	5.28E−03	2.216E+00	1.17E−02
γ 310	7.54E−03	2.234E+00	1.68E−02
γ 311	5.57E−02	2.237E+00	1.25E−01
γ 312	4.64E−03	2.244E+00	1.04E−02
γ 324	4.93E−03	2.313E+00	1.14E−02
γ 325	1.59E−02	2.319E+00	3.69E−02
γ 326	1.75E−02	2.336E+00	4.08E−02
γ 334	2.38E−03	2.414E+00	5.74E−03
γ 335	1.13E−02	2.423E+00	2.73E−02
γ 350	4.35E−03	2.518E+00	1.10E−02
γ 351	2.03E−03	2.533E+00	5.14E−03
γ 352	2.03E−03	2.533E+00	5.14E−03
γ 353	3.02E−03	2.541E+00	7.66E−03
γ 354	2.38E−03	2.543E+00	6.05E−03
γ 357	2.73E−03	2.574E+00	7.02E−03
γ 362	3.77E−03	2.614E+00	9.86E−03
γ 364	2.44E−03	2.630E+00	6.41E−03
γ 365	5.86E−03	2.635E+00	1.54E−02
γ 373	3.13E−03	2.718E+00	8.51E−03
γ 378	1.39E−03	2.830E+00	3.94E−03
γ 379	5.68E−03	2.839E+00	1.61E−02
γ 397	1.45E−03	3.145E+00	4.56E−03
K_{α_1} X-ray	3.88E−01	6.683E−02	2.59E−02
K_{α_2} X-ray	2.26E−01	6.512E−02	1.47E−02
K_{β_1} X-ray	8.76E−02	7.575E−02	6.64E−03
Auger-KLL	1.84E−02	5.236E−02*	9.63E−04
Auger-KLX	1.01E−02	6.288E−02*	6.38E−04
Auger-LMM	3.19E−01	7.374E−03*	2.35E−03
Auger-LMX	2.03E−01	9.678E−03*	1.97E−03
Auger-LXY	3.36E−02	1.147E−02*	3.85E−04
Auger-MXY	1.25E+00	2.486E−03*	3.11E−03

Listed X, γ and $\gamma^\pm$ radiations	1.60E+00
Omitted X, γ and $\gamma^\pm$ radiations**	3.44E−01
Listed β, ce and Auger radiations	8.39E−02
Omitted β, ce and Auger radiations**	6.86E−03
Listed radiations	1.68E+00
Omitted radiations**	3.51E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum$y(i)×E(i) in its category.

Pt-192 daughter is stable.

79-Au-196m

06-NOV-95

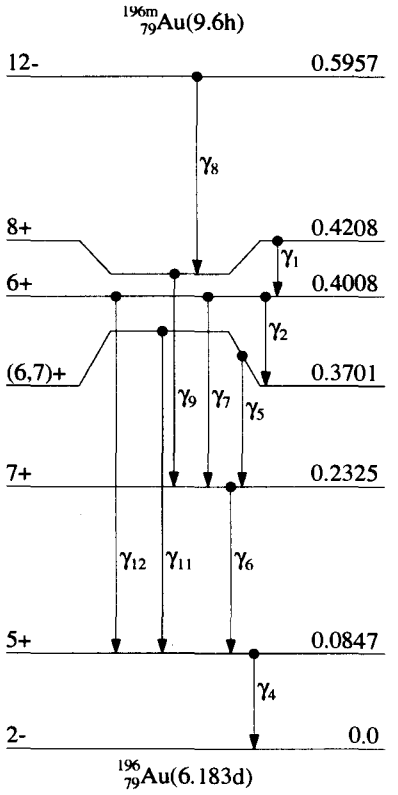
Half-life = 9.6 h
Decay mode(s): IT

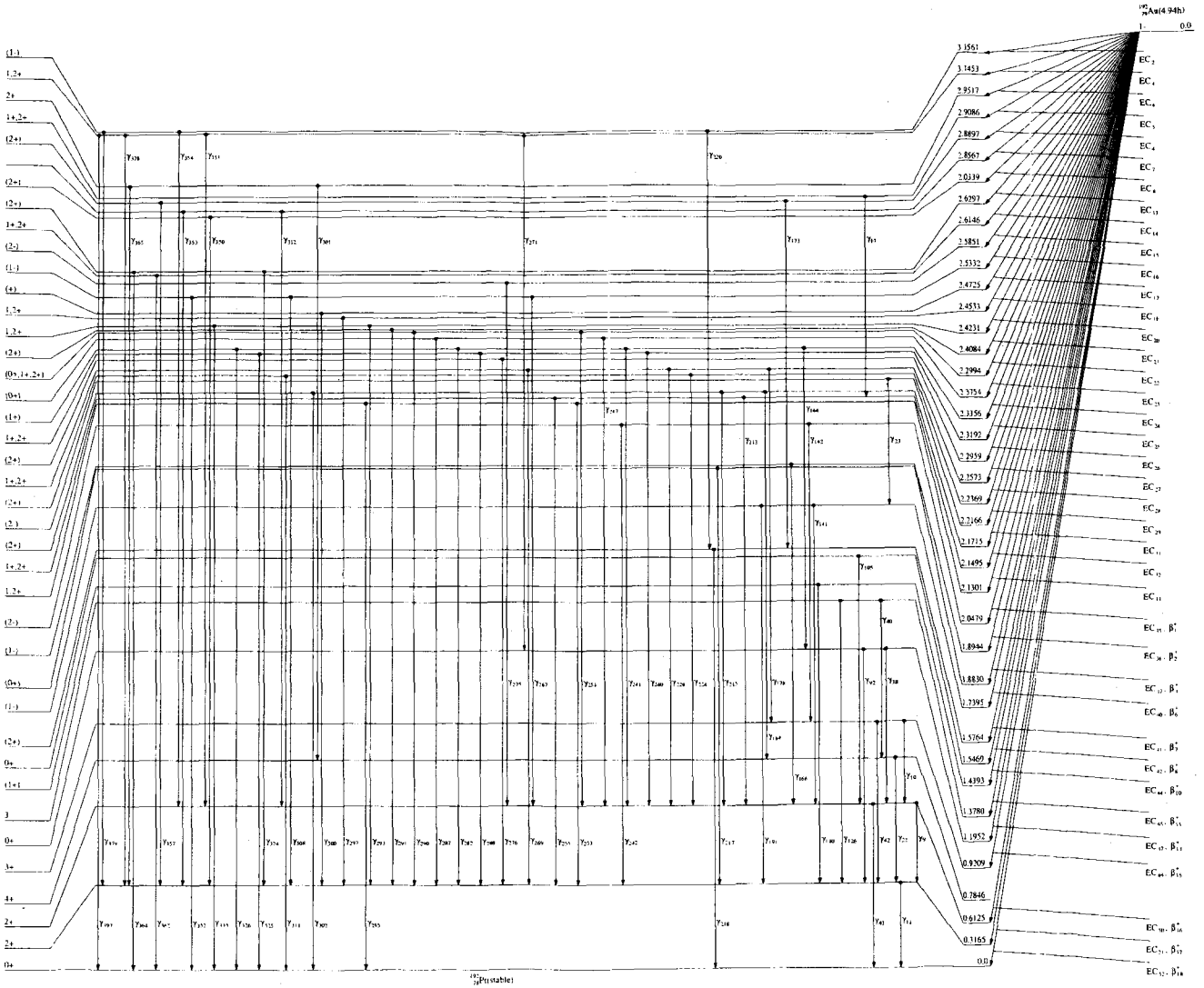
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-L_2, γ 1	6.72E−02	6.186E−03	4.16E−04
ce-L_3, γ 1	8.02E−02	8.001E−03	6.42E−04
ce-M, γ 1	3.78E−02	1.718E−02*	6.50E−04
ce-L_1, γ 2	6.32E−02	1.636E−02	1.03E−03
ce-M, γ 2	1.62E−02	2.797E−02*	4.54E−04
γ 4	2.93E−03	8.466E−02	2.48E−04
ce-L_1, γ 4	1.09E−02	7.031E−02	7.63E−04
ce-L_2, γ 4	3.93E−01	7.093E−02	2.79E−02
ce-L_3, γ 4	3.08E−01	7.274E−02	2.24E−02
ce-M, γ 4	2.02E−01	8.192E−02*	1.65E−02
ce-N^+, γ 4	6.45E−02	8.466E−02*	5.46E−03
γ 5	1.27E−02	1.377E−01	1.76E−03
ce-K, γ 5	3.16E−02	5.697E−02	1.80E−03
ce-L_1, γ 5	4.78E−03	1.233E−01	5.89E−04
γ 6	4.25E−01	1.478E−01	6.28E−02
ce-K, γ 6	1.49E−01	6.709E−02	9.99E−03
ce-L_1, γ 6	1.85E−02	1.335E−01	2.47E−03
ce-L_2, γ 6	1.32E−01	1.341E−01	1.77E−02
ce-L_3, γ 6	9.48E−02	1.359E−01	1.29E−02
ce-M, γ 6	6.34E−02	1.451E−01*	9.20E−03
ce-N^+, γ 6	1.98E−02	1.478E−01*	2.93E−03
γ 7	7.65E−02	1.684E−01	1.29E−02
ce-K, γ 7	1.07E−01	8.765E−02	9.39E−03
ce-L_1, γ 7	1.62E−02	1.540E−01	2.49E−03
ce-M, γ 7	4.15E−03	1.656E−01*	6.87E−04
γ 8	4.12E−03	1.749E−01	7.21E−04
ce-K, γ 8	2.59E−01	9.419E−02	2.44E−02
ce-L_1, γ 8	1.82E−01	1.606E−01	2.92E−02
ce-L_2, γ 8	4.42E−02	1.612E−01	7.12E−03
ce-L_3, γ 8	2.82E−01	1.630E−01	4.60E−02
ce-M, γ 8	1.53E−01	1.722E−01*	2.63E−02
ce-N^+, γ 8	5.14E−02	1.749E−01*	9.00E−03
γ 9	3.74E−01	1.883E−01	7.04E−02
ce-K, γ 9	3.78E−01	1.075E−01	4.06E−02
ce-L_1, γ 9	5.71E−02	1.739E−01	9.92E−03
ce-L_2, γ 9	6.16E−03	1.745E−01	1.07E−03
ce-M, γ 9	1.48E−02	1.855E−01*	2.75E−03
ce-N^+, γ 9	4.68E−03	1.883E−01*	8.82E−04
γ 10	1.27E−02	2.640E−01	3.37E−03
γ 11	4.33E−02	2.855E−01	1.24E−02
ce-K, γ 11	3.06E−03	2.048E−01	6.27E−04
γ 12	2.89E−02	3.162E−01	9.14E−03
ce-K, γ 12	2.14E−03	2.355E−01	5.04E−04
K_{α_1} X-ray	4.42E−01	6.881E−02	3.04E−02
K_{α_2} X-ray	2.59E−01	6.699E−02	1.73E−02
K_{β_1} X-ray	1.00E−01	7.798E−02	7.82E−03
K_{β_2} X-ray	4.13E−02	8.022E−02	3.32E−03
K_{β_3} X-ray	5.23E−02	7.758E−02	4.06E−03
L_α X-ray	3.81E−01	9.704E−03*	3.70E−03
L_β X-ray	3.96E−01	1.148E−02*	4.54E−03
L_γ X-ray	7.14E−02	1.347E−02*	9.62E−04
Auger-KLL	2.04E−02	5.466E−02*	1.11E−03
Auger-KLX	1.13E−02	6.469E−02*	7.32E−04
Auger-LMM	9.56E−01	7.596E−03*	7.26E−03
Auger-LMX	6.12E−01	9.972E−03*	6.10E−03
Auger-LXY	1.01E−01	1.183E−02*	1.20E−03
Auger-MXY	3.89E+00	2.502E−03*	9.73E−03
ΔE	1.05E+00	4.307E−04*	4.51E−04

Listed X, γ and $\gamma^\pm$ radiations	2.46E−01
Omitted X, γ AND $\gamma^\pm$ radiations**	4.87E−04
Listed β, ce AND Auger radiations	3.71E−01
Omitted β, ce AND Auger radiations**	3.51E−03
Listed radiations	6.17E−01
Omitted radiations**	4.00E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Au-196 daughter is radioactive.




$^{195}_{79}$Au(4.94h)
$^{195}_{78}$Pt(stable)

79-Au-196

06-NOV-95

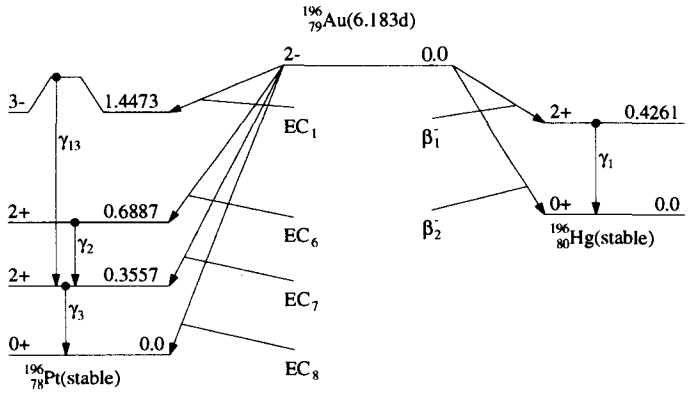
Half-life = 6.183 d
Decay mode(s): EC, β^-

Radiation	y(i) $(\text{Bq s})^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-K, γ 2	2.05E−01	2.546E−01	5.22E−02
ce-L_1, γ 2	3.34E−02	3.192E−01	1.07E−02
ce-M, γ 2	7.66E−03	3.304E−01*	2.53E−03
ce-N^+, γ 2	2.39E−03	3.330E−01*	7.95E−04
γ 3	8.75E−01	3.557E−01	3.11E−01
ce-K, γ 3	3.55E−02	2.773E−01	9.84E−03
ce-L_1, γ 3	4.77E−03	3.418E−01	1.63E−03
ce-L_2, γ 3	5.85E−03	3.424E−01	2.00E−03
ce-L_3, γ 3	2.84E−03	3.441E−01	9.77E−04
ce-M, γ 3	3.33E−03	3.530E−01*	1.18E−03
ce-N^+, γ 3	1.01E−03	3.557E−01*	3.59E−04
γ 13	1.50E−03	1.091E+00	1.63E−03
K_{α_1} X-ray	4.66E−01	6.683E−02	3.12E−02
K_{α_2} X-ray	2.72E−01	6.512E−02	1.77E−02
K_{β_1} X-ray	1.05E−01	7.575E−02	7.98E−03
K_{β_2} X-ray	4.24E−02	7.792E−02	3.30E−03
K_{β_3} X-ray	5.50E−02	7.537E−02	4.15E−03
L_α X-ray	1.48E−01	9.434E−03*	1.40E−03
L_β X-ray	1.42E−01	1.112E−02*	1.58E−03
Auger-KLL	2.21E−02	5.236E−02*	1.16E−03
Auger-KLX	1.22E−02	6.288E−02*	7.67E−04
Auger-KXY	1.94E−03	7.303E−02*	1.42E−04
Auger-LMM	3.80E−01	7.370E−03*	2.80E−03
Auger-LMX	2.43E−01	9.675E−03*	2.35E−03
Auger-LXY	4.00E−02	1.147E−02*	4.59E−04
Auger-MXY	1.49E+00	2.487E−03*	3.71E−03
ΔE	3.58E−01	3.894E−04*	1.39E−04
β^- 1	6.44E−02	7.188E−02*	4.63E−03
β^- 2	5.15E−03	2.193E−01*	1.13E−03
γ 1	6.67E−02	4.261E−01	2.84E−02
ce-K, γ 1	1.86E−03	3.430E−01	6.38E−04
ce-L_1, γ 1	2.63E−04	4.113E−01	1.08E−04
ce-L_2, γ 1	2.62E−04	4.119E−01	1.08E−04

Listed X, γ and $\gamma^\pm$ radiations	4.08E−01
Omitted X, γ and $\gamma^\pm$ radiations**	1.70E−03
Listed β, ce and Auger radiations	1.00E−01
Omitted β, ce and Auger radiations**	1.81E−04
Listed radiations	5.09E−01
Omitted radiations**	1.88E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pt-196 daughter, yield 9.305E−01, is stable.
Hg-196 daughter, yield 6.95E−02, is stable.



79-Au-202

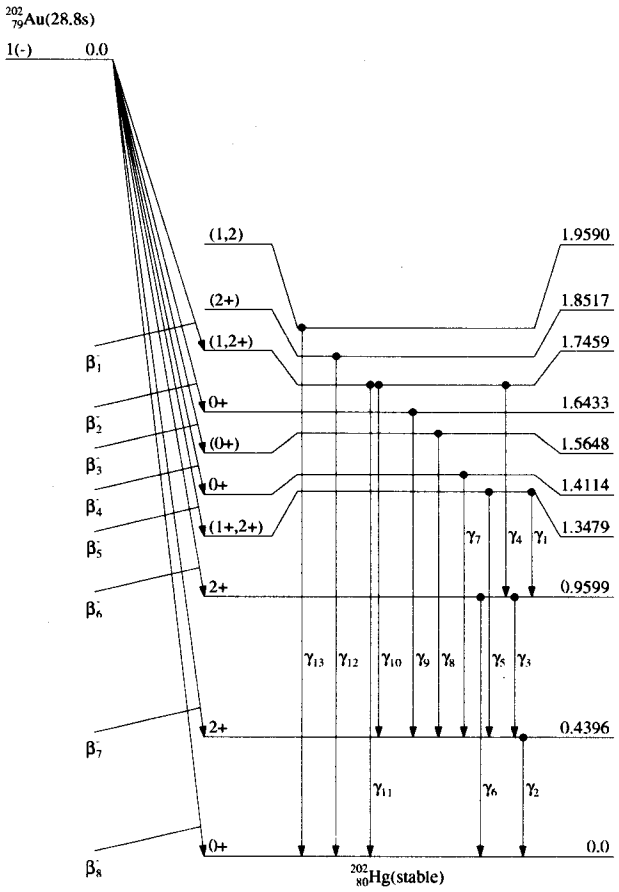
24-APR-97

Half-life = 28.8 s
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	2.74E−02	4.090E−01*	1.12E−02
β^- 2	1.96E−02	4.498E−01*	8.80E−03
β^- 3	2.25E−02	4.814E−01*	1.08E−02
β^- 4	7.33E−03	5.438E−01*	3.99E−03
β^- 5	2.84E−02	5.699E−01*	1.62E−02
β^- 6	4.89E−03	7.320E−01*	3.58E−03
β^- 7	9.78E−03	9.542E−01*	9.33E−03
β^- 8	8.80E−01	1.145E+00*	1.01E+00
γ 1	1.00E−02	3.881E−01	3.88E−03
γ 2	1.00E−01	4.395E−01	4.40E−02
γ 3	1.70E−02	5.203E−01	8.85E−03
γ 4	5.10E−03	7.860E−01	4.01E−03
γ 5	1.85E−02	9.084E−01	1.68E−02
γ 6	2.40E−03	9.597E−01	2.30E−03
γ 7	7.50E−03	9.718E−01	7.29E−03
γ 8	2.30E−02	1.125E+00	2.59E−02
γ 9	2.01E−02	1.204E+00	2.42E−02
γ 10	2.25E−02	1.306E+00	2.94E−02
γ 11	7.10E−04	1.746E+00	1.24E−03
γ 12	1.00E−03	1.852E+00	1.85E−03
γ 13	1.00E−03	1.959E+00	1.96E−03
K_{α_1} X-ray	2.73E−03	7.082E−02	1.94E−04
Listed X, γ and $\gamma^{\pm}$ radiations			1.72E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**			2.33E−04
Listed β, ce and Auger radiations			1.07E+00
Omitted β, ce and Auger radiations**			3.46E−03
Listed radiations			1.24E+00
Omitted radiations**			3.70E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i)\times E(i)$ in its category.

Hg-202 daughter is stable.



80-Hg-191m

22-JUN-95

Half-life = 50.8 m
Decay mode(s): EC, β^+

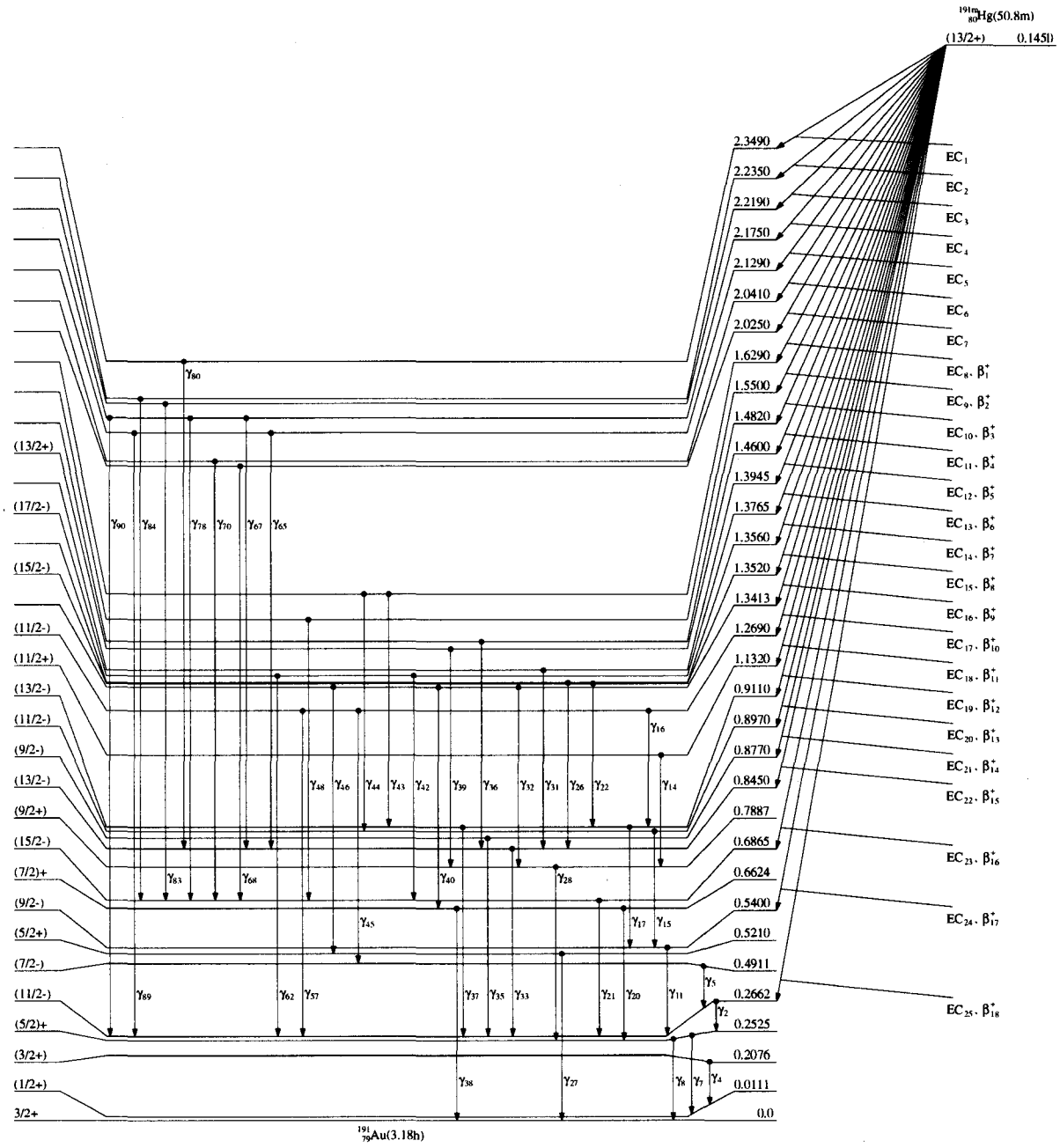
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 9	5.54E−04	4.496E−01*	2.49E−04
β^+ 10	1.09E−03	4.812E−01*	5.23E−04
β^+ 11	4.34E−04	5.412E−01*	2.35E−04
β^+ 12	3.26E−04	6.381E−01*	2.08E−04
β^+ 13	2.17E−03	6.442E−01*	1.40E−03
β^+ 14	5.43E−04	6.577E−01*	3.57E−04
β^+ 15	2.17E−03	6.670E−01*	1.45E−03
β^+ 16	6.73E−03	7.367E−01*	4.96E−03
β^+ 17	1.09E−03	7.998E−01*	8.69E−04
β^+ 18	1.19E−02	9.223E−01*	1.10E−02
$\gamma^{\pm}$	5.62E−02	5.110E−01	2.87E−02
ce-L_3, γ 2	3.58E−01	1.781E−03	6.38E−04
ce-M, γ 2	2.87E−01	1.096E−02*	3.15E−03
ce-N^+, γ 2	1.75E−01	1.370E−02*	2.40E−03
γ 4	2.57E−02	1.965E−01	5.04E−03
ce-K, γ 4	2.33E−02	1.158E−01	2.70E−03
ce-L_1, γ 4	3.51E−03	1.821E−01	6.40E−04
ce-M, γ 4	8.99E−04	1.938E−01*	1.74E−04
γ 5	3.42E−02	2.249E−01	7.69E−03
ce-K, γ 5	4.38E−03	1.442E−01	6.31E−04
ce-L_2, γ 5	1.70E−03	2.112E−01	3.58E−04
ce-L_3, γ 5	1.01E−03	2.130E−01	2.16E−04
ce-M, γ 5	8.33E−04	2.222E−01*	1.85E−04
γ 7	1.21E−01	2.414E−01	2.93E−02
ce-K, γ 7	1.30E−02	1.607E−01	2.09E−03
ce-L_1, γ 7	1.69E−03	2.270E−01	3.84E−04
ce-L_2, γ 7	4.46E−03	2.277E−01	1.02E−03
ce-L_3, γ 7	2.57E−03	2.295E−01	5.89E−04
ce-M, γ 7	2.21E−03	2.387E−01*	5.28E−04
ce-N^+, γ 7	6.88E−04	2.414E−01*	1.66E−04
γ 8	5.70E−01	2.526E−01	1.44E−01
ce-K, γ 8	1.67E−01	1.719E−01	2.87E−02
ce-L_1, γ 8	2.46E−02	2.382E−01	5.86E−03
ce-L_2, γ 8	9.82E−03	2.389E−01	2.34E−03
ce-L_3, γ 8	4.53E−03	2.407E−01	1.09E−03
ce-M, γ 8	9.34E−03	2.499E−01*	2.33E−03
ce-N^+, γ 8	2.91E−03	2.526E−01*	7.36E−04
γ 11	1.31E−01	2.741E−01	3.59E−02
ce-K, γ 11	4.72E−02	1.934E−01	9.13E−03
ce-L_1, γ 11	7.06E−03	2.597E−01	1.83E−03
ce-L_2, γ 11	7.08E−04	2.604E−01	1.84E−04
ce-M, γ 11	1.81E−03	2.714E−01*	4.92E−04
ce-N^+, γ 11	5.66E−04	2.741E−01*	1.55E−04
γ 12	9.69E−03	3.016E−01	2.92E−03
γ 13	4.33E−02	3.316E−01	1.44E−02
ce-K, γ 13	2.12E−03	2.509E−01	5.33E−04
γ 14	1.48E−02	3.433E−01	5.09E−03
ce-K, γ 14	2.92E−03	2.626E−01	7.67E−04
ce-L_1, γ 14	4.36E−04	3.289E−01	1.43E−04
γ 15	4.84E−02	3.570E−01	1.73E−02
ce-K, γ 15	8.20E−03	2.763E−01	2.27E−03
ce-L_1, γ 15	1.22E−03	3.426E−01	4.19E−04
γ 16	4.84E−02	3.570E−01	1.73E−02
ce-K, γ 16	8.59E−03	2.763E−01	2.37E−03
ce-L_1, γ 16	1.28E−03	3.426E−01	4.39E−04
γ 17	6.27E−02	3.710E−01	2.33E−02
ce-K, γ 17	2.35E−03	2.903E−01	6.82E−04
ce-L_2, γ 17	3.89E−04	3.573E−01	1.39E−04
γ 20	2.79E−02	4.097E−01	1.14E−02
ce-K, γ 20	3.43E−03	3.290E−01	1.13E−03
ce-L_1, γ 20	5.11E−04	3.953E−01	2.02E−04
γ 21	1.86E−01	4.203E−01	7.81E−02
ce-K, γ 21	5.21E−03	3.396E−01	1.77E−03
ce-L_1, γ 21	7.24E−04	4.059E−01	2.94E−04
ce-L_2, γ 21	7.00E−04	4.066E−01	2.84E−04
ce-M, γ 21	4.27E−04	4.176E−01*	1.78E−04
γ 22	1.14E−02	4.410E−01	5.03E−03
ce-K, γ 22	1.15E−03	3.603E−01	4.14E−04
γ 24	5.70E−03	4.578E−01	2.61E−03
γ 26	2.28E−02	5.110E−01	1.17E−02
ce-K, γ 26	4.13E−04	4.303E−01	1.78E−04
γ 27	3.93E−02	5.215E−01	2.05E−02
ce-K, γ 27	6.82E−04	4.408E−01	3.01E−04
γ 28	8.04E−02	5.361E−01	4.31E−02
ce-K, γ 28	1.31E−03	4.554E−01	5.98E−04
γ 29	1.54E−02	5.456E−01	8.40E−03
γ 30	5.13E−03	5.460E−01	2.80E−03
γ 31	2.05E−02	5.495E−01	1.13E−02
ce-K, γ 31	3.18E−04	4.688E−01	1.49E−04
γ 32	1.60E−02	5.525E−01	8.82E−03
γ 33	1.76E−01	5.787E−01	1.02E−01
ce-K, γ 33	8.07E−03	4.980E−01	4.02E−03
ce-L_1, γ 33	1.19E−03	5.643E−01	6.72E−04
ce-M, γ 33	3.09E−04	5.760E−01*	1.78E−04
γ 34	7.98E−03	5.970E−01	4.76E−03
γ 35	4.67E−02	6.106E−01	2.85E−02
ce-K, γ 35	2.01E−03	5.299E−01	1.07E−03
ce-L_1, γ 35	2.97E−04	5.962E−01	1.77E−04
γ 36	1.42E−02	6.371E−01	9.08E−03
γ 37	8.55E−03	6.445E−01	5.51E−03
ce-K, γ 37	3.20E−04	5.638E−01	1.81E−04
γ 38	1.14E−02	6.620E−01	7.55E−03
γ 39	2.96E−02	6.710E−01	1.99E−02
ce-K, γ 39	3.02E−04	5.903E−01	1.78E−04
γ 40	2.17E−02	6.786E−01	1.47E−02
γ 41	1.31E−02	6.832E−01	8.96E−03
γ 42	2.17E−02	6.900E−01	1.49E−02
ce-K, γ 42	6.80E−04	6.093E−01	4.14E−04
γ 43	3.08E−02	7.180E−01	2.21E−02
ce-K, γ 43	2.74E−04	6.373E−01	1.74E−04
γ 44	5.13E−03	7.328E−01	3.76E−03
γ 45	1.71E−02	7.778E−01	1.33E−02
γ 46	1.20E−02	8.208E−01	9.82E−03
γ 47	7.98E−03	8.290E−01	6.62E−03
γ 48	7.98E−03	8.636E−01	6.89E−03
γ 49	1.82E−02	8.870E−01	1.62E−02
γ 50	5.70E−03	8.970E−01	5.11E−03
γ 51	7.41E−03	9.083E−01	6.73E−03
γ 52	1.14E−02	9.383E−01	1.07E−02
γ 53	5.70E−03	9.494E−01	5.41E−03
γ 54	6.27E−03	9.548E−01	5.99E−03
γ 55	7.98E−03	9.700E−01	7.74E−03
γ 56	2.34E−02	9.964E−01	2.33E−02
γ 57	1.54E−02	1.003E+00	1.54E−02
ce-K, γ 57	1.87E−04	9.220E−01	1.72E−04
γ 58	5.13E−03	1.041E+00	5.34E−03
γ 59	6.27E−03	1.046E+00	6.56E−03
γ 60	7.98E−03	1.057E+00	8.43E−03
γ 61	1.20E−02	1.091E+00	1.31E−02
γ 62	1.77E−02	1.109E+00	1.96E−02
ce-K, γ 62	7.16E−04	1.029E+00	7.36E−04
γ 63	8.55E−03	1.165E+00	9.96E−03
γ 64	5.13E−03	1.257E+00	6.45E−03
γ 65	1.94E−02	1.284E+00	2.49E−02
γ 66	9.69E−03	1.307E+00	1.27E−02
γ 67	2.91E−02	1.330E+00	3.87E−02
γ 68	1.08E−02	1.338E+00	1.45E−02
γ 69	5.70E−03	1.348E+00	7.68E−03
γ 70	6.84E−03	1.355E+00	9.27E−03
γ 71	8.55E−03	1.365E+00	1.17E−02
γ 72	5.70E−03	1.384E+00	7.89E−03
γ 73	1.08E−02	1.392E+00	1.51E−02
γ 74	7.41E−03	1.434E+00	1.06E−02

γ 75	7.98E−03	1.441E+00	1.15E−02
γ 76	1.54E−02	1.448E+00	2.23E−02
γ 77	6.27E−03	1.473E+00	9.24E−03
γ 78	7.41E−03	1.488E+00	1.10E−02
γ 79	9.69E−03	1.491E+00	1.45E−02
γ 80	1.99E−02	1.504E+00	3.00E−02
γ 81	7.98E−03	1.512E+00	1.21E−02
γ 82	6.84E−03	1.525E+00	1.04E−02
γ 83	1.03E−02	1.533E+00	1.57E−02
γ 84	1.94E−02	1.549E+00	3.00E−02
γ 85	5.70E−03	1.633E+00	9.31E−03
γ 86	9.12E−03	1.672E+00	1.52E−02
γ 87	1.42E−02	1.739E+00	2.48E−02
γ 88	9.69E−03	1.760E+00	1.71E−02
γ 89	6.27E−03	1.864E+00	1.17E−02
γ 90	1.60E−02	1.908E+00	3.05E−02
K_{α_1} X-ray	5.17E−01	6.881E−02	3.56E−02
K_{α_2} X-ray	3.03E−01	6.699E−02	2.03E−02
K_{β_1} X-ray	1.17E−01	7.798E−02	9.15E−03
K_{β_2} X-ray	4.84E−02	8.022E−02	3.88E−03
K_{β_3} X-ray	6.12E−02	7.758E−02	4.75E−03
L_α X-ray	2.58E−01	9.704E−03*	2.50E−03
L_β X-ray	1.85E−01	1.149E−02*	2.13E−03
Auger-KLL	2.39E−02	5.466E−02*	1.30E−03
Auger-KLX	1.32E−02	6.469E−02*	8.57E−04
Auger-KXY	2.11E−03	7.516E−02*	1.59E−04
Auger-LMM	5.57E−01	7.401E−03*	4.12E−03
Auger-LMX	3.57E−01	9.779E−03*	3.49E−03
Auger-LXY	5.93E−02	1.164E−02*	6.90E−04
Auger-MXY	2.40E+00	2.566E−03*	6.16E−03
ΔE	7.02E−01	4.469E−04*	3.14E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.49E+00
Omitted X, γ AND $\gamma^{\pm}$ radiations**	7.71E−04
Listed β, ce AND Auger radiations	1.28E−01
Omitted β, ce AND Auger radiations**	6.85E−03
Listed radiations	1.61E+00
Omitted radiations**	7.62E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Au-191 daughter is radioactive.


191m 80 Hg(50.8m)
(13/2+) (0.145l)
2.3490
2.2350
2.2190
2.1750
2.1290
2.0410
2.0250
1.6290
1.5500
1.4820
1.4600
1.3945
1.3765
1.3560
1.3520
1.3413
1.2690
1.1320
0.9110
0.8970
0.8770
0.8450
0.7887
0.6865
0.6624
0.5400
0.5210
0.4911
0.2662
0.2525
0.2076
0.0111
0.0
EC1
EC2
EC3
EC4
EC5
EC6
EC7
EC8, β+1
EC9, β+2
EC10, β+3
EC11, β+4
EC12, β+5
EC13, β+6
EC14, β+7
EC15, β+8
EC16, β+9
EC17, β+10
EC18, β+11
EC19, β+12
EC20, β+13
EC21, β+14
EC22, β+15
EC23, β+16
EC24, β+17
EC25, β+18
(13/2+)
(17/2-)
(15/2-)
(11/2-)
(11/2+)
(13/2-)
(11/2-)
(9/2-)
(13/2-)
(9/2+)
(15/2-)
(7/2)+
(9/2-)
(5/2+)
(7/2-)
(11/2-)
(5/2)+
(3/2+)
(1/2+)
3/2+
191 79 Au(3.18h)

81-Tl-196

06-NOV-95

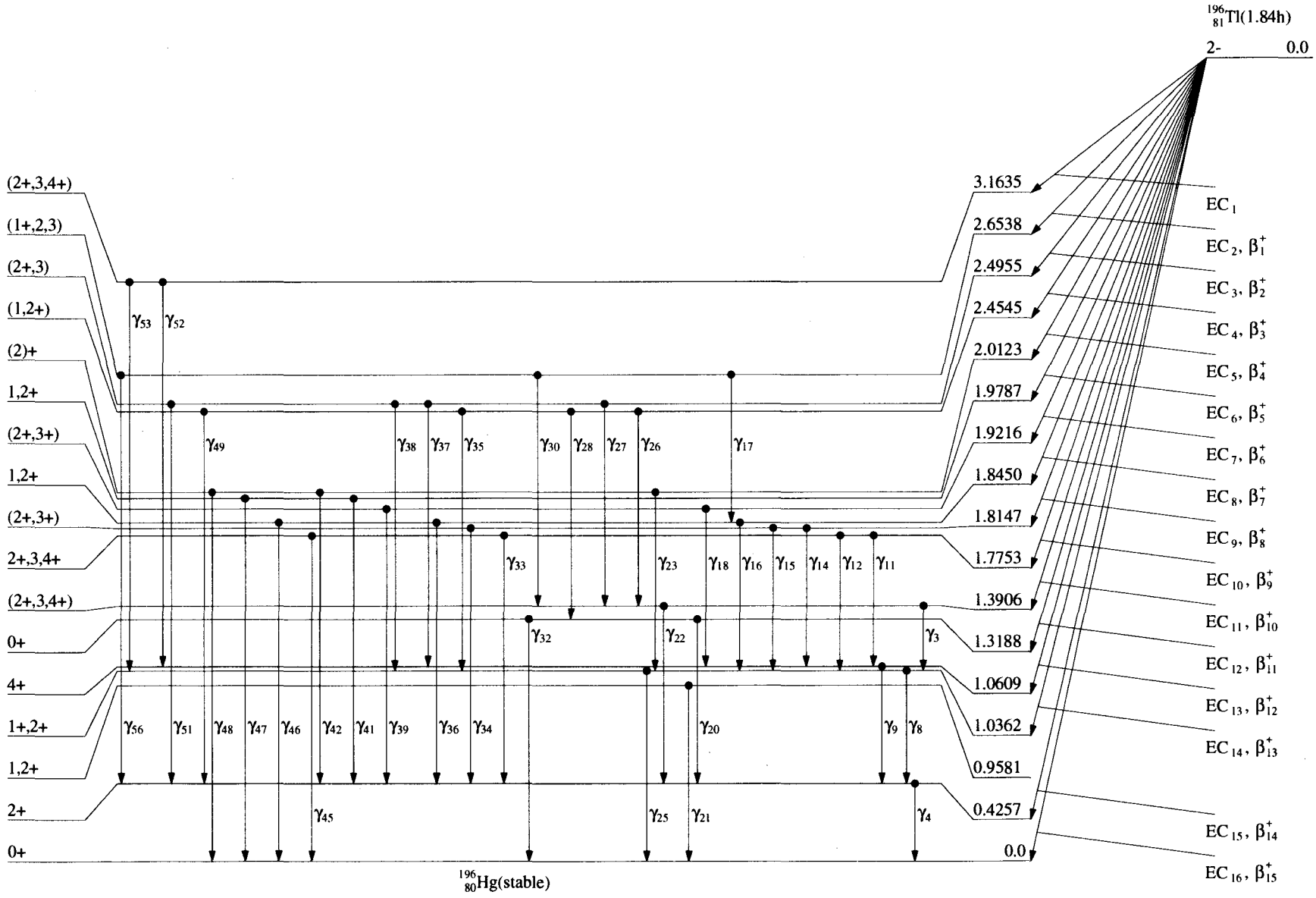
Half-life = 1.84 h
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 4	1.83E−03	6.182E−01*	1.13E−03
β^+ 5	1.74E−03	6.329E−01*	1.10E−03
β^+ 6	3.09E−03	6.579E−01*	2.03E−03
β^+ 7	1.06E−03	6.915E−01*	7.34E−04
β^+ 8	2.22E−03	7.048E−01*	1.56E−03
β^+ 9	2.70E−03	7.221E−01*	1.95E−03
β^+ 10	3.18E−03	8.917E−01*	2.84E−03
β^+ 12	5.40E−03	1.025E+00*	5.54E−03
β^+ 13	9.65E−03	1.049E+00*	1.01E−02
β^+ 14	9.65E−02	1.322E+00*	1.28E−01
β^+ 15	7.72E−03	1.479E+00*	1.14E−02
$\gamma^\pm$	2.71E−01	5.110E−01	1.38E−01
γ 2	2.02E−02	3.449E−01	6.95E−03
ce-K, γ 2	9.19E−04	2.618E−01	2.40E−04
γ 3	1.25E−02	3.545E−01	4.42E−03
ce-K, γ 3	2.45E−03	2.714E−01	6.64E−04
γ 4	8.35E−01	4.257E−01	3.56E−01
ce-K, γ 4	2.33E−02	3.426E−01	8.00E−03
ce-L_1, γ 4	3.30E−03	4.109E−01	1.36E−03
ce-L_2, γ 4	3.29E−03	4.115E−01	1.36E−03
ce-L_3, γ 4	1.39E−03	4.134E−01	5.75E−04
ce-M, γ 4	1.98E−03	4.229E−01*	8.39E−04
ce-N^+, γ 4	6.17E−04	4.257E−01*	2.63E−04
γ 8	1.19E−01	6.105E−01	7.27E−02
ce-K, γ 8	2.89E−03	5.274E−01	1.52E−03
ce-L_1, γ 8	4.25E−04	5.957E−01	2.53E−04
γ 9	9.79E−02	6.352E−01	6.22E−02
ce-K, γ 9	1.16E−03	5.521E−01	6.41E−04
γ 10	1.34E−02	7.050E−01	9.48E−03
γ 11	1.25E−02	7.136E−01	8.91E−03
γ 12	3.74E−03	7.387E−01	2.77E−03
γ 13	1.34E−02	7.500E−01	1.01E−02
γ 14	1.44E−02	7.540E−01	1.09E−02
γ 15	1.15E−02	7.784E−01	8.97E−03
ce-K, γ 15	2.87E−04	6.953E−01	2.00E−04
γ 16	5.57E−03	8.089E−01	4.50E−03
γ 17	5.57E−03	8.089E−01	4.50E−03
γ 18	4.42E−03	8.610E−01	3.80E−03
γ 20	2.50E−03	8.932E−01	2.23E−03
γ 21	2.30E−03	9.572E−01	2.21E−03
γ 22	3.55E−02	9.646E−01	3.43E−02
γ 23	4.22E−03	9.761E−01	4.12E−03
γ 24	8.64E−03	1.025E+00	8.86E−03
γ 25	2.59E−02	1.036E+00	2.69E−02
ce-K, γ 25	3.10E−04	9.531E−01	2.95E−04
γ 26	3.07E−03	1.065E+00	3.27E−03
γ 27	5.66E−03	1.106E+00	6.26E−03
γ 28	2.59E−03	1.137E+00	2.95E−03
γ 30	7.97E−03	1.262E+00	1.01E−02
γ 31	1.15E−02	1.289E+00	1.49E−02
ce-K, γ 32	4.02E−04	1.236E+00	4.97E−04
γ 33	1.15E−02	1.350E+00	1.56E−02
γ 34	2.50E−02	1.389E+00	3.47E−02
γ 35	6.91E−03	1.419E+00	9.81E−03
γ 36	6.91E−03	1.419E+00	9.81E−03
γ 37	1.44E−02	1.434E+00	2.07E−02
γ 38	6.62E−03	1.460E+00	9.67E−03
γ 39	8.16E−02	1.496E+00	1.22E−01
ce-K, γ 39	3.91E−04	1.413E+00	5.52E−04
γ 40	2.88E−02	1.511E+00	4.35E−02
γ 41	4.80E−02	1.553E+00	7.45E−02
ce-K, γ 41	2.09E−04	1.470E+00	3.07E−04
γ 42	2.30E−02	1.587E+00	3.66E−02
γ 43	4.90E−02	1.621E+00	7.94E−02
γ 44	2.98E−02	1.697E+00	5.05E−02
γ 45	2.78E−02	1.776E+00	4.94E−02
γ 46	1.92E−02	1.845E+00	3.54E−02
γ 47	7.78E−03	1.979E+00	1.54E−02
γ 48	3.74E−02	2.011E+00	7.53E−02
γ 49	1.54E−02	2.029E+00	3.12E−02
γ 50	1.15E−02	2.049E+00	2.36E−02
γ 51	1.06E−02	2.067E+00	2.18E−02
γ 52	1.15E−02	2.102E+00	2.42E−02
γ 53	2.78E−02	2.128E+00	5.92E−02
γ 54	9.60E−03	2.149E+00	2.06E−02
γ 55	3.36E−02	2.212E+00	7.43E−02
γ 56	1.25E−02	2.228E+00	2.78E−02
γ 57	1.73E−02	2.393E+00	4.13E−02
K_{α_1} X-ray	3.47E−01	7.082E−02	2.46E−02
K_{α_2} X-ray	2.04E−01	6.889E−02	1.41E−02
K_{β_1} X-ray	7.92E−02	8.026E−02	6.35E−03
K_{β_2} X-ray	3.33E−02	8.258E−02	2.75E−03
K_{β_3} X-ray	4.12E−02	7.982E−02	3.29E−03
Auger-KLL	1.51E−02	5.526E−02*	8.36E−04
Auger-KLX	8.42E−03	6.652E−02*	5.60E−04
Auger-LMM	2.69E−01	7.727E−03*	2.08E−03
Auger-LMX	1.73E−01	1.019E−02*	1.77E−03
Auger-LXY	2.89E−02	1.211E−02*	3.49E−04
Auger-MXY	1.08E+00	2.695E−03*	2.92E−03

Listed X, γ and $\gamma^\pm$ radiations	1.88E+00
Omitted X, γ and $\gamma^\pm$ radiations**	6.86E−03
Listed β, ce and Auger radiations	1.92E−01
Omitted β, ce and Auger radiations**	5.25E−03
Listed radiations	2.07E+00
Omitted radiations**	1.21E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Hg-196 daughter is stable.


$^{196}_{81}$Tl(1.84h)
2- 0.0
(2+,3,4+)
(1+,2,3)
(2+,3)
(1,2+)
(2)+
1,2+
(2+,3+)
1,2+
(2+,3+)
2+,3,4+
(2+,3,4+)
0+
4+
1+,2+
1,2+
2+
0+
3.1635
2.6538
2.4955
2.4545
2.0123
1.9787
1.9216
1.8450
1.8147
1.7753
1.3906
1.3188
1.0609
1.0362
0.9581
0.4257
0.0
EC1
EC2, β1+
EC3, β2+
EC4, β3+
EC5, β4+
EC6, β5+
EC7, β6+
EC8, β7+
EC9, β8+
EC10, β9+
EC11, β10+
EC12, β11+
EC13, β12+
EC14, β13+
EC15, β14+
EC16, β15+
γ53 γ52
γ49
γ38 γ37 γ35
γ30 γ28 γ27 γ26
γ17
γ33
γ23 γ18 γ16 γ15 γ14 γ12 γ11
γ32
γ22
γ3
γ56 γ51 γ48 γ47 γ46 γ42 γ41 γ39 γ36 γ34
γ20
γ9 γ8
γ45
γ25 γ21
γ4
$^{196}_{80}$Hg(stable)

82-Pb-194

α: 14-DEC-90
EC, β^+: 14-NOV-96

Half-life = 12 m
Decay mode(s): α, EC, β^+

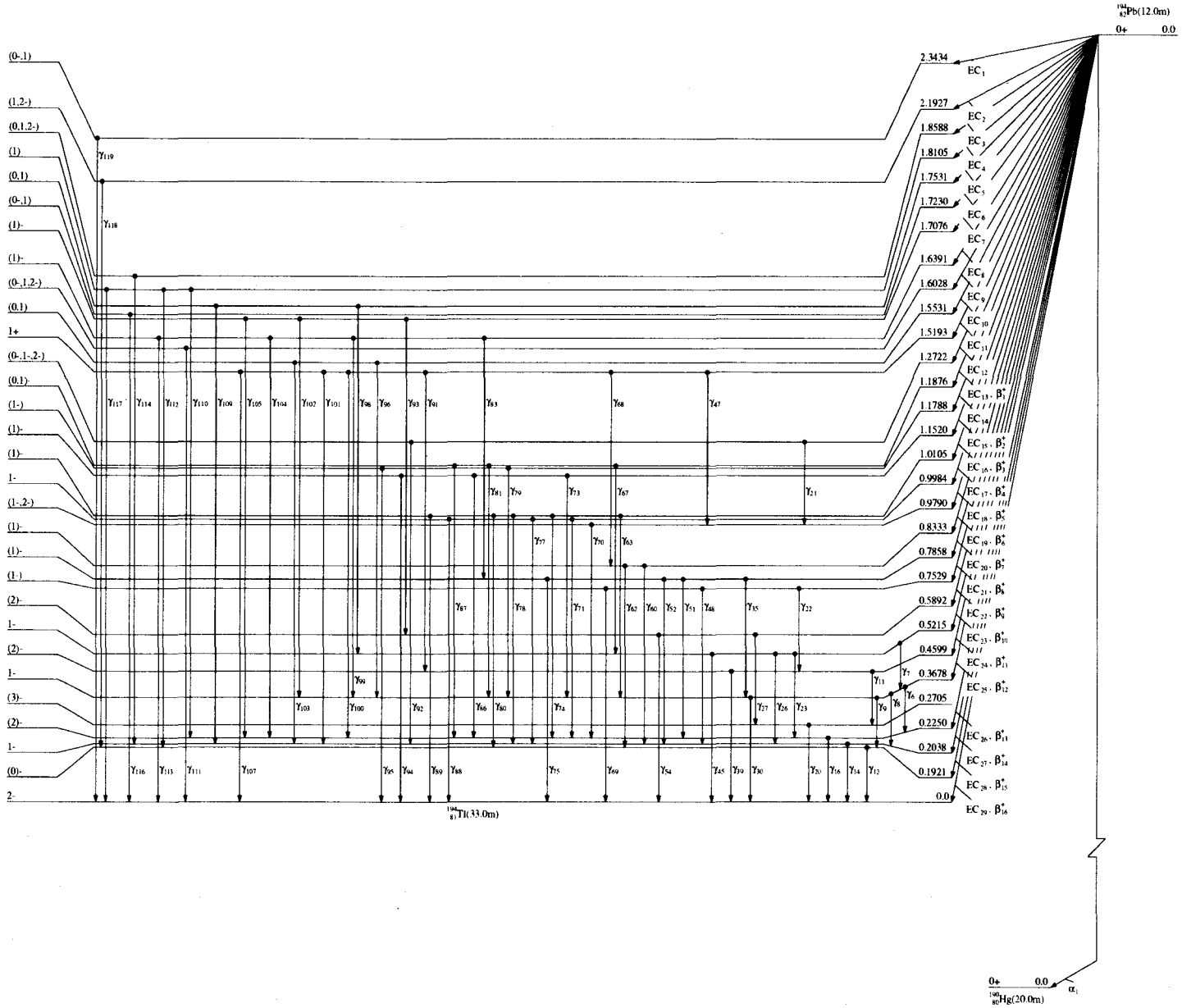
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	7.30E−08	4.640E+00	3.39E−07
α recoil	7.30E−08	9.775E−02	7.14E−09
β^+ 7	1.66E−03	4.248E−01*	7.05E−04
β^+ 10	5.86E−04	5.403E−01*	3.17E−04
β^+ 12	5.86E−04	6.076E−01*	3.56E−04
β^+ 14	2.34E−03	6.794E−01*	1.59E−03
β^+ 15	1.27E−03	6.845E−01*	8.69E−04
β^+ 16	2.34E−04	7.671E−01*	1.80E−04
$\gamma^{\pm}$	1.49E−02	5.110E−01	7.61E−03
ce-K, γ 6	5.27E−03	5.741E−02	3.02E−04
ce-K, γ 7	5.28E−03	6.827E−02	3.60E−04
ce-K, γ 8	4.31E−03	7.837E−02	3.38E−04
ce-K, γ 9	5.08E−03	9.015E−02	4.58E−04
γ 11	1.52E−02	1.894E−01	2.87E−03
ce-K, γ 11	1.78E−02	1.039E−01	1.85E−03
ce-L$_1$, γ 11	2.75E−03	1.741E−01	4.78E−04
γ 12	4.52E−02	1.920E−01	8.67E−03
ce-K, γ 12	8.51E−03	1.065E−01	9.06E−04
ce-L$_1$, γ 12	1.14E−03	1.767E−01	2.02E−04
ce-L$_2$, γ 12	5.32E−03	1.773E−01	9.44E−04
ce-L$_3$, γ 12	3.28E−03	1.794E−01	5.88E−04
ce-M, γ 12	2.52E−03	1.891E−01*	4.77E−04
γ 14	1.63E−01	2.038E−01	3.32E−02
ce-K, γ 14	1.47E−01	1.183E−01	1.74E−02
ce-L$_1$, γ 14	2.25E−02	1.885E−01	4.25E−03
ce-L$_2$, γ 14	3.48E−03	1.891E−01	6.58E−04
ce-L$_3$, γ 14	9.11E−04	1.911E−01	1.74E−04
ce-M, γ 14	6.35E−03	2.008E−01*	1.28E−03
ce-N$^+$, γ 14	2.04E−03	2.038E−01*	4.17E−04
γ 16	5.05E−02	2.250E−01	1.14E−02
ce-K, γ 16	3.47E−02	1.395E−01	4.84E−03
ce-L$_1$, γ 16	5.30E−03	2.097E−01	1.11E−03
ce-M, γ 16	1.47E−03	2.220E−01*	3.27E−04
γ 20	2.09E−02	2.705E−01	5.64E−03
ce-K, γ 20	8.80E−03	1.850E−01	1.63E−03
ce-L$_1$, γ 20	1.34E−03	2.552E−01	3.43E−04
γ 21	8.48E−03	2.930E−01	2.48E−03
ce-K, γ 21	1.94E−03	2.074E−01	4.03E−04
γ 22	8.48E−03	2.930E−01	2.48E−03
ce-K, γ 22	1.94E−03	2.074E−01	4.03E−04
ce-K, γ 23	1.69E−03	2.109E−01	3.57E−04
ce-K, γ 26	1.55E−03	2.322E−01	3.60E−04
ce-K, γ 27	1.63E−03	2.332E−01	3.79E−04
γ 30	8.15E−02	3.678E−01	3.00E−02
ce-K, γ 30	1.55E−02	2.823E−01	4.39E−03
ce-L$_1$, γ 30	2.37E−03	3.525E−01	8.36E−04
ce-M, γ 30	6.12E−04	3.648E−01*	2.23E−04
γ 35	2.28E−02	4.179E−01	9.54E−03
ce-K, γ 35	2.92E−03	3.324E−01	9.70E−04
ce-L$_1$, γ 35	4.44E−04	4.026E−01	1.79E−04
γ 39	3.05E−02	4.600E−01	1.40E−02
ce-K, γ 39	2.12E−03	3.745E−01	7.92E−04
γ 42	6.19E−03	4.876E−01	3.02E−03
γ 44	4.56E−03	4.987E−01	2.28E−03
γ 45	4.11E−02	5.215E−01	2.14E−02
ce-K, γ 45	2.93E−03	4.360E−01	1.28E−03
ce-L$_1$, γ 45	4.43E−04	5.062E−01	2.24E−04
γ 47	4.30E−03	5.405E−01	2.33E−03
γ 48	7.92E−03	5.490E−01	4.35E−03
γ 51	1.36E−02	5.607E−01	7.62E−03
ce-K, γ 51	5.58E−04	4.752E−01	2.65E−04
γ 52	1.89E−01	5.818E−01	1.10E−01
ce-K, γ 52	9.71E−03	4.963E−01	4.82E−03
ce-L$_1$, γ 52	1.46E−03	5.665E−01	8.28E−04
ce-M, γ 52	3.87E−04	5.789E−01*	2.24E−04
γ 54	3.81E−03	5.891E−01	2.25E−03
γ 60	6.19E−03	6.299E−01	3.90E−03
γ 62	5.54E−03	6.406E−01	3.55E−03
γ 63	8.48E−03	6.428E−01	5.45E−03
ce-K, γ 63	3.74E−04	5.573E−01	2.09E−04
γ 64	4.40E−03	6.528E−01	2.87E−03
γ 67	1.66E−02	6.661E−01	1.11E−02
ce-K, γ 67	6.03E−04	5.805E−01	3.50E−04
γ 68	6.26E−03	6.859E−01	4.29E−03
γ 69	1.50E−02	7.528E−01	1.13E−02
ce-K, γ 69	2.71E−04	6.673E−01	1.81E−04
γ 70	4.40E−03	7.544E−01	3.32E−03
γ 71	4.12E−03	7.735E−01	3.19E−03
γ 73	3.10E−03	7.842E−01	2.43E−03
γ 74	3.10E−03	7.855E−01	2.43E−03
γ 75	3.91E−03	7.855E−01	3.07E−03
γ 77	1.11E−02	7.948E−01	8.81E−03
γ 78	9.62E−03	8.065E−01	7.76E−03
γ 79	3.88E−03	8.115E−01	3.15E−03
γ 80	8.13E−03	8.180E−01	6.65E−03
γ 81	2.25E−02	8.195E−01	1.84E−02
ce-K, γ 81	3.33E−04	7.340E−01	2.44E−04
γ 83	4.42E−03	8.529E−01	3.77E−03
γ 84	2.62E−03	8.811E−01	2.31E−03
γ 86	1.24E−02	9.270E−01	1.15E−02
γ 87	1.09E−02	9.626E−01	1.05E−02
γ 88	2.04E−02	9.985E−01	2.03E−02
ce-K, γ 88	2.30E−04	9.129E−01	2.10E−04
γ 89	1.06E−02	1.011E+00	1.07E−02
γ 90	8.15E−03	1.015E+00	8.27E−03
γ 91	3.88E−02	1.059E+00	4.11E−02
γ 92	3.99E−03	1.068E+00	4.27E−03
γ 93	6.36E−03	1.118E+00	7.11E−03
γ 94	4.69E−03	1.152E+00	5.41E−03
γ 95	5.41E−03	1.179E+00	6.38E−03
γ 96	6.59E−03	1.185E+00	7.81E−03
γ 98	7.01E−03	1.232E+00	8.63E−03
γ 99	7.50E−03	1.272E+00	9.54E−03
γ 100	1.91E−02	1.294E+00	2.47E−02
γ 101	5.54E−03	1.316E+00	7.29E−03
γ 102	3.42E−03	1.340E+00	4.59E−03
γ 103	7.14E−03	1.349E+00	9.63E−03
γ 104	2.28E−03	1.414E+00	3.23E−03
γ 105	3.91E−03	1.483E+00	5.80E−03
γ 107	1.65E−01	1.519E+00	2.50E−01
ce-K, γ 107	1.60E−04	1.434E+00	2.30E−04
γ 108	4.89E−03	1.546E+00	7.56E−03
γ 109	1.32E−02	1.549E+00	2.05E−02
γ 110	4.03E−03	1.585E+00	6.38E−03
γ 111	2.67E−03	1.603E+00	4.28E−03
γ 112	5.44E−03	1.618E+00	8.81E−03
γ 113	5.09E−03	1.639E+00	8.34E−03
γ 114	2.04E−03	1.655E+00	3.37E−03
γ 116	4.89E−03	1.723E+00	8.43E−03
γ 117	1.57E−02	1.810E+00	2.84E−02
γ 118	1.21E−03	2.001E+00	2.41E−03
γ 119	2.64E−03	2.343E+00	6.19E−03
γ 120	1.24E−03	2.386E+00	2.96E−03
γ 121	1.04E−03	2.392E+00	2.50E−03
K$_{\alpha_1}$ X-ray	5.16E−01	7.287E−02	3.76E−02
K$_{\alpha_2}$ X-ray	3.04E−01	7.083E−02	2.16E−02
K$_{\beta_1}$ X-ray	1.18E−01	8.257E−02	9.71E−03
K$_{\beta_2}$ X-ray	5.11E−02	8.497E−02	4.34E−03
K$_{\beta_3}$ X-ray	6.12E−02	8.211E−02	5.03E−03
L$_\beta$ X-ray	1.78E−01	1.223E−02*	2.18E−03
Auger-KLL	2.18E−02	5.674E−02*	1.24E−03
Auger-KLX	1.22E−02	6.838E−02*	8.33E−04

Auger-LMM	3.96E−01	7.927E−03*	3.14E−03
Auger-LMX	2.57E−01	1.047E−02*	2.69E−03
Auger-LXY	4.31E−02	1.246E−02*	5.37E−04
Auger-MXY	1.63E+00	2.805E−03*	4.57E−03
ΔE	3.99E−01	4.743E−04*	1.89E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.04E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.83E−02
Listed β, ce and Auger radiations	7.49E−02
Omitted β, ce and Auger radiations**	1.09E−02
Listed α and α recoil radiations	3.46E−07
Listed radiations	1.11E+00
Omitted radiations**	5.93E−02

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Hg-190 daughter, yield 7.3E−08, is radioactive.
Tl-194 daughter, yield 1.00E+00, is radioactive.


$^{194}_{83}$Pb(12.0m)
0+ 0.0
2.3434 EC1
2.1927 EC2
1.8588 EC3
1.8105 EC4
1.7531 EC5
1.7230 EC6
1.7076 EC7
1.6391 EC8
1.6028 EC9
1.5531 EC10
1.5193 EC11
1.2722 EC12
1.1876 EC13, β+1
1.1788 EC14
1.1520 EC15, β+2
1.0105 EC16, β+3
0.9984 EC17, β+4
0.9790 EC18, β+5
0.8333 EC19, β+6
0.7858 EC20, β+7
0.7529 EC21, β+8
0.5892 EC22, β+9
0.5215 EC23, β+10
0.4599 EC24, β+11
0.3678 EC25, β+12
0.2705 EC26, β+13
0.2250 EC27, β+14
0.2038 EC28, β+15
0.1921 EC29, β+16
0.0
(0-,1)
(1,2-)
(0,1,2-)
(1)
(0,1)
(0-,1)
(1)-
(1)-
(0-,1,2-)
(0,1)
1+
(0-,1-,2-)
(0,1)-
(1-)
(1)-
(1)-
1-
(1-,2-)
(1)-
(1)-
(1-)
(2)-
1-
(2)-
1-
(3)-
(2)-
1-
(0)-
2-
$^{194}_{81}$Tl(33.0m)
0+ 0.0
$^{190}_{80}$Hg(20.0m)
α1

82-Pb-196

06-NOV-95

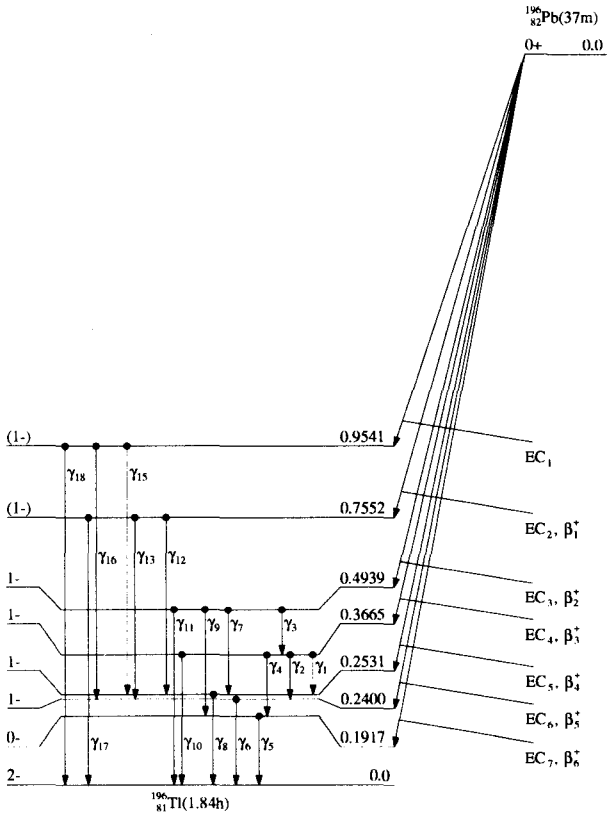
Half-life = 37 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 4	4.99E−04	3.689E−01*	1.84E−04
β^+ 5	4.99E−04	3.746E−01*	1.87E−04
β^+ 6	5.99E−04	3.959E−01*	2.37E−04
$\gamma^{\pm}$	4.04E−03	5.110E−01	2.06E−03
ce-K, γ 1	1.39E−02	2.747E−02	3.83E−04
ce-L_1, γ 1	2.15E−03	9.765E−02	2.10E−04
ce-K, γ 2	8.16E−03	4.047E−02	3.30E−04
ce-L_1, γ 2	1.26E−03	1.107E−01	1.39E−04
ce-K, γ 3	8.98E−03	4.147E−02	3.72E−04
ce-L_1, γ 3	1.38E−03	1.117E−01	1.54E−04
γ 4	7.83E−03	1.750E−01	1.37E−03
ce-K, γ 4	1.16E−02	8.947E−02	1.04E−03
ce-L_1, γ 4	1.79E−03	1.597E−01	2.86E−04
γ 5	1.11E−01	1.917E−01	2.12E−02
ce-K, γ 5	2.09E−02	1.062E−01	2.22E−03
ce-L_1, γ 5	2.81E−03	1.764E−01	4.95E−04
ce-L_2, γ 5	1.31E−02	1.770E−01	2.33E−03
ce-L_3, γ 5	8.11E−03	1.790E−01	1.45E−03
ce-M, γ 5	6.23E−03	1.887E−01*	1.18E−03
ce-N^+, γ 5	2.01E−03	1.917E−01*	3.84E−04
γ 6	8.10E−02	2.400E−01	1.94E−02
ce-K, γ 6	4.33E−02	1.545E−01	6.69E−03
ce-L_1, γ 6	6.59E−03	2.247E−01	1.48E−03
ce-L_2, γ 6	1.70E−03	2.253E−01	3.84E−04
ce-L_3, γ 6	6.45E−04	2.273E−01	1.47E−04
ce-M, γ 6	2.13E−03	2.370E−01*	5.06E−04
ce-N^+, γ 6	6.83E−04	2.400E−01*	1.64E−04
γ 7	9.45E−03	2.410E−01	2.28E−03
ce-K, γ 7	5.76E−03	1.555E−01	8.95E−04
ce-L_1, γ 7	8.80E−04	2.257E−01	1.99E−04
γ 8	2.70E−01	2.531E−01	6.83E−02
ce-K, γ 8	1.44E−01	1.676E−01	2.41E−02
ce-L_1, γ 8	2.20E−02	2.378E−01	5.22E−03
ce-L_2, γ 8	2.21E−03	2.384E−01	5.26E−04
ce-M, γ 8	5.68E−03	2.501E−01*	1.42E−03
ce-N^+, γ 8	1.82E−03	2.531E−01*	4.60E−04
γ 9	3.78E−02	3.022E−01	1.14E−02
ce-K, γ 9	1.24E−02	2.167E−01	2.68E−03
ce-L_1, γ 9	1.89E−03	2.869E−01	5.43E−04
ce-M, γ 9	4.88E−04	2.992E−01*	1.46E−04
γ 10	1.11E−01	3.665E−01	4.06E−02
ce-K, γ 10	2.15E−02	2.810E−01	6.04E−03
ce-L_1, γ 10	3.28E−03	3.512E−01	1.15E−03
ce-L_2, γ 10	3.22E−04	3.518E−01	1.13E−04
ce-M, γ 10	8.43E−04	3.635E−01*	3.07E−04
ce-N^+, γ 10	2.68E−04	3.665E−01*	9.84E−05
γ 11	5.67E−02	4.939E−01	2.80E−02
ce-K, γ 11	4.99E−03	4.084E−01	2.04E−03
ce-L_1, γ 11	7.54E−04	4.786E−01	3.61E−04
γ 12	2.65E−01	5.021E−01	1.33E−01
ce-K, γ 12	2.23E−02	4.166E−01	9.28E−03
ce-L_1, γ 12	3.37E−03	4.868E−01	1.64E−03
ce-L_2, γ 12	3.21E−04	4.874E−01	1.56E−04
ce-M, γ 12	8.66E−04	4.991E−01*	4.32E−04
ce-N^+, γ 12	2.80E−04	5.021E−01*	1.41E−04
γ 13	1.35E−02	5.152E−01	6.96E−03
ce-K, γ 13	1.06E−03	4.297E−01	4.56E−04
γ 15	1.89E−02	7.010E−01	1.32E−02
ce-K, γ 15	6.67E−04	6.155E−01	4.11E−04
γ 16	8.10E−03	7.141E−01	5.78E−03
ce-K, γ 16	2.73E−04	6.286E−01	1.71E−04
γ 17	1.89E−02	7.552E−01	1.43E−02
ce-K, γ 17	5.51E−04	6.697E−01	3.69E−04
γ 18	4.05E−02	9.541E−01	3.86E−02
ce-K, γ 18	6.50E−04	8.686E−01	5.65E−04
K_{α_1} X-ray	5.28E−01	7.287E−02	3.85E−02
K_{α_2} X-ray	3.12E−01	7.083E−02	2.21E−02
K_{β_1} X-ray	1.20E−01	8.257E−02	9.95E−03
K_{β_2} X-ray	5.23E−02	8.497E−02	4.44E−03
K_{β_3} X-ray	6.27E−02	8.211E−02	5.15E−03
L_α X-ray	1.90E−01	1.026E−02*	1.95E−03
L_β X-ray	1.82E−01	1.223E−02*	2.23E−03
Auger-KLL	2.23E−02	5.674E−02*	1.27E−03
Auger-KLX	1.25E−02	6.838E−02*	8.54E−04
Auger-KXY	2.02E−03	7.953E−02*	1.60E−04
Auger-LMM	4.04E−01	7.928E−03*	3.21E−03
Auger-LMX	2.63E−01	1.047E−02*	2.75E−03
Auger-LXY	4.40E−02	1.246E−02*	5.48E−04
Auger-MXY	1.66E+00	2.806E−03*	4.67E−03
ΔE	4.07E−01	4.742E−04*	1.93E−04

Listed X, γ and $\gamma^{\pm}$ radiations	4.91E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.79E−03
Listed β, ce and Auger radiations	9.45E−02
Omitted β, ce and Auger radiations**	1.41E−03
Listed radiations	5.85E−01
Omitted radiations**	3.20E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Tl-196 daughter is radioactive.



82-Pb-197m

04-JAN-96

Half-life = 43 m
Decay mode(s): EC, β^+, IT

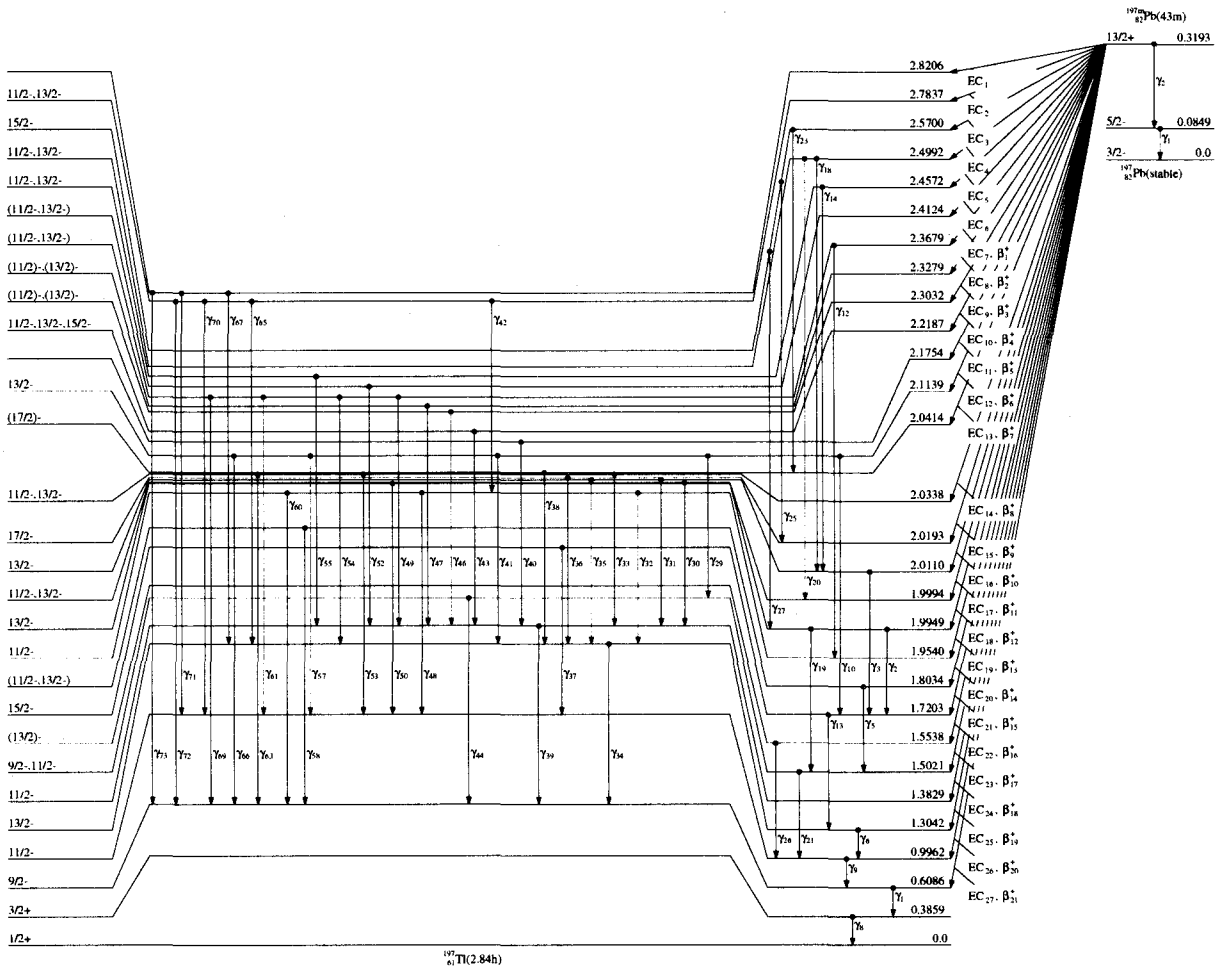
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 15	5.65E−04	5.362E−01*	3.03E−04
β^+ 16	8.93E−04	6.091E−01*	5.44E−04
β^+ 18	2.38E−03	6.839E−01*	1.63E−03
β^+ 19	1.98E−03	7.184E−01*	1.43E−03
β^+ 20	2.98E−03	8.539E−01*	2.54E−03
β^+ 21	9.92E−03	1.012E+00*	1.00E−02
$\gamma^\pm$	4.02E−02	5.110E−01	2.06E−02
γ 1	2.46E−01	2.227E−01	5.48E−02
ce-K, γ 1	8.78E−02	1.372E−01	1.20E−02
ce-L_1, γ 1	2.34E−02	2.074E−01	4.86E−03
ce-L_2, γ 1	2.22E−01	2.081E−01	4.61E−02
ce-L_3, γ 1	1.01E−01	2.101E−01	2.12E−02
ce-M, γ 1	9.37E−02	2.198E−01*	2.06E−02
ce-N^+, γ 1	3.05E−02	2.227E−01*	6.79E−03
ce-K, γ 2	1.52E−03	1.890E−01	2.87E−04
γ 3	1.13E−02	2.910E−01	3.29E−03
ce-K, γ 3	4.10E−03	2.054E−01	8.43E−04
ce-K, γ 5	1.25E−03	2.155E−01	2.69E−04
γ 6	2.99E−02	3.079E−01	9.20E−03
ce-K, γ 6	9.09E−03	2.224E−01	2.02E−03
ce-L_1, γ 6	1.39E−03	2.926E−01	4.06E−04
γ 8	7.36E−01	3.859E−01	2.84E−01
ce-K, γ 8	5.16E−02	3.003E−01	1.55E−02
ce-L_1, γ 8	7.68E−03	3.705E−01	2.85E−03
ce-L_2, γ 8	3.97E−03	3.712E−01	1.47E−03
ce-L_3, γ 8	1.56E−03	3.732E−01	5.81E−04
ce-M, γ 8	3.22E−03	3.829E−01*	1.23E−03
ce-N^+, γ 8	1.02E−03	3.859E−01*	3.95E−04
γ 9	2.51E−01	3.877E−01	9.74E−02
ce-K, γ 9	3.53E−02	3.022E−01	1.07E−02
ce-L_1, γ 9	5.37E−03	3.724E−01	2.00E−03
ce-L_2, γ 9	8.15E−04	3.730E−01	3.04E−04
ce-M, γ 9	1.49E−03	3.848E−01*	5.74E−04
γ 10	5.78E−03	3.937E−01	2.27E−03
ce-K, γ 10	9.25E−04	3.082E−01	2.85E−04
γ 12	2.91E−03	4.137E−01	1.21E−03
γ 13	2.29E−02	4.162E−01	9.51E−03
ce-K, γ 13	3.16E−03	3.307E−01	1.04E−03
γ 14	5.73E−03	4.463E−01	2.55E−03
γ 18	1.38E−02	4.882E−01	6.74E−03
ce-K, γ 18	1.25E−03	4.027E−01	5.04E−04
γ 19	7.53E−03	4.929E−01	3.71E−03
γ 20	4.02E−03	4.996E−01	2.01E−03
γ 21	1.05E−02	5.060E−01	5.34E−03
γ 22	3.77E−03	5.151E−01	1.94E−03
γ 23	4.27E−03	5.287E−01	2.26E−03
γ 25	2.66E−03	5.507E−01	1.47E−03
γ 26	3.52E−02	5.578E−01	1.96E−02
ce-K, γ 26	1.59E−03	4.723E−01	7.51E−04
γ 27	2.51E−03	5.747E−01	1.44E−03
γ 29	8.29E−03	6.118E−01	5.07E−03
γ 30	1.10E−02	6.164E−01	6.81E−03
ce-K, γ 30	4.87E−04	5.309E−01	2.58E−04
γ 31	3.34E−03	6.279E−01	2.10E−03
γ 32	7.03E−03	6.496E−01	4.57E−03
γ 33	9.54E−03	6.511E−01	6.21E−03
γ 34	9.54E−02	6.956E−01	6.64E−02
ce-K, γ 34	9.79E−04	6.101E−01	5.97E−04
γ 35	1.58E−02	7.068E−01	1.12E−02
ce-K, γ 35	5.47E−04	6.213E−01	3.40E−04
γ 36	1.10E−02	7.151E−01	7.90E−03
γ 37	3.74E−02	7.241E−01	2.71E−02
γ 38	7.28E−03	7.372E−01	5.37E−03
γ 39	1.41E−01	7.743E−01	1.09E−01
ce-K, γ 39	2.96E−03	6.887E−01	2.04E−03
ce-L_1, γ 39	4.43E−04	7.589E−01	3.36E−04
γ 40	9.29E−03	7.925E−01	7.36E−03
γ 41	5.02E−03	8.097E−01	4.07E−03
γ 42	3.01E−03	8.299E−01	2.50E−03
γ 43	1.03E−02	8.358E−01	8.60E−03
γ 44	2.13E−02	8.933E−01	1.91E−02
γ 45	8.04E−03	8.961E−01	7.20E−03
γ 46	1.16E−02	9.203E−01	1.06E−02
γ 47	8.04E−03	9.450E−01	7.59E−03
γ 48	5.88E−02	9.577E−01	5.63E−02
ce-K, γ 48	6.01E−04	8.722E−01	5.24E−04
γ 49	4.12E−03	9.850E−01	4.06E−03
γ 50	2.39E−02	9.986E−01	2.38E−02
γ 52	6.48E−03	1.029E+00	6.67E−03
γ 53	4.02E−03	1.037E+00	4.17E−03
γ 54	7.03E−03	1.064E+00	7.48E−03
γ 55	7.53E−03	1.074E+00	8.09E−03
γ 56	1.81E−03	1.080E+00	1.95E−03
γ 57	3.21E−02	1.118E+00	3.59E−02
γ 58	1.58E−03	1.195E+00	1.89E−03
γ 59	4.02E−03	1.279E+00	5.14E−03
γ 60	8.79E−03	1.345E+00	1.18E−02
γ 61	3.04E−03	1.372E+00	4.17E−03
γ 62	2.18E−03	1.376E+00	3.01E−03
γ 63	3.49E−03	1.425E+00	4.97E−03
γ 64	5.60E−03	1.455E+00	8.15E−03
γ 65	9.79E−03	1.479E+00	1.45E−02
γ 66	1.18E−03	1.505E+00	1.78E−03
γ 67	2.86E−03	1.516E+00	4.34E−03
γ 68	2.11E−03	1.572E+00	3.32E−03
γ 69	1.58E−03	1.759E+00	2.78E−03
γ 70	2.74E−03	1.788E+00	4.89E−03
γ 71	5.45E−03	1.824E+00	9.94E−03
γ 72	2.89E−03	2.175E+00	6.28E−03
γ 73	2.29E−03	2.212E+00	5.05E−03
K_{α_1} X-ray	3.99E−01	7.287E−02	2.91E−02
K_{α_2} X-ray	2.36E−01	7.083E−02	1.67E−02
K_{β_1} X-ray	9.09E−02	8.257E−02	7.51E−03
K_{β_2} X-ray	3.95E−02	8.497E−02	3.36E−03
K_{β_3} X-ray	4.73E−02	8.211E−02	3.89E−03
L_α X-ray	1.77E−01	1.026E−02*	1.81E−03
L_β X-ray	2.10E−01	1.223E−02*	2.57E−03
Auger-KLL	1.69E−02	5.674E−02*	9.57E−04
Auger-KLX	9.43E−03	6.838E−02*	6.45E−04
Auger-LMM	4.16E−01	8.056E−03*	3.35E−03
Auger-LMX	2.69E−01	1.059E−02*	2.85E−03
Auger-LXY	4.50E−02	1.258E−02*	5.66E−04
Auger-MXY	1.74E+00	2.763E−03*	4.80E−03
γ 1	4.84E−02	8.490E−02	4.11E−03
ce-L_1, γ 1	9.72E−02	6.904E−02	6.71E−03
ce-L_2, γ 1	1.00E−02	6.970E−02	6.97E−04
ce-M, γ 1	2.53E−02	8.183E−02*	2.07E−03
ce-N^+, γ 1	8.30E−03	8.490E−02*	7.05E−04
ce-K, γ 2	6.81E−02	1.464E−01	9.98E−03
ce-L_1, γ 2	3.62E−02	2.185E−01	7.92E−03
ce-L_2, γ 2	9.35E−03	2.192E−01	2.05E−03
ce-L_3, γ 2	3.97E−02	2.214E−01	8.78E−03
ce-M, γ 2	2.51E−02	2.313E−01*	5.80E−03
ce-N^+, γ 2	8.62E−03	2.344E−01*	2.02E−03
K_{α_1} X-ray	3.22E−02	7.497E−02	2.41E−03
K_{α_2} X-ray	1.91E−02	7.280E−02	1.39E−03
Auger-LMM	8.66E−02	8.135E−03*	7.04E−04
Auger-LMX	5.70E−02	1.078E−02*	6.14E−04
Auger-MXY	3.68E−01	2.812E−03*	1.03E−03

Listed X, γ and $\gamma^\pm$ radiations	1.16E+00
Omitted X, γ and $\gamma^\pm$ radiations**	1.06E−02
Listed β, ce and Auger radiations	2.36E−01

Omitted β, ce and Auger radiations**	8.68E−03
Listed radiations	1.40E+00
Omitted radiations**	1.93E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Tl-197 daughter, yield 8.10E−01, is radioactive.
Pb-197 daughter, yield 1.90E−01, is radioactive.



82-Pb-197

04-JAN-96

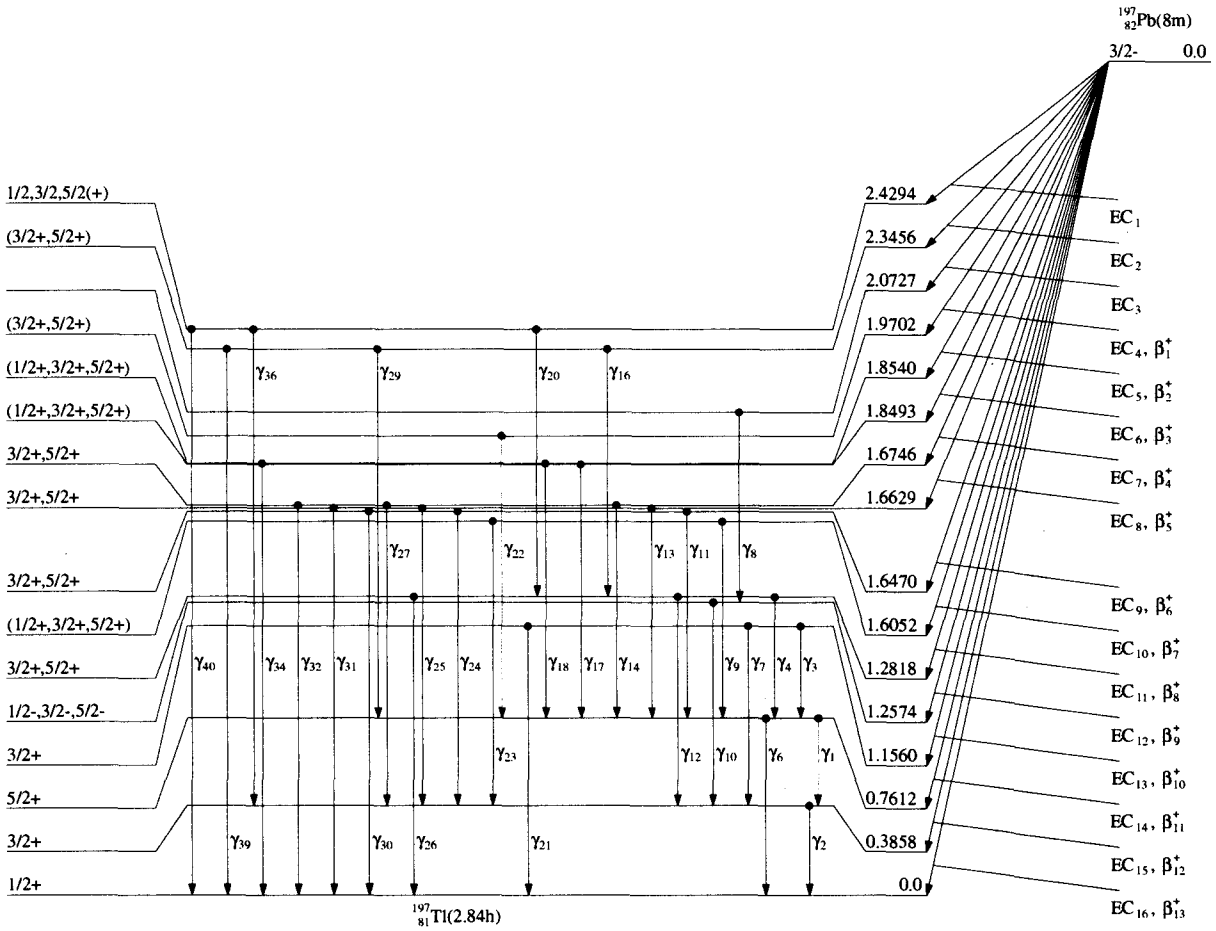
Half-life = 8 m
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 2	2.58E−04	3.376E−01*	8.72E−05
β^+ 4	5.96E−04	4.165E−01*	2.48E−04
β^+ 5	3.58E−04	4.217E−01*	1.51E−04
β^+ 6	8.94E−04	4.287E−01*	3.83E−04
β^+ 7	3.68E−04	4.468E−01*	1.64E−04
β^+ 8	1.29E−03	5.883E−01*	7.60E−04
β^+ 9	1.29E−03	5.990E−01*	7.74E−04
β^+ 10	2.78E−03	6.434E−01*	1.79E−03
β^+ 11	4.47E−03	8.168E−01*	3.65E−03
β^+ 12	8.94E−03	9.825E−01*	8.79E−03
β^+ 13	1.79E−02	1.154E+00*	2.06E−02
$\gamma^\pm$	7.85E−02	5.110E−01	4.01E−02
γ 1	1.28E−01	3.755E−01	4.80E−02
ce-K, γ 1	2.32E−02	2.899E−01	6.74E−03
ce-L_1, γ 1	3.55E−03	3.601E−01	1.28E−03
ce-L_2, γ 1	3.48E−04	3.608E−01	1.25E−04
ce-M, γ 1	9.12E−04	3.725E−01*	3.40E−04
ce-N^+, γ 1	2.90E−04	3.755E−01*	1.09E−04
γ 2	5.04E−01	3.859E−01	1.94E−01
ce-K, γ 2	3.53E−02	3.003E−01	1.06E−02
ce-L_1, γ 2	5.26E−03	3.705E−01	1.95E−03
ce-L_2, γ 2	2.72E−03	3.712E−01	1.01E−03
ce-L_3, γ 2	1.07E−03	3.732E−01	3.98E−04
ce-M, γ 2	2.21E−03	3.829E−01*	8.45E−04
ce-N^+, γ 2	7.02E−04	3.859E−01*	2.71E−04
γ 3	2.07E−02	3.947E−01	8.17E−03
ce-K, γ 3	3.29E−03	3.092E−01	1.02E−03
ce-L_1, γ 3	5.02E−04	3.794E−01	1.90E−04
γ 4	1.41E−02	5.207E−01	7.36E−03
ce-K, γ 4	1.08E−03	4.352E−01	4.71E−04
ce-L_1, γ 4	1.63E−04	5.054E−01	8.25E−05
γ 6	1.33E−01	7.611E−01	1.01E−01
ce-K, γ 6	1.14E−03	6.756E−01	7.73E−04
ce-L_1, γ 6	1.66E−04	7.458E−01	1.24E−04
γ 7	2.52E−02	7.698E−01	1.94E−02
ce-K, γ 7	6.99E−04	6.843E−01	4.78E−04
γ 8	1.07E−02	8.153E−01	8.73E−03
γ 9	2.61E−02	8.442E−01	2.20E−02
ce-K, γ 9	1.84E−04	7.586E−01	1.39E−04
γ 10	6.12E−02	8.716E−01	5.33E−02
ce-K, γ 10	1.58E−04	7.861E−01	1.24E−04
γ 11	9.00E−03	8.854E−01	7.97E−03
ce-K, γ 11	1.44E−04	7.999E−01	1.15E−04
γ 12	5.04E−02	8.961E−01	4.52E−02
ce-K, γ 12	4.51E−04	8.106E−01	3.65E−04
γ 13	3.15E−02	9.017E−01	2.84E−02
ce-K, γ 13	5.84E−04	8.161E−01	4.77E−04
γ 14	2.16E−02	9.135E−01	1.97E−02
ce-K, γ 14	3.87E−04	8.279E−01	3.21E−04
γ 15	1.62E−02	1.004E+00	1.63E−02
γ 16	6.30E−03	1.064E+00	6.70E−03
γ 17	2.09E−02	1.088E+00	2.27E−02
ce-K, γ 17	9.10E−05	1.003E+00	9.12E−05
γ 18	3.33E−02	1.093E+00	3.64E−02
ce-K, γ 18	1.44E−04	1.007E+00	1.45E−04
γ 19	1.89E−02	1.140E+00	2.15E−02
γ 20	7.02E−03	1.148E+00	8.06E−03
γ 21	3.78E−02	1.156E+00	4.37E−02
ce-K, γ 21	3.13E−04	1.071E+00	3.35E−04
γ 22	2.03E−02	1.209E+00	2.46E−02
ce-K, γ 22	1.79E−04	1.123E+00	2.01E−04
γ 23	1.67E−02	1.219E+00	2.04E−02
ce-K, γ 23	1.44E−04	1.134E+00	1.64E−04
γ 24	8.28E−02	1.261E+00	1.04E−01
ce-K, γ 24	4.31E−04	1.176E+00	5.06E−04
γ 25	1.48E−02	1.277E+00	1.89E−02
ce-K, γ 25	1.13E−04	1.192E+00	1.35E−04
γ 26	3.96E−03	1.281E+00	5.07E−03
γ 27	4.86E−02	1.289E+00	6.26E−02
ce-K, γ 27	2.42E−04	1.203E+00	2.91E−04
γ 28	7.38E−03	1.383E+00	1.02E−02
γ 29	1.89E−02	1.584E+00	2.99E−02
ce-K, γ 29	8.42E−05	1.499E+00	1.26E−04
γ 30	2.34E−02	1.647E+00	3.85E−02
ce-K, γ 30	9.47E−05	1.562E+00	1.48E−04
γ 31	6.12E−03	1.663E+00	1.02E−02
γ 32	2.97E−02	1.675E+00	4.97E−02
ce-K, γ 32	1.15E−04	1.589E+00	1.83E−04
γ 33	4.86E−03	1.727E+00	8.39E−03
γ 34	6.12E−02	1.854E+00	1.13E−01
ce-K, γ 34	1.85E−04	1.769E+00	3.28E−04
γ 35	1.21E−02	1.976E+00	2.38E−02
γ 36	1.67E−02	2.044E+00	3.42E−02
γ 37	1.09E−02	2.113E+00	2.30E−02
γ 38	6.48E−03	2.144E+00	1.39E−02
γ 39	4.41E−02	2.345E+00	1.03E−01
ce-K, γ 39	7.35E−05	2.260E+00	1.66E−04
γ 40	4.68E−03	2.429E+00	1.14E−02
K_{α_1} X-ray	3.97E−01	7.287E−02	2.90E−02
K_{α_2} X-ray	2.35E−01	7.083E−02	1.66E−02
K_{β_1} X-ray	9.06E−02	8.257E−02	7.48E−03
K_{β_2} X-ray	3.93E−02	8.497E−02	3.34E−03
K_{β_3} X-ray	4.72E−02	8.211E−02	3.87E−03
L_β X-ray	1.34E−01	1.223E−02*	1.64E−03
Auger-KLL	1.68E−02	5.674E−02*	9.53E−04
Auger-KLX	9.39E−03	6.838E−02*	6.42E−04
Auger-KXY	1.52E−03	7.953E−02*	1.21E−04
Auger-LMM	3.00E−01	7.922E−03*	2.37E−03
Auger-LMX	1.94E−01	1.046E−02*	2.03E−03
Auger-LXY	3.26E−02	1.245E−02*	4.06E−04
Auger-MXY	1.23E+00	2.808E−03*	3.46E−03
ΔE	3.01E−01	4.739E−04*	1.42E−04

Listed X, γ and $\gamma^\pm$ radiations	1.53E+00
Omitted X, γ and $\gamma^\pm$ radiations**	3.42E−03
Listed β, ce and Auger radiations	7.87E−02
Omitted β, ce and Auger radiations**	2.23E−03
Listed radiations	1.61E+00
Omitted radiations**	5.66E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Tl-197 daughter is radioactive.


$^{197}_{82}$Pb(8m)
3/2- 0.0
1/2,3/2,5/2(+)
(3/2+,5/2+)
(3/2+,5/2+)
(1/2+,3/2+,5/2+)
(1/2+,3/2+,5/2+)
3/2+,5/2+
3/2+,5/2+
3/2+,5/2+
(1/2+,3/2+,5/2+)
3/2+,5/2+
1/2-,3/2-,5/2-
3/2+
5/2+
3/2+
1/2+
2.4294
2.3456
2.0727
1.9702
1.8540
1.8493
1.6746
1.6629
1.6470
1.6052
1.2818
1.2574
1.1560
0.7612
0.3858
0.0
EC$_1$
EC$_2$
EC$_3$
EC$_4$, β^+_1
EC$_5$, β^+_2
EC$_6$, β^+_3
EC$_7$, β^+_4
EC$_8$, β^+_5
EC$_9$, β^+_6
EC$_{10}$, β^+_7
EC$_{11}$, β^+_8
EC$_{12}$, β^+_9
EC$_{13}$, β^+_{10}
EC$_{14}$, β^+_{11}
EC$_{15}$, β^+_{12}
EC$_{16}$, β^+_{13}
γ_{36} γ_{29} γ_{20} γ_{16}
γ_{27} γ_{22} γ_{13} γ_{11} γ_8
γ_{40} γ_{34} γ_{32} γ_{31} γ_{25} γ_{24} γ_{18} γ_{17} γ_{14} γ_9 γ_7 γ_4 γ_3
γ_{23} γ_{12} γ_{10} γ_6 γ_1
γ_{39} γ_{30} γ_{26} γ_{21} γ_2
$^{197}_{81}$Tl(2.84h)

82-Pb-204m

04-NOV-94

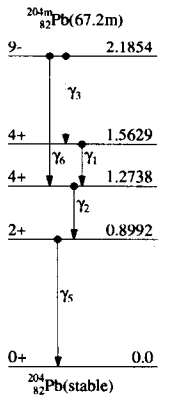
Half-life = 67.2 m
Decay mode(s): IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-K, γ 1	7.90E−04	2.012E−01	1.59E−04
γ 2	8.93E−01	3.747E−01	3.34E−01
ce-K, γ 2	3.51E−02	2.867E−01	1.01E−02
ce-L$_1$, γ 2	5.11E−03	3.589E−01	1.83E−03
ce-L$_2$, γ 2	7.07E−03	3.595E−01	2.54E−03
ce-L$_3$, γ 2	3.04E−03	3.617E−01	1.10E−03
ce-M, γ 2	3.86E−03	3.717E−01*	1.43E−03
ce-N$^+$, γ 2	1.22E−03	3.747E−01*	4.58E−04
ce-K, γ 3	4.76E−04	5.342E−01	2.54E−04
ce-L$_2$, γ 3	3.73E−04	6.070E−01	2.26E−04
γ 5	9.92E−01	8.992E−01	8.92E−01
ce-K, γ 5	6.47E−03	8.111E−01	5.25E−03
ce-L$_1$, γ 5	9.40E−04	8.833E−01	8.31E−04
ce-L$_2$, γ 5	3.02E−04	8.840E−01	2.67E−04
ce-M, γ 5	2.72E−04	8.961E−01*	2.44E−04
ce-N$^+$, γ 5	1.22E−04	8.992E−01*	1.09E−04
γ 6	9.07E−01	9.117E−01	8.27E−01
ce-K, γ 6	5.58E−02	8.237E−01	4.60E−02
ce-L$_1$, γ 6	1.24E−02	8.959E−01	1.11E−02
ce-L$_2$, γ 6	1.72E−02	8.965E−01	1.54E−02
ce-L$_3$, γ 6	2.42E−03	8.987E−01	2.18E−03
ce-M, γ 6	1.99E−03	9.087E−01*	1.81E−03
K$_{\alpha_1}$ X-ray	4.66E−02	7.497E−02	3.49E−03
Auger-KLL	1.91E−03	5.825E−02*	1.11E−04
Auger-LMM	4.50E−02	8.291E−03*	3.73E−04
Auger-LMX	2.94E−02	1.091E−02*	3.20E−04
Auger-MXY	1.83E−01	2.874E−03*	5.25E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.06E+00
Omitted X, γ AND $\gamma^{\pm}$ radiations**	6.83E−03
Listed β, ce AND Auger radiations	1.03E−01
Omitted β, ce AND Auger radiations**	4.72E−04
Listed radiations	2.16E+00
Omitted radiations**	7.30E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pb-204 daughter is stable.



83-Bi-204

04-NOV-94

Half-life = 11.22 h
Decay mode(s): EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^+ 14	4.14E−04	5.394E−01*	2.23E−04
β^+ 15	1.01E−03	5.421E−01*	5.48E−04
ce-N$^+$, γ 1	3.47E−02	6.270E−03*	2.18E−04
ce-L$_1$, γ 2	1.39E−02	1.314E−02	1.82E−04
ce-L$_2$, γ 3	2.36E−02	6.334E−02	1.49E−03
ce-L$_3$, γ 3	2.03E−02	6.550E−02	1.33E−03
ce-M, γ 3	1.17E−02	7.547E−02*	8.84E−04
ce-N$^+$, γ 3	3.77E−03	7.854E−02*	2.96E−04
ce-L$_1$, γ 4	1.74E−02	6.429E−02	1.12E−03
ce-L$_2$, γ 4	3.34E−03	6.495E−02	2.17E−04
ce-M, γ 4	5.29E−03	7.708E−02*	4.08E−04
ce-K, γ 12	1.57E−02	5.280E−02	8.29E−04
ce-L$_1$, γ 12	2.43E−03	1.249E−01	3.04E−04
ce-L$_2$, γ 12	2.59E−03	1.256E−01	3.26E−04
ce-L$_3$, γ 12	1.67E−03	1.278E−01	2.13E−04
ce-M, γ 12	1.69E−03	1.377E−01*	2.33E−04
ce-K, γ 18	2.29E−03	8.040E−02	1.84E−04
ce-K, γ 19	4.06E−03	8.183E−02	3.32E−04
ce-K, γ 20	1.52E−02	8.809E−02	1.34E−03
ce-L$_1$, γ 20	2.34E−03	1.602E−01	3.76E−04
ce-K, γ 22	2.75E−03	1.247E−01	3.43E−04
ce-K, γ 23	1.28E−02	1.281E−01	1.64E−03
ce-L$_1$, γ 23	1.99E−03	2.002E−01	3.98E−04
ce-K, γ 24	3.19E−03	1.284E−01	4.10E−04
ce-K, γ 25	3.15E−03	1.314E−01	4.14E−04
ce-L$_2$, γ 25	1.67E−03	2.042E−01	3.41E−04
ce-L$_3$, γ 25	9.51E−04	2.064E−01	1.96E−04
ce-M, γ 25	7.95E−04	2.163E−01*	1.72E−04
ce-K, γ 26	7.85E−03	1.341E−01	1.05E−03
ce-L$_1$, γ 26	1.22E−03	2.063E−01	2.51E−04
ce-K, γ 29	2.07E−03	1.524E−01	3.15E−04
ce-K, γ 30	1.30E−02	1.609E−01	2.09E−03
ce-L$_1$, γ 30	2.01E−03	2.331E−01	4.69E−04
γ 33	2.86E−02	2.893E−01	8.27E−03
ce-K, γ 33	1.14E−02	2.013E−01	2.29E−03
ce-L$_1$, γ 33	1.76E−03	2.734E−01	4.81E−04
ce-K, γ 34	2.73E−03	2.034E−01	5.56E−04
ce-K, γ 37	1.03E−03	2.431E−01	2.50E−04
γ 44	8.18E−01	3.748E−01	3.06E−01
ce-K, γ 44	3.21E−02	2.868E−01	9.21E−03
ce-L$_1$, γ 44	4.68E−03	3.589E−01	1.68E−03
ce-L$_2$, γ 44	6.48E−03	3.596E−01	2.33E−03
ce-L$_3$, γ 44	2.78E−03	3.617E−01	1.01E−03
ce-M, γ 44	3.53E−03	3.717E−01*	1.31E−03
ce-N$^+$, γ 44	1.12E−03	3.748E−01*	4.20E−04
ce-K, γ 47	5.39E−04	3.243E−01	1.75E−04
ce-K, γ 48	1.64E−03	3.336E−01	5.47E−04
ce-K, γ 50	1.04E−03	3.505E−01	3.64E−04
γ 51	2.46E−02	4.405E−01	1.08E−02
ce-K, γ 52	5.92E−04	3.591E−01	2.13E−04
ce-K, γ 56	5.68E−04	3.802E−01	2.16E−04
ce-K, γ 59	7.65E−04	4.137E−01	3.17E−04
ce-K, γ 62	5.24E−04	4.342E−01	2.27E−04
γ 64	1.35E−02	5.327E−01	7.19E−03
ce-K, γ 64	1.06E−03	4.447E−01	4.69E−04
γ 79	2.54E−02	6.616E−01	1.68E−02
ce-K, γ 79	1.13E−03	5.736E−01	6.47E−04
γ 83	1.14E−01	6.707E−01	7.62E−02
ce-K, γ 83	4.86E−03	5.827E−01	2.83E−03
ce-L$_1$, γ 83	7.39E−04	6.549E−01	4.84E−04
γ 86	9.53E−03	6.907E−01	6.58E−03
γ 88	1.43E−02	7.091E−01	1.01E−02

ce-K, γ 88	5.30E−04	6.211E−01	3.29E−04
γ 89	1.43E−02	7.105E−01	1.02E−02
ce-K, γ 89	5.27E−04	6.225E−01	3.28E−04
γ 90	9.05E−03	7.184E−01	6.50E−03
ce-K, γ 90	3.25E−04	6.304E−01	2.05E−04
γ 91	9.29E−03	7.251E−01	6.74E−03
γ 94	1.08E−02	7.538E−01	8.14E−03
ce-K, γ 94	3.42E−04	6.658E−01	2.28E−04
γ 97	3.26E−02	7.912E−01	2.58E−02
ce-K, γ 97	5.90E−04	7.032E−01	4.15E−04
γ 101	9.53E−03	8.320E−01	7.93E−03
ce-K, γ 101	2.34E−04	7.439E−01	1.74E−04
γ 102	1.11E−02	8.342E−01	9.27E−03
ce-K, γ 102	2.71E−04	7.462E−01	2.02E−04
γ 104	9.53E−03	8.472E−01	8.07E−03
γ 105	9.85E−01	8.992E−01	8.85E−01
ce-K, γ 105	6.42E−03	8.111E−01	5.21E−03
ce-L_1, γ 105	9.34E−04	8.833E−01	8.25E−04
ce-L_2, γ 105	2.99E−04	8.840E−01	2.65E−04
ce-M, γ 105	2.70E−04	8.961E−01*	2.42E−04
γ 107	1.11E−01	9.120E−01	1.01E−01
ce-K, γ 107	2.15E−03	8.240E−01	1.78E−03
ce-L_1, γ 107	3.27E−04	8.961E−01	2.93E−04
γ 108	1.08E−01	9.183E−01	9.92E−02
ce-K, γ 108	6.77E−04	8.303E−01	5.62E−04
γ 120	5.88E−01	9.840E−01	5.78E−01
ce-K, γ 120	1.26E−03	8.960E−01	1.13E−03
γ 121	1.19E−02	9.904E−01	1.18E−02
γ 126	1.27E−02	1.044E+00	1.33E−02
γ 131	9.53E−03	1.064E+00	1.01E−02
γ 136	1.47E−02	1.111E+00	1.63E−02
γ 139	8.58E−03	1.133E+00	9.72E−03
γ 140	5.56E−03	1.140E+00	6.34E−03
γ 141	5.56E−03	1.140E+00	6.34E−03
γ 148	1.98E−02	1.204E+00	2.39E−02
ce-K, γ 148	1.90E−04	1.116E+00	2.12E−04
γ 149	3.02E−02	1.212E+00	3.66E−02
γ 155	2.14E−02	1.275E+00	2.73E−02
γ 161	4.76E−03	1.352E+00	6.44E−03
γ 162	8.73E−03	1.353E+00	1.18E−02
γ 166	9.69E−03	1.415E+00	1.37E−02
γ 176	9.61E−03	1.524E+00	1.46E−02
γ 177	4.13E−03	1.537E+00	6.34E−03
γ 180	3.97E−03	1.589E+00	6.31E−03
γ 185	6.91E−03	1.646E+00	1.14E−02
γ 186	5.56E−03	1.652E+00	9.18E−03
γ 187	5.56E−03	1.655E+00	9.20E−03
γ 195	5.80E−03	1.689E+00	9.79E−03
γ 198	1.98E−02	1.703E+00	3.38E−02
γ 201	5.88E−03	1.732E+00	1.02E−02
γ 203	1.22E−02	1.755E+00	2.15E−02
γ 212	5.16E−03	1.818E+00	9.38E−03
γ 213	5.56E−03	1.826E+00	1.02E−02
γ 220	1.29E−02	1.896E+00	2.44E−02
γ 223	5.88E−03	1.926E+00	1.13E−02
γ 225	7.86E−03	1.941E+00	1.53E−02
γ 227	3.41E−03	1.957E+00	6.68E−03
γ 228	3.97E−03	1.958E+00	7.77E−03
γ 229	3.73E−03	1.965E+00	7.33E−03
γ 246	2.94E−03	2.263E+00	6.65E−03
γ 262	3.73E−03	2.681E+00	1.00E−02
γ 263	2.70E−03	2.687E+00	7.25E−03
K_{α_1} X-ray	4.57E−01	7.497E−02	3.43E−02
K_{α_2} X-ray	2.71E−01	7.280E−02	1.97E−02
K_{β_1} X-ray	1.04E−01	8.494E−02	8.85E−03
Auger-KLL	1.88E−02	5.825E−02*	1.09E−03
Auger-KLX	1.05E−02	7.029E−02*	7.38E−04
Auger-LMM	3.82E−01	8.154E−03*	3.11E−03
Auger-LMX	2.50E−01	1.078E−02*	2.69E−03
Auger-LXY	4.22E−02	1.284E−02*	5.41E−04
Auger-MXY	1.61E+00	2.906E−03*	4.69E−03
ΔE	4.34E−01	5.187E−04*	2.25E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.69E+00
Omitted X, γ AND $\gamma^{\pm}$ radiations**	4.12E−01
Listed β, ce AND Auger radiations	7.07E−02
Omitted β, ce AND Auger radiations**	1.53E−02
Listed radiations	2.76E+00
Omitted radiations**	4.28E−01

* Average energy (MeV)

** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Pb-204m daughter, yield 9.80E−02, is radioactive.
Pb-204 daughter, yield 9.020E−01, is stable.

83-Bi-208

13-MAY-86

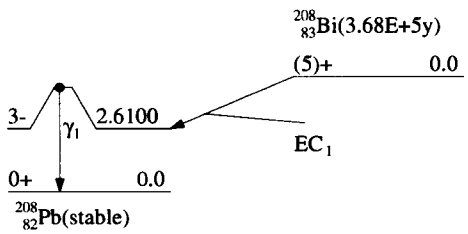
Half-life = 3.68E+5 y
Decay mode(s): EC

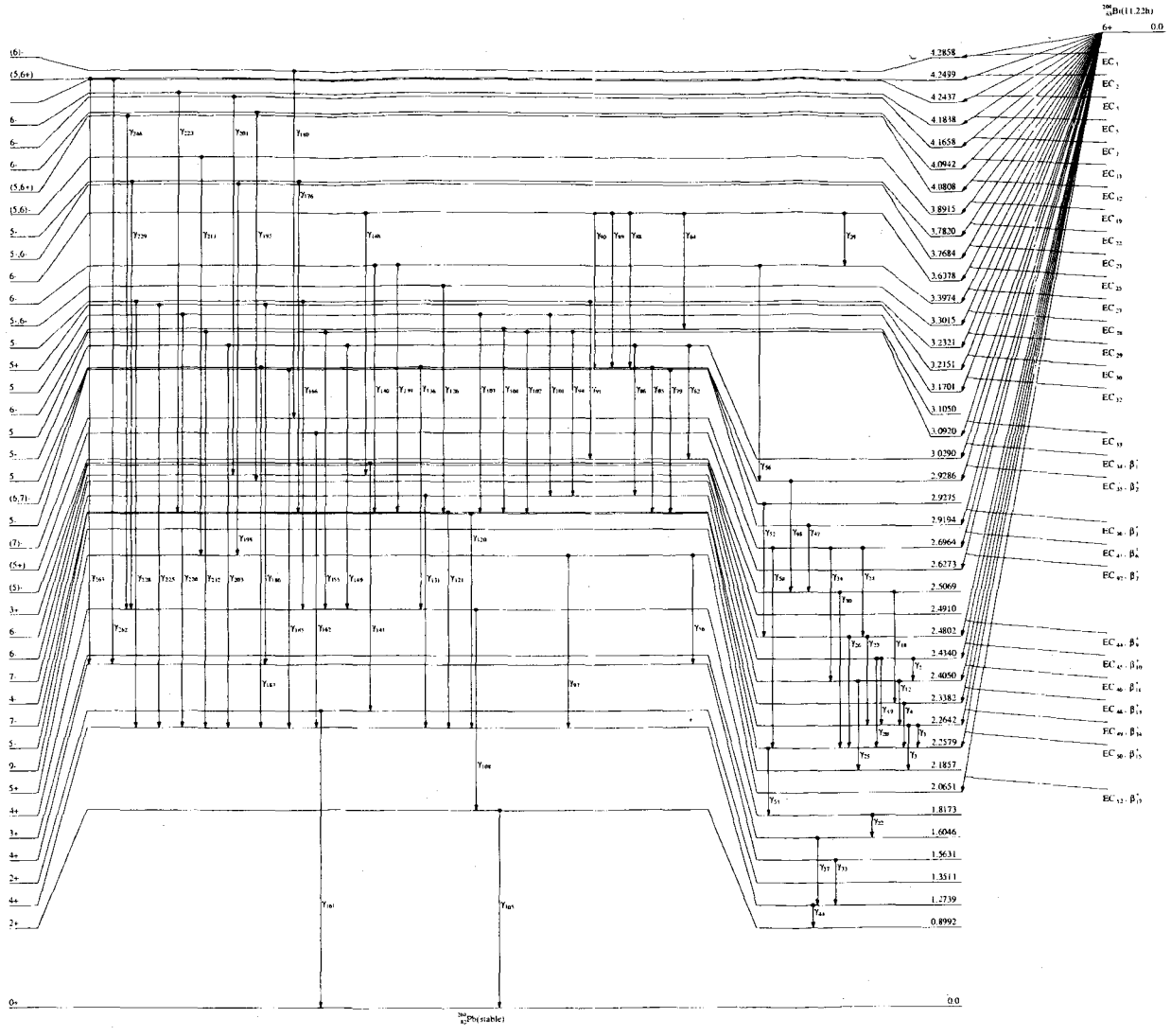
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	1.00E+00	2.610E+00	2.61E+00
ce-K, γ 1	1.69E−03	2.522E+00	4.27E−03
ce-L_1, γ 1	2.40E−04	2.594E+00	6.21E−04
ce-L_2, γ 1	2.88E−05	2.595E+00	7.48E−05
ce-M, γ 1	2.21E−05	2.607E+00*	5.77E−05
K_{α_1} X-ray	2.06E−01	7.497E−02	1.54E−02
K_{α_2} X-ray	1.22E−01	7.280E−02	8.88E−03
K_{β_1} X-ray	4.69E−02	8.494E−02	3.98E−03
Auger-KLL	8.44E−03	5.825E−02*	4.92E−04
Auger-KLX	4.73E−03	7.029E−02*	3.32E−04
Auger-KXY	7.69E−04	8.179E−02*	6.29E−05
Auger-LMM	2.67E−01	8.083E−03*	2.15E−03
Auger-LMX	1.75E−01	1.072E−02*	1.88E−03
Auger-LXY	2.97E−02	1.278E−02*	3.79E−04
Auger-MXY	1.14E+00	2.859E−03*	3.25E−03
ΔE	3.01E−01	5.209E−04*	1.57E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.64E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	7.38E−03
Listed β, ce and Auger radiations	1.37E−02
Omitted β, ce and Auger radiations**	1.11E−05
Listed radiations	2.65E+00
Omitted radiations**	7.39E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pb-208 daughter is stable.




$^{208}_{83}$Bi(11.22h)
6+
0.0
4.2858
4.2499
4.2437
4.1838
4.1658
4.0942
4.0808
3.8915
3.7820
3.7684
3.6378
3.3974
3.3015
3.2321
3.2151
3.1701
3.1050
3.0920
3.0290
2.9286
2.9275
2.9194
2.6964
2.6273
2.5069
2.4910
2.4802
2.4340
2.4050
2.3382
2.2642
2.2579
2.1857
2.0651
1.8173
1.6046
1.5631
1.3511
1.2739
0.8992
0+
0.0
$^{208}_{82}$Pb(stable)

84-Po-204

α: 06-OCT-95
EC: 04-NOV-94

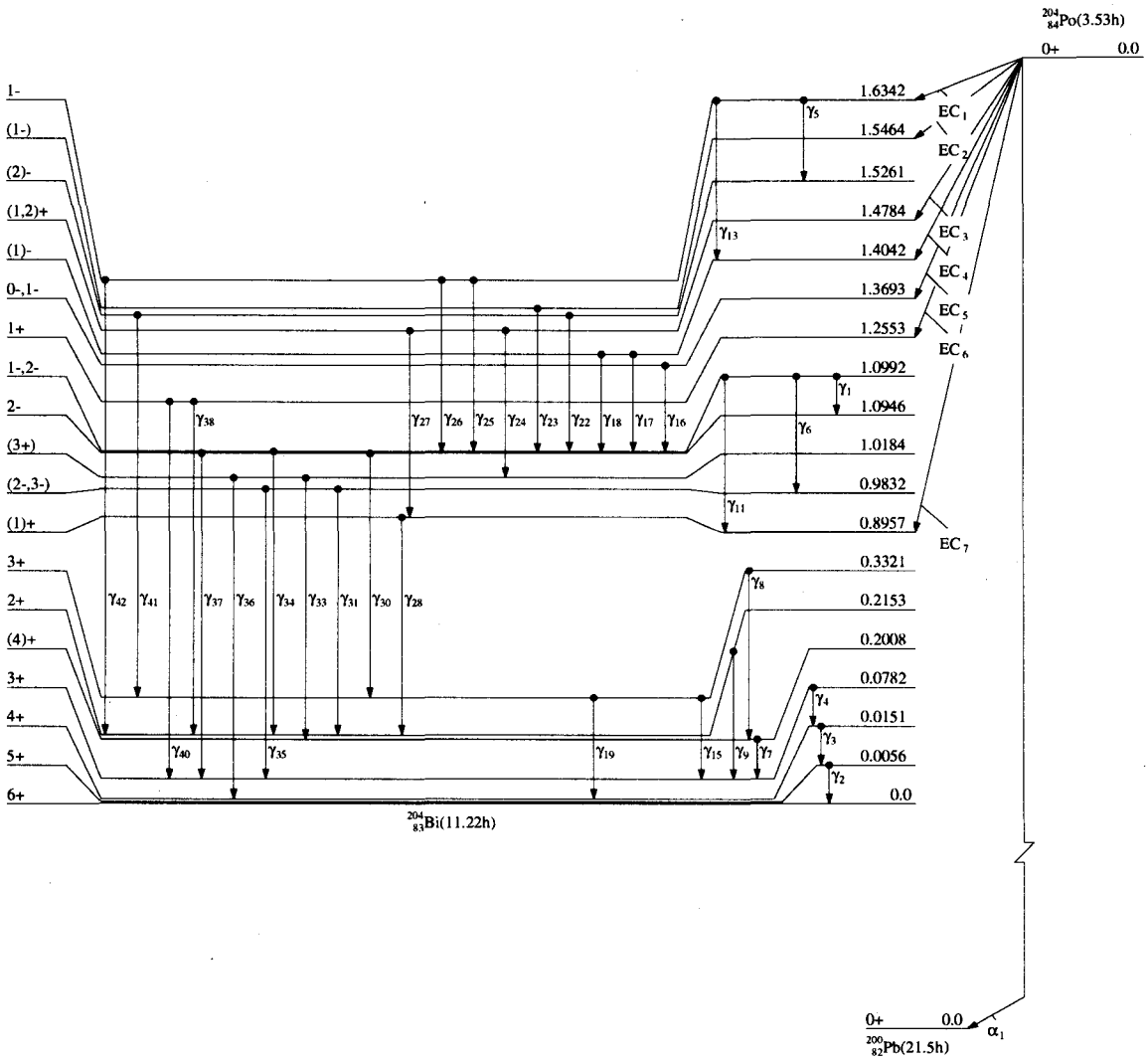
Half-life = 3.53 h
Decay mode(s): α, EC

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	6.60E−03	5.377E+00	3.55E−02
α recoil	6.60E−03	1.076E−01	7.10E−04
ce-N^+, γ 1	2.09E−01	4.700E−03*	9.83E−04
ce-M, γ 2	3.87E−01	2.373E−03*	9.17E−04
ce-N^+, γ 2	6.06E−01	5.550E−03*	3.36E−03
ce-M, γ 3	5.68E−01	6.343E−03*	3.60E−03
ce-N^+, γ 3	4.23E−01	9.520E−03*	4.03E−03
γ 4	1.08E−01	6.319E−02	6.80E−03
ce-L_1, γ 4	5.62E−01	4.680E−02	2.63E−02
ce-L_2, γ 4	5.87E−02	4.747E−02	2.79E−03
ce-L_3, γ 4	4.73E−03	4.977E−02	2.35E−04
ce-M, γ 4	1.47E−01	6.001E−02*	8.81E−03
ce-N^+, γ 4	4.92E−02	6.319E−02*	3.11E−03
ce-K, γ 5	2.45E−02	1.753E−02	4.30E−04
ce-L_1, γ 5	3.87E−03	9.167E−02	3.54E−04
ce-K, γ 6	2.58E−02	2.553E−02	6.59E−04
ce-L_1, γ 6	4.07E−03	9.967E−02	4.06E−04
γ 7	1.14E−02	1.226E−01	1.39E−03
ce-K, γ 7	5.50E−02	3.206E−02	1.76E−03
ce-L_1, γ 7	8.67E−03	1.062E−01	9.20E−04
ce-M, γ 7	2.26E−03	1.194E−01*	2.70E−04
γ 8	8.97E−03	1.312E−01	1.18E−03
ce-K, γ 8	3.57E−02	4.070E−02	1.45E−03
ce-L_1, γ 8	5.63E−03	1.148E−01	6.46E−04
ce-M, γ 8	1.47E−03	1.280E−01*	1.88E−04
γ 9	9.72E−02	1.370E−01	1.33E−02
ce-K, γ 9	3.42E−01	4.650E−02	1.59E−02
ce-L_1, γ 9	5.39E−02	1.206E−01	6.50E−03
ce-L_2, γ 9	5.67E−03	1.213E−01	6.88E−04
ce-M, γ 9	1.41E−02	1.338E−01*	1.89E−03
ce-N^+, γ 9	4.75E−03	1.370E−01*	6.51E−04
γ 11	2.81E−02	2.036E−01	5.72E−03
ce-K, γ 11	1.27E−02	1.130E−01	1.44E−03
ce-L_1, γ 11	2.76E−03	1.872E−01	5.17E−04
γ 12	6.28E−03	2.098E−01	1.32E−03
γ 13	7.98E−03	2.299E−01	1.84E−03
ce-K, γ 13	6.54E−03	1.394E−01	9.11E−04
ce-L_1, γ 13	1.02E−03	2.136E−01	2.18E−04
γ 14	1.82E−02	2.447E−01	4.44E−03
γ 15	5.92E−03	2.538E−01	1.50E−03
ce-K, γ 15	3.70E−03	1.633E−01	6.05E−04
γ 16	2.78E−01	2.701E−01	7.51E−02
ce-K, γ 16	1.47E−01	1.795E−01	2.64E−02
ce-L_1, γ 16	2.28E−02	2.537E−01	5.79E−03
ce-L_2, γ 16	2.38E−03	2.544E−01	6.05E−04
ce-M, γ 16	5.95E−03	2.669E−01*	1.59E−03
ce-N^+, γ 16	1.98E−03	2.701E−01*	5.36E−04
γ 17	3.26E−02	3.050E−01	9.94E−03
ce-K, γ 17	1.23E−02	2.144E−01	2.64E−03
ce-L_1, γ 17	1.92E−03	2.886E−01	5.53E−04
γ 18	5.50E−03	3.098E−01	1.70E−03
ce-K, γ 18	1.99E−03	2.193E−01	4.36E−04
γ 19	4.28E−02	3.170E−01	1.36E−02
ce-K, γ 19	1.45E−02	2.265E−01	3.29E−03
ce-L_1, γ 19	2.26E−03	3.006E−01	6.80E−04
ce-M, γ 19	5.88E−04	3.138E−01*	1.85E−04
γ 20	1.27E−02	3.621E−01	4.59E−03
ce-K, γ 20	3.00E−03	2.716E−01	8.15E−04
γ 21	5.20E−03	4.191E−01	2.18E−03
γ 22	1.88E−02	4.268E−01	8.04E−03
ce-K, γ 22	2.88E−03	3.363E−01	9.67E−04
γ 23	1.91E−02	4.518E−01	8.65E−03
ce-K, γ 23	2.51E−03	3.613E−01	9.08E−04
γ 24	9.63E−03	4.599E−01	4.43E−03
ce-K, γ 24	1.21E−03	3.694E−01	4.46E−04
γ 25	1.32E−01	5.349E−01	7.09E−02
ce-K, γ 25	1.11E−02	4.444E−01	4.94E−03
ce-L_1, γ 25	1.71E−03	5.185E−01	8.86E−04
ce-M, γ 25	4.45E−04	5.317E−01*	2.37E−04
γ 26	1.35E−02	5.395E−01	7.26E−03
ce-K, γ 26	1.10E−03	4.490E−01	4.96E−04
γ 27	6.46E−03	5.827E−01	3.76E−03
ce-K, γ 27	4.33E−04	4.922E−01	2.13E−04
γ 28	7.62E−02	6.804E−01	5.19E−02
ce-K, γ 28	3.41E−03	5.899E−01	2.01E−03
ce-L_1, γ 28	5.23E−04	6.640E−01	3.48E−04
γ 29	1.06E−02	7.516E−01	7.96E−03
ce-K, γ 29	3.66E−04	6.611E−01	2.42E−04
γ 30	1.15E−01	7.625E−01	8.78E−02
ce-K, γ 30	4.11E−04	6.720E−01	2.76E−04
γ 31	3.68E−03	7.681E−01	2.82E−03
γ 33	7.06E−03	8.176E−01	5.77E−03
γ 34	2.99E−01	8.840E−01	2.64E−01
ce-K, γ 34	8.13E−04	7.934E−01	6.45E−04
γ 35	1.24E−02	9.052E−01	1.12E−02
γ 36	5.11E−03	1.003E+00	5.13E−03
γ 37	2.41E−01	1.016E+00	2.45E−01
ce-K, γ 37	5.09E−04	9.258E−01	4.72E−04
γ 38	9.60E−02	1.040E+00	9.98E−02
ce-K, γ 38	1.44E−03	9.495E−01	1.37E−03
ce-L_1, γ 38	2.20E−04	1.024E+00	2.25E−04
γ 39	3.14E−03	1.046E+00	3.29E−03
γ 40	1.17E−03	1.178E+00	1.37E−03
γ 41	1.32E−03	1.194E+00	1.57E−03
γ 42	8.97E−04	1.419E+00	1.27E−03
K_{α_1} X-ray	7.01E−01	7.711E−02	5.41E−02
K_{α_2} X-ray	4.17E−01	7.481E−02	3.12E−02
K_{β_1} X-ray	1.60E−01	8.735E−02	1.40E−02
K_{β_2} X-ray	7.36E−02	8.991E−02	6.62E−03
K_{β_3} X-ray	8.34E−02	8.683E−02	7.24E−03
L_α X-ray	3.67E−01	1.083E−02*	3.97E−03
L_β X-ray	3.72E−01	1.301E−02*	4.83E−03
L_γ X-ray	7.65E−02	1.543E−02*	1.18E−03
Auger-KLL	2.79E−02	5.979E−02*	1.67E−03
Auger-KLX	1.57E−02	7.222E−02*	1.13E−03
Auger-KXY	2.56E−03	8.408E−02*	2.15E−04
Auger-LMM	7.19E−01	8.395E−03*	6.04E−03
Auger-LMX	4.75E−01	1.111E−02*	5.28E−03
Auger-LXY	8.09E−02	1.324E−02*	1.07E−03
Auger-MXY	4.11E+00	3.039E−03*	1.25E−02
ΔE	2.04E+00	6.289E−04*	1.28E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.16E+00
Omitted X, γ AND $\gamma^{\pm}$ radiations**	3.17E−03
Listed β, ce AND Auger radiations	1.78E−01
Omitted β, ce AND Auger radiations**	5.44E−03
Listed α and α recoil radiations	3.62E−02
Listed radiations	1.37E+00
Omitted radiations**	8.61E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pb-200 daughter, yield 6.6E−03, is radioactive.
Bi-204 daughter, yield 9.934E−01, is radioactive.


204 84 Po(3.53h)
0+ 0.0
1.6342
1.5464
1.5261
1.4784
1.4042
1.3693
1.2553
1.0992
1.0946
1.0184
0.9832
0.8957
0.3321
0.2153
0.2008
0.0782
0.0151
0.0056
0.0
EC1
EC2
EC3
EC4
EC5
EC6
EC7
1-
(1-)
(2)-
(1,2)+
(1)-
0-,1-
1+
1-,2-
2-
(3+)
(2-,3-)
(1)+
3+
2+
(4)+
3+
4+
5+
6+
204 83 Bi(11.22h)
0+ 0.0
200 82 Pb(21.5h)
α1

84-Po-206

α: 24-APR-97
EC: 13-DEC-90

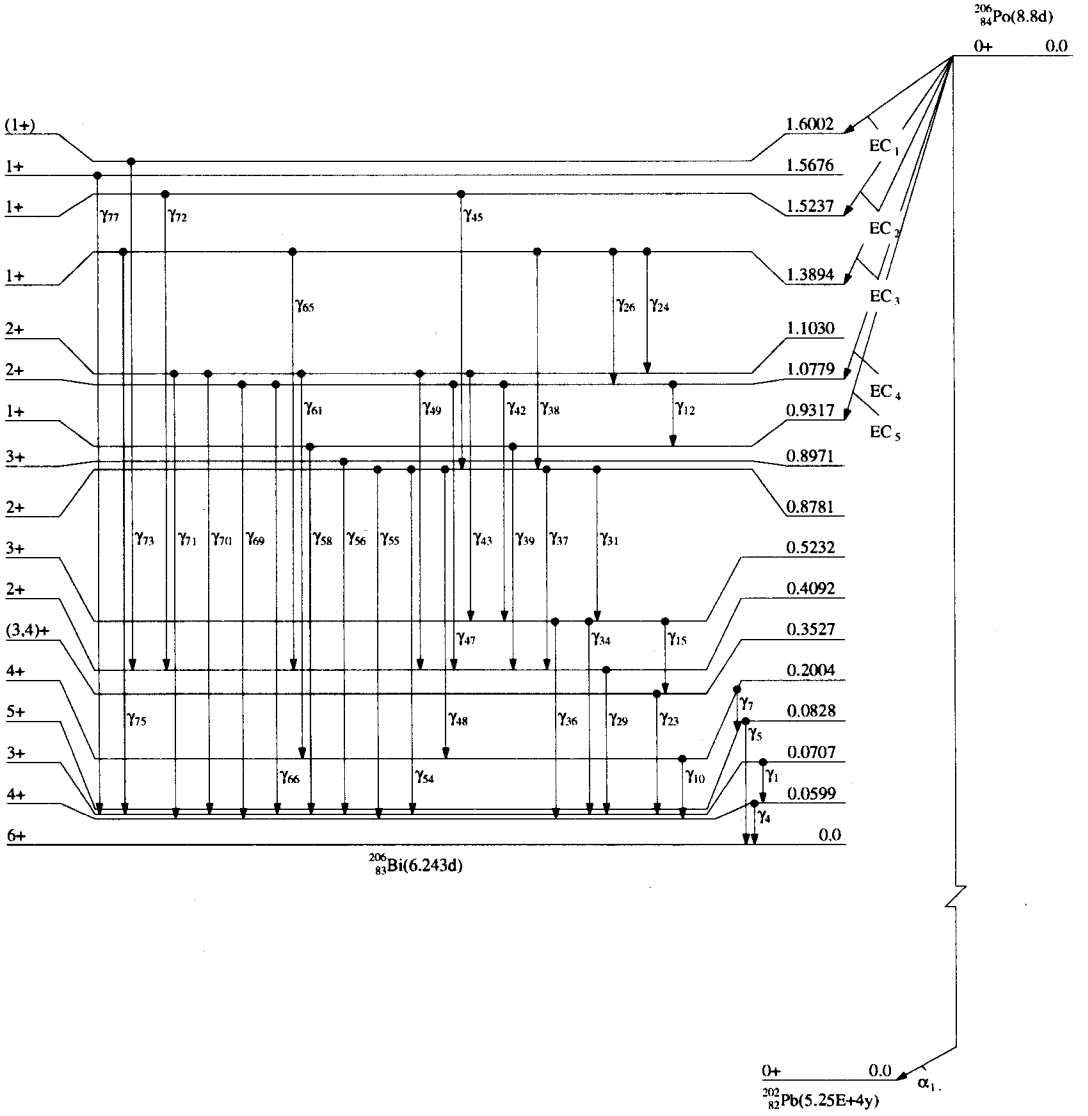
Half-life = 8.8 d
Decay mode(s): α, EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	5.45E−02	5.223E+00	2.85E−01
α recoil	5.45E−02	1.035E−01	5.64E−03
ce-M, γ 1	5.42E−01	7.659E−03*	4.15E−03
ce-N$^+$, γ 1	3.53E−01	1.084E−02*	3.82E−03
ce-L$_1$, γ 4	8.10E−03	4.352E−02	3.53E−04
ce-L$_2$, γ 4	3.43E−01	4.420E−02	1.52E−02
ce-L$_3$, γ 4	3.15E−01	4.649E−02	1.47E−02
ce-M, γ 4	1.76E−01	5.673E−02*	1.00E−02
ce-N$^+$, γ 4	5.83E−02	5.991E−02*	3.49E−03
ce-K, γ 7	7.17E−03	2.701E−02	1.94E−04
ce-K, γ 10	4.65E−03	4.996E−02	2.32E−04
ce-K, γ 12	3.17E−03	5.565E−02	1.77E−04
ce-K, γ 15	5.97E−03	7.998E−02	4.78E−04
γ 23	8.35E−03	2.819E−01	2.35E−03
ce-K, γ 23	3.82E−03	1.914E−01	7.32E−04
γ 24	2.38E−01	2.864E−01	6.82E−02
ce-K, γ 24	1.06E−01	1.959E−01	2.08E−02
ce-L$_1$, γ 24	1.65E−02	2.700E−01	4.47E−03
ce-L$_2$, γ 24	1.76E−03	2.707E−01	4.75E−04
ce-M, γ 24	4.33E−03	2.832E−01*	1.23E−03
ce-N$^+$, γ 24	1.44E−03	2.864E−01*	4.13E−04
γ 26	4.24E−02	3.116E−01	1.32E−02
ce-K, γ 26	1.47E−02	2.210E−01	3.26E−03
ce-L$_1$, γ 26	2.30E−03	2.952E−01	6.78E−04
ce-M, γ 26	6.06E−04	3.084E−01*	1.87E−04
γ 29	1.92E−01	3.384E−01	6.49E−02
ce-K, γ 29	5.45E−02	2.479E−01	1.35E−02
ce-L$_1$, γ 29	8.48E−03	3.221E−01	2.73E−03
ce-L$_2$, γ 29	8.75E−04	3.227E−01	2.82E−04
ce-M, γ 29	2.21E−03	3.353E−01*	7.39E−04
ce-N$^+$, γ 29	7.33E−04	3.384E−01*	2.48E−04
γ 31	3.95E−03	3.549E−01	1.40E−03
ce-K, γ 31	9.87E−04	2.643E−01	2.61E−04
γ 34	3.22E−03	4.525E−01	1.46E−03
γ 36	1.79E−02	4.634E−01	8.31E−03
ce-K, γ 36	2.09E−03	3.729E−01	7.80E−04
γ 37	2.59E−03	4.690E−01	1.21E−03
γ 38	2.41E−01	5.114E−01	1.23E−01
ce-K, γ 38	2.24E−02	4.208E−01	9.42E−03
ce-L$_1$, γ 38	3.44E−03	4.950E−01	1.70E−03
ce-L$_2$, γ 38	3.56E−04	4.956E−01	1.77E−04
ce-M, γ 38	8.99E−04	5.082E−01*	4.57E−04
γ 39	1.57E−01	5.225E−01	8.22E−02
ce-K, γ 39	1.38E−02	4.319E−01	5.96E−03
ce-L$_1$, γ 39	2.12E−03	5.061E−01	1.07E−03
ce-M, γ 39	5.54E−04	5.193E−01*	2.88E−04
γ 42	1.56E−02	5.546E−01	8.63E−03
ce-K, γ 42	1.10E−03	4.641E−01	5.10E−04
γ 43	1.06E−02	5.798E−01	6.13E−03
ce-K, γ 43	6.45E−04	4.893E−01	3.16E−04
γ 45	3.52E−03	6.456E−01	2.27E−03
γ 47	8.58E−03	6.687E−01	5.74E−03
ce-K, γ 47	3.58E−04	5.782E−01	2.07E−04
γ 48	1.47E−02	6.777E−01	9.98E−03
γ 49	2.04E−03	6.938E−01	1.42E−03
γ 54	2.27E−01	8.074E−01	1.83E−01
ce-K, γ 54	6.32E−03	7.169E−01	4.53E−03
ce-L$_1$, γ 54	9.68E−04	7.910E−01	7.66E−04
ce-M, γ 54	2.56E−04	8.042E−01*	2.06E−04
γ 55	1.04E−02	8.182E−01	8.54E−03
γ 56	1.52E−03	8.264E−01	1.26E−03
γ 58	3.54E−02	8.609E−01	3.05E−02
ce-K, γ 58	2.62E−04	7.704E−01	2.02E−04
γ 61	2.47E−03	9.025E−01	2.23E−03
γ 65	7.08E−02	9.802E−01	6.94E−02
ce-K, γ 65	1.13E−03	8.897E−01	1.01E−03
ce-L$_1$, γ 65	1.72E−04	9.638E−01	1.66E−04
γ 66	3.06E−02	1.007E+00	3.09E−02
ce-K, γ 66	4.43E−04	9.166E−01	4.06E−04
γ 68	1.95E−03	1.012E+00	1.98E−03
γ 69	3.63E−03	1.018E+00	3.70E−03
γ 70	3.29E−01	1.032E+00	3.40E−01
ce-K, γ 70	4.86E−03	9.417E−01	4.58E−03
ce-L$_1$, γ 70	7.41E−04	1.016E+00	7.53E−04
ce-M, γ 70	1.79E−04	1.029E+00*	1.85E−04
γ 71	2.88E−03	1.043E+00	3.01E−03
γ 72	2.95E−03	1.114E+00	3.29E−03
γ 73	4.72E−03	1.191E+00	5.62E−03
γ 75	6.49E−03	1.319E+00	8.56E−03
γ 77	2.52E−03	1.497E+00	3.77E−03
K$_{\alpha_1}$ X-ray	4.59E−01	7.711E−02	3.54E−02
K$_{\alpha_2}$ X-ray	2.73E−01	7.481E−02	2.04E−02
K$_{\beta_1}$ X-ray	1.05E−01	8.735E−02	9.14E−03
K$_{\beta_2}$ X-ray	4.82E−02	8.991E−02	4.33E−03
K$_{\beta_3}$ X-ray	5.46E−02	8.683E−02	4.74E−03
L$_\alpha$ X-ray	2.82E−01	1.083E−02*	3.05E−03
L$_\beta$ X-ray	3.02E−01	1.301E−02*	3.93E−03
Auger-KLL	1.82E−02	5.979E−02*	1.09E−03
Auger-KLX	1.03E−02	7.222E−02*	7.41E−04
Auger-LMM	5.77E−01	8.433E−03*	4.87E−03
Auger-LMX	3.79E−01	1.114E−02*	4.22E−03
Auger-LXY	6.42E−02	1.326E−02*	8.52E−04
Auger-MXY	3.01E+00	2.999E−03*	9.03E−03
ΔE	1.01E+00	5.946E−04*	6.00E−04

Listed X, γ and γ$^\pm$ radiations	1.18E+00
Omitted X, γ and γ$^\pm$ radiations**	1.39E−02
Listed β, ce and Auger radiations	1.58E−01
Omitted β, ce and Auger radiations**	5.89E−03
Listed α and α recoil radiations	2.90E−01
Listed radiations	1.63E+00
Omitted radiations**	1.98E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pb-202 daughter, yield 5.45E−02, is radioactive.
Bi-206 daughter, yield 9.455E−01, is radioactive.


206 84 Po(8.8d)
0+ 0.0
(1+) 1.6002
1+ 1.5676
1+ 1.5237
1+ 1.3894
2+ 1.1030
2+ 1.0779
1+ 0.9317
3+ 0.8971
2+ 0.8781
3+ 0.5232
2+ 0.4092
(3,4)+ 0.3527
4+ 0.2004
5+ 0.0828
3+ 0.0707
4+ 0.0599
6+ 0.0
EC 1
EC 2
EC 3
EC 4
EC 5
γ77 γ72 γ45 γ65 γ26 γ24 γ61 γ49 γ42 γ38 γ12 γ73 γ71 γ70 γ69 γ58 γ56 γ55 γ43 γ39 γ37 γ31 γ47 γ34 γ15 γ75 γ48 γ36 γ29 γ23 γ7 γ5 γ66 γ54 γ10 γ1 γ4
206 83 Bi(6.243d)
0+ 0.0
α1
202 82 Pb(5.25E+4y)

84-Po-208

α: 04-NOV-94
EC: 13-MAY-86

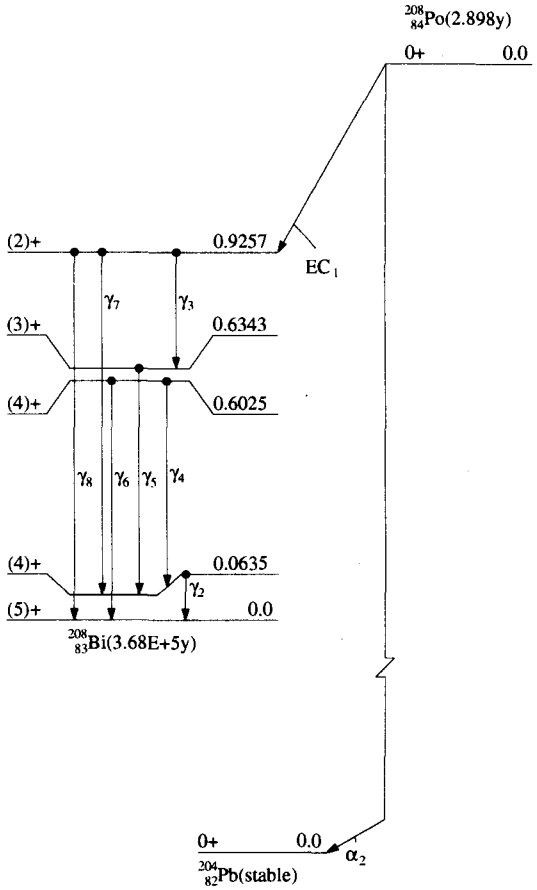
Half-life = 2.898 y
Decay mode(s): α, EC

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 2	1.00E+00	5.115E+00	5.11E+00
α recoil	1.00E+00	1.004E−01	1.00E−01
γ 2	3.84E−06	6.313E−02	2.43E−07
ce-L_1, γ 2	2.01E−05	4.674E−02	9.41E−07
ce-L_2, γ 2	2.10E−06	4.742E−02	9.96E−08
ce-L_3, γ 2	1.69E−07	4.971E−02	8.42E−09
ce-M, γ 2	5.26E−06	5.995E−02*	3.15E−07
ce-N^+, γ 2	1.76E−06	6.313E−02*	1.11E−07
γ 3	2.55E−05	2.918E−01	7.43E−06
ce-K, γ 3	1.08E−05	2.013E−01	2.18E−06
ce-L_1, γ 3	1.69E−06	2.754E−01	4.65E−07
ce-L_2, γ 3	1.75E−07	2.761E−01	4.84E−08
ce-M, γ 3	4.40E−07	2.886E−01*	1.27E−07
ce-N^+, γ 3	1.46E−07	2.918E−01*	4.27E−08
γ 4	5.65E−06	5.384E−01	3.04E−06
ce-K, γ 4	4.67E−07	4.479E−01	2.09E−07
ce-L_1, γ 4	7.16E−08	5.220E−01	3.74E−08
ce-M, γ 4	1.87E−08	5.352E−01*	9.99E−09
γ 5	1.55E−05	5.701E−01	8.85E−06
ce-K, γ 5	1.10E−06	4.796E−01	5.28E−07
ce-L_1, γ 5	1.69E−07	5.537E−01	9.37E−08
ce-L_2, γ 5	1.67E−08	5.544E−01	9.28E−09
ce-M, γ 5	4.41E−08	5.670E−01*	2.50E−08
ce-N^+, γ 5	1.48E−08	5.701E−01*	8.42E−09
γ 6	1.20E−05	6.015E−01	7.20E−06
ce-K, γ 6	7.37E−07	5.110E−01	3.76E−07
ce-L_1, γ 6	1.13E−07	5.851E−01	6.63E−08
ce-M, γ 6	2.95E−08	5.983E−01*	1.77E−08
γ 7	8.32E−06	8.618E−01	7.17E−06
ce-K, γ 7	6.14E−08	7.713E−01	4.74E−08
ce-L_1, γ 7	9.04E−09	8.454E−01	7.64E−09
γ 8	8.22E−06	9.251E−01	7.61E−06
ce-K, γ 8	5.31E−08	8.346E−01	4.43E−08
ce-L_1, γ 8	7.80E−09	9.087E−01	7.09E−09
K_{α_1} X-ray	1.90E−05	7.711E−02	1.47E−06
K_{α_2} X-ray	1.13E−05	7.481E−02	8.46E−07
K_{β_1} X-ray	4.33E−06	8.735E−02	3.79E−07
K_{β_2} X-ray	2.00E−06	8.991E−02	1.79E−07
K_{β_3} X-ray	2.26E−06	8.683E−02	1.96E−07
L_α X-ray	1.18E−05	1.083E−02*	1.28E−07
L_β X-ray	1.20E−05	1.300E−02*	1.56E−07
Auger-KLL	7.55E−07	5.979E−02*	4.51E−08
Auger-KLX	4.25E−07	7.222E−02*	3.07E−08
Auger-LMM	2.31E−05	8.401E−03*	1.94E−07
Auger-LMX	1.53E−05	1.112E−02*	1.70E−07
Auger-LXY	2.60E−06	1.325E−02*	3.45E−08
Auger-MXY	9.88E−05	2.975E−03*	2.94E−07
ΔE	2.65E−05	5.560E−04*	1.47E−08

Listed X, γ and $\gamma^{\pm}$ radiations	4.49E−05
Omitted X, γ and $\gamma^{\pm}$ radiations**	5.81E−08
Listed β, ce and Auger radiations	6.61E−06
Omitted β, ce and Auger radiations**	4.29E−08
Listed α and α recoil radiations	5.22E+00
Omitted α and α recoil radiations	1.04E−05
Listed radiations	5.22E+00
Omitted radiations**	1.05E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pb-204 daughter, yield 9.9996E−01, is stable.
Bi-208 daughter, yield 4.2E−05, is radioactive.



84-Po-209

α: 06-OCT-93
EC: 13-NOV-91

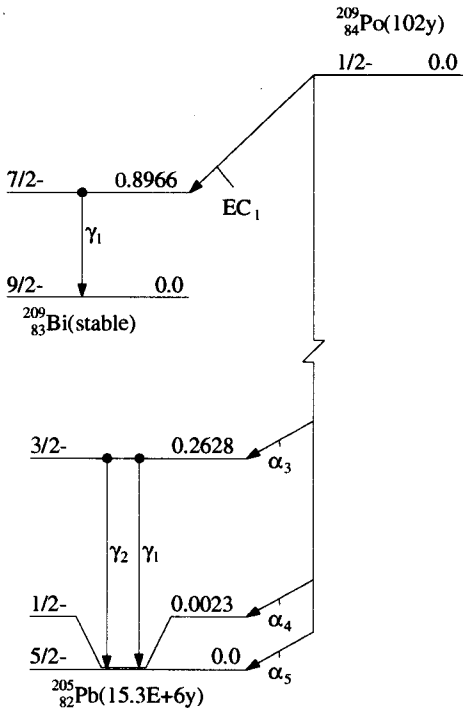
Half-life = 102 y
Decay mode(s): α, EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 3	9.07E−03	4.626E+00	4.20E−02
α recoil	9.07E−03	9.032E−02	8.19E−04
α 4	7.89E−01	4.882E+00	3.85E+00
α recoil	7.89E−01	9.531E−02	7.52E−02
α 5	1.97E−01	4.884E+00	9.63E−01
α recoil	1.97E−01	9.536E−02	1.88E−02
γ 1	6.75E−03	2.605E−01	1.76E−03
ce-K, γ 1	3.38E−03	1.725E−01	5.84E−04
ce-L_1, γ 1	5.22E−04	2.446E−01	1.28E−04
ce-L_2, γ 1	1.05E−04	2.453E−01	2.57E−05
ce-L_3, γ 1	3.15E−05	2.475E−01	7.80E−06
ce-M, γ 1	1.57E−04	2.574E−01*	4.03E−05
ce-N^+, γ 1	5.06E−05	2.605E−01*	1.32E−05
γ 2	2.25E−03	2.628E−01	5.90E−04
ce-K, γ 2	1.10E−03	1.748E−01	1.93E−04
ce-L_1, γ 2	1.70E−04	2.469E−01	4.20E−05
ce-L_2, γ 2	3.39E−05	2.476E−01	8.39E−06
ce-L_3, γ 2	1.01E−05	2.498E−01	2.52E−06
ce-M, γ 2	5.09E−05	2.597E−01*	1.32E−05
ce-N^+, γ 2	1.64E−05	2.628E−01*	4.32E−06
K_{α_1} X-ray	2.12E−03	7.497E−02	1.59E−04
K_{α_2} X-ray	1.26E−03	7.280E−02	9.15E−05
K_{β_1} X-ray	4.83E−04	8.494E−02	4.10E−05
K_{β_2} X-ray	2.16E−04	8.742E−02	1.89E−05
K_{β_3} X-ray	2.52E−04	8.445E−02	2.13E−05
L_α X-ray	7.79E−04	1.054E−02*	8.21E−06
L_β X-ray	7.27E−04	1.262E−02*	9.17E−06
Auger-KLL	8.70E−05	5.825E−02*	5.07E−06
Auger-KLX	4.87E−05	7.029E−02*	3.42E−06
Auger-LMM	1.58E−03	8.135E−03*	1.29E−05
Auger-LMX	1.03E−03	1.076E−02*	1.11E−05
Auger-LXY	1.75E−04	1.281E−02*	2.24E−06
Auger-MXY	6.56E−03	2.920E−03*	1.92E−05
γ 1	4.70E−03	8.966E−01	4.22E−03
ce-K, γ 1	7.98E−05	8.061E−01	6.43E−05
ce-L_1, γ 1	1.21E−05	8.802E−01	1.07E−05
ce-L_2, γ 1	1.50E−06	8.809E−01	1.32E−06
ce-M, γ 1	3.06E−06	8.934E−01*	2.74E−06
K_{α_1} X-ray	1.63E−03	7.711E−02	1.26E−04
K_{α_2} X-ray	9.71E−04	7.481E−02	7.26E−05
K_{β_1} X-ray	3.72E−04	8.735E−02	3.25E−05
K_{β_2} X-ray	1.71E−04	8.991E−02	1.54E−05
K_{β_3} X-ray	1.94E−04	8.683E−02	1.68E−05
L_α X-ray	6.89E−04	1.083E−02*	7.47E−06
L_β X-ray	6.47E−04	1.301E−02*	8.42E−06
Auger-KLL	6.48E−05	5.979E−02*	3.88E−06
Auger-KLX	3.65E−05	7.222E−02*	2.64E−06
Auger-LMM	1.32E−03	8.340E−03*	1.10E−05
Auger-LMX	8.70E−04	1.105E−02*	9.61E−06
Auger-LXY	1.48E−04	1.318E−02*	1.95E−06
Auger-MXY	5.61E−03	3.022E−03*	1.69E−05

Listed X, γ and $\gamma^{\pm}$ radiations	7.19E−03
Omitted X, γ AND $\gamma^{\pm}$ radiations**	7.15E−06
Listed β, ce AND Auger radiations	1.24E−03
Omitted β, ce AND Auger radiations**	3.97E−06
Listed α and α recoil radiations	4.95E+00
Omitted α and α recoil radiations	2.98E−05
Listed radiations	4.96E+00
Omitted radiations**	4.09E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i)\times E(i)$ in its category.

Pb-205 daughter, yield 9.952E−01, is radioactive.
Bi-209 daughter, yield 4.8E−03, is stable.



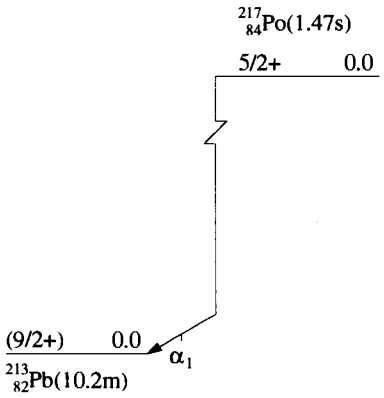
84-Po-217

13-MAY-92

Half-life = 1.47 s
Decay mode(s): α

Radiation	y(i) $(\text{Bq s})^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E+00	6.537E+00	6.54E+00
α recoil	1.00E+00	1.228E−01	1.23E−01
Listed α and α recoil radiations			6.66E+00
Listed radiations			6.66E+00

Pb-213 daughter is radioactive.



85-At-205

α: 08-JUL-94
EC, β^+: 06-OCT-93

Half-life = 26.2 m
Decay mode(s): α, EC, β^+

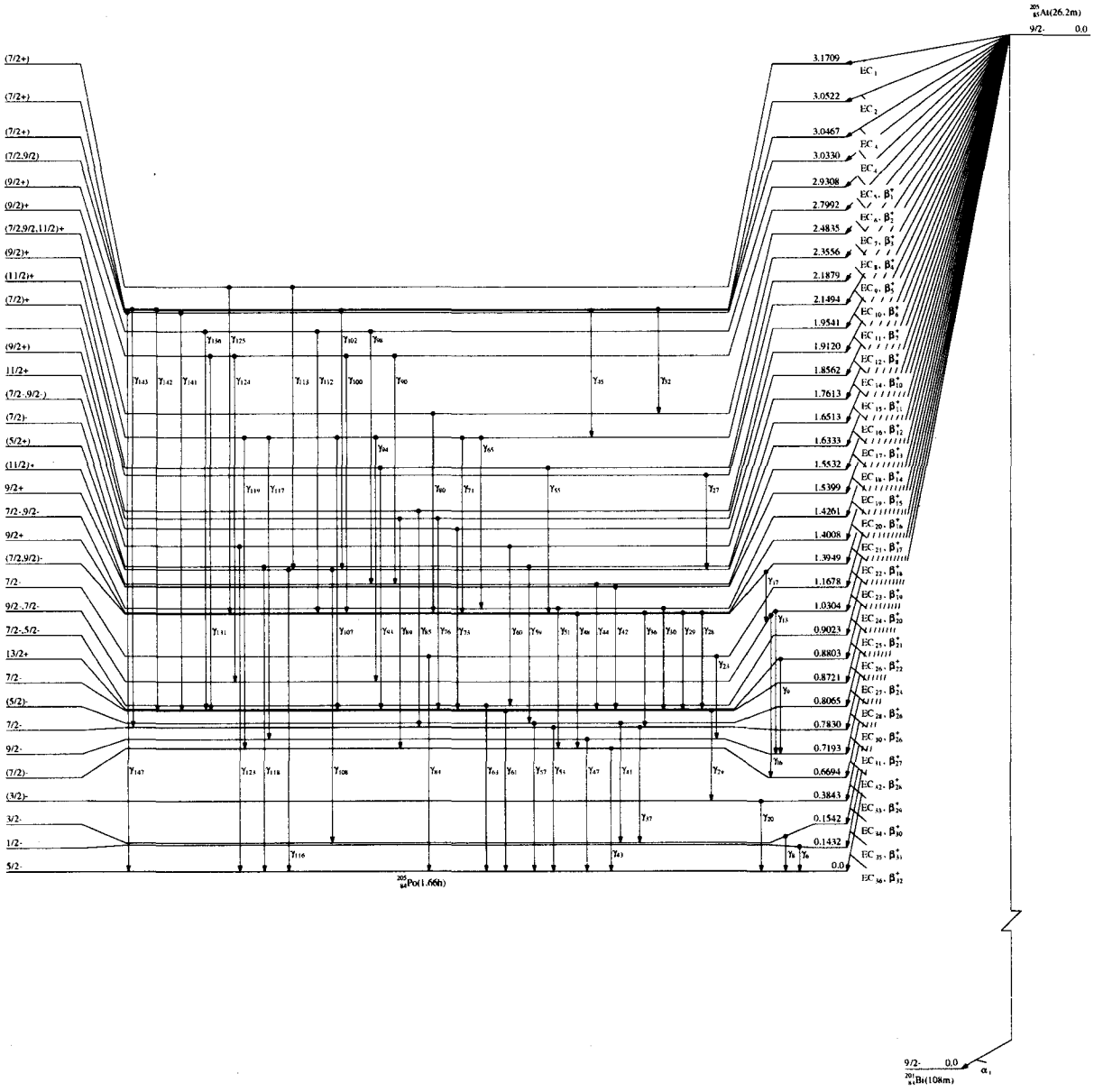
Radiation	y(i) $(\text{Bq s})^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E−01	5.902E+00	5.90E−01
α recoil	1.00E−01	1.175E−01	1.18E−02
β^+ 8	9.95E−04	7.343E−01*	7.31E−04
β^+ 10	7.27E−04	7.587E−01*	5.51E−04
β^+ 12	8.56E−04	8.485E−01*	7.26E−04
β^+ 14	2.39E−03	8.917E−01*	2.13E−03
β^+ 15	1.49E−03	8.975E−01*	1.34E−03
β^+ 16	9.95E−04	9.476E−01*	9.43E−04
β^+ 17	4.08E−03	9.587E−01*	3.91E−03
β^+ 18	5.97E−04	9.613E−01*	5.74E−04
β^+ 19	1.99E−03	1.062E+00*	2.11E−03
β^+ 20	5.57E−03	1.122E+00*	6.26E−03
β^+ 21	5.57E−04	1.179E+00*	6.57E−04
β^+ 22	1.29E−03	1.164E+00*	1.51E−03
β^+ 23	4.28E−03	1.193E+00*	5.11E−03
β^+ 24	7.96E−04	1.195E+00*	9.52E−04
β^+ 25	8.96E−04	1.198E+00*	1.07E−03
β^+ 26	8.06E−03	1.232E+00*	9.94E−03
β^+ 27	7.96E−03	1.261E+00*	1.00E−02
β^+ 28	7.96E−03	1.283E+00*	1.02E−02
β^+ 29	1.99E−03	1.381E+00*	2.75E−03
β^+ 30	7.96E−03	1.477E+00*	1.18E−02
β^+ 31	5.97E−03	1.518E+00*	9.07E−03
β^+ 32	8.16E−02	1.538E+00*	1.26E−01
$\gamma^{\pm}$	3.02E−01	5.110E−01	1.54E−01
ce-L_2, γ 6	4.62E−03	1.269E−01	5.86E−04
γ 8	2.57E−02	1.542E−01	3.96E−03
ce-K, γ 8	7.04E−02	6.109E−02	4.30E−03
ce-L_1, γ 8	1.12E−02	1.373E−01	1.54E−03
ce-K, γ 9	1.17E−01	6.793E−02	7.93E−03
ce-L_1, γ 9	3.04E−02	1.441E−01	4.38E−03
ce-L_2, γ 9	4.04E−03	1.448E−01	5.85E−04
ce-L_3, γ 9	4.83E−03	1.472E−01	7.10E−04
ce-M, γ 9	1.00E−02	1.577E−01*	1.59E−03
ce-N^+, γ 9	3.50E−03	1.610E−01*	5.64E−04
γ 13	4.13E−02	3.111E−01	1.29E−02
ce-K, γ 13	1.50E−02	2.180E−01	3.26E−03
ce-L_1, γ 13	2.35E−03	2.942E−01	6.92E−04
γ 16	1.16E−02	3.609E−01	4.20E−03
γ 17	8.26E−03	3.646E−01	3.01E−03
ce-K, γ 17	2.09E−03	2.715E−01	5.68E−04
γ 20	1.22E−02	3.846E−01	4.68E−03
γ 23	1.68E−02	4.486E−01	7.55E−03
ce-K, γ 23	1.94E−03	3.555E−01	6.91E−04
γ 26	5.51E−03	4.879E−01	2.69E−03
γ 27	1.29E−02	5.160E−01	6.63E−03
γ 28	4.41E−02	5.204E−01	2.29E−02
γ 29	7.13E−03	5.289E−01	3.77E−03
γ 30	6.15E−03	5.539E−01	3.41E−03
γ 31	4.28E−03	5.662E−01	2.43E−03
γ 32	5.51E−03	5.685E−01	3.13E−03
γ 33	5.51E−03	5.771E−01	3.18E−03
γ 34	4.93E−03	5.870E−01	2.89E−03
γ 35	5.26E−03	5.954E−01	3.13E−03
γ 36	2.20E−02	6.178E−01	1.36E−02
γ 37	5.60E−02	6.289E−01	3.52E−02
γ 41	4.59E−03	6.525E−01	2.99E−03
γ 42	2.30E−02	6.596E−01	1.51E−02
γ 43	8.60E−02	6.694E−01	5.76E−02
ce-K, γ 43	1.27E−03	5.763E−01	7.30E−04
γ 44	3.21E−02	6.729E−01	2.16E−02

γ 45	3.52E−03	6.914E−01	2.43E−03
γ 47	3.06E−01	7.193E−01	2.20E−01
ce-K, γ 47	3.32E−03	6.262E−01	2.08E−03
γ 48	5.88E−03	7.255E−01	4.26E−03
γ 51	6.30E−03	7.568E−01	4.77E−03
γ 53	1.96E−02	7.828E−01	1.53E−02
γ 54	1.29E−02	7.892E−01	1.01E−02
γ 55	5.17E−03	7.925E−01	4.10E−03
γ 57	5.26E−03	8.064E−01	4.24E−03
γ 58	6.55E−03	8.195E−01	5.37E−03
γ 59	3.46E−03	8.452E−01	2.92E−03
γ 60	2.91E−03	8.592E−01	2.50E−03
γ 61	3.12E−02	8.724E−01	2.72E−02
γ 63	4.35E−03	9.022E−01	3.92E−03
γ 65	5.35E−03	9.296E−01	4.98E−03
γ 67	3.86E−03	9.360E−01	3.61E−03
γ 68	4.19E−03	9.419E−01	3.95E−03
γ 71	3.24E−03	9.610E−01	3.12E−03
γ 72	2.39E−03	9.719E−01	2.32E−03
γ 73	9.09E−03	9.760E−01	8.87E−03
γ 74	3.37E−03	9.933E−01	3.34E−03
γ 75	6.27E−03	1.014E+00	6.36E−03
γ 76	1.99E−02	1.032E+00	2.05E−02
γ 80	5.66E−03	1.083E+00	6.13E−03
γ 84	2.11E−03	1.167E+00	2.46E−03
γ 85	6.98E−03	1.171E+00	8.17E−03
γ 89	3.00E−03	1.242E+00	3.73E−03
γ 90	3.61E−03	1.246E+00	4.50E−03
γ 91	5.51E−03	1.252E+00	6.90E−03
γ 93	1.07E−02	1.308E+00	1.40E−02
γ 94	1.25E−02	1.325E+00	1.66E−02
γ 96	2.02E−03	1.358E+00	2.74E−03
γ 98	1.96E−03	1.378E+00	2.70E−03
γ 99	2.23E−03	1.389E+00	3.10E−03
γ 100	3.76E−03	1.398E+00	5.26E−03
γ 102	3.58E−03	1.413E+00	5.06E−03
γ 104	1.71E−03	1.437E+00	2.46E−03
γ 105	3.40E−03	1.443E+00	4.90E−03
γ 106	2.20E−03	1.456E+00	3.21E−03
γ 107	8.41E−03	1.475E+00	1.24E−02
γ 108	8.84E−03	1.479E+00	1.31E−02
γ 109	2.39E−03	1.484E+00	3.54E−03
γ 112	1.96E−03	1.531E+00	3.00E−03
γ 113	4.74E−03	1.537E+00	7.29E−03
γ 115	1.71E−03	1.600E+00	2.74E−03
γ 116	5.08E−03	1.633E+00	8.29E−03
γ 117	1.71E−03	1.637E+00	2.81E−03
γ 118	4.83E−03	1.651E+00	7.98E−03
γ 119	2.36E−03	1.686E+00	3.97E−03
γ 120	2.69E−03	1.689E+00	4.55E−03
γ 121	2.02E−03	1.750E+00	3.53E−03
γ 123	3.09E−03	1.761E+00	5.44E−03
γ 124	3.34E−03	1.769E+00	5.90E−03
γ 125	1.35E−03	1.776E+00	2.39E−03
γ 126	1.41E−03	1.788E+00	2.52E−03
γ 127	1.44E−03	1.804E+00	2.59E−03
γ 129	1.47E−03	1.875E+00	2.75E−03
γ 130	2.82E−03	1.907E+00	5.37E−03
γ 131	1.22E−03	1.929E+00	2.36E−03
γ 132	1.19E−03	2.006E+00	2.39E−03
γ 135	2.85E−03	2.032E+00	5.78E−03
γ 136	7.28E−03	2.050E+00	1.49E−02
γ 138	1.10E−03	2.119E+00	2.33E−03
γ 141	1.62E−03	2.161E+00	3.50E−03
γ 142	1.10E−03	2.181E+00	2.40E−03
γ 143	1.22E−03	2.268E+00	2.78E−03
γ 145	9.18E−04	2.709E+00	2.49E−03
γ 147	1.01E−03	3.033E+00	3.06E−03
K_{α_1} X-ray	4.04E−01	7.929E−02	3.20E−02
K_{α_2} X-ray	2.41E−01	7.686E−02	1.85E−02
K_{β_1} X-ray	9.21E−02	8.980E−02	8.27E−03
K_{β_2} X-ray	4.36E−02	9.246E−02	4.03E−03
K_{β_3} X-ray	4.80E−02	8.925E−02	4.29E−03
Auger-KLL	1.55E−02	6.134E−02*	9.52E−04
Auger-KLX	8.77E−03	7.419E−02*	6.51E−04
Auger-LMM	2.94E−01	8.564E−03*	2.52E−03
Auger-LMX	1.95E−01	1.137E−02*	2.22E−03
Auger-MXY	1.26E+00	3.159E−03*	3.99E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.06E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	9.56E−02
Listed β, ce and Auger radiations	2.48E−01
Omitted β, ce and Auger radiations**	1.86E−02
Listed α and α recoil radiations	6.02E−01
Listed radiations	1.91E+00
Omitted radiations**	1.14E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum y(i) \times E(i)$ in its category.

Bi-201 daughter, yield 1.00E−01, is radioactive.
Po-205 daughter, yield 9.00E−01, is radioactive.


205 85At(26.2m)
9/2- 0.0
(7/2+)
(7/2+)
(7/2+)
(7/2,9/2)
(9/2+)
(9/2)+
(7/2,9/2,11/2)+
(9/2)+
(11/2)+
(7/2)+
(9/2+)
11/2+
(7/2-,9/2-)
(7/2)-
(5/2+)
(11/2)+
9/2+
7/2-,9/2-
9/2+
(7/2,9/2)-
7/2-
9/2-,7/2-
7/2-,5/2-
13/2+
7/2-
(5/2)-
7/2-
9/2-
(7/2)-
(3/2)-
3/2-
1/2-
5/2-
3.1709
3.0522
3.0467
3.0330
2.9308
2.7992
2.4835
2.3556
2.1879
2.1494
1.9541
1.9120
1.8562
1.7613
1.6513
1.6333
1.5532
1.5399
1.4261
1.4008
1.3949
1.1678
1.0304
0.9023
0.8803
0.8721
0.8065
0.7830
0.7193
0.6694
0.3843
0.1542
0.1432
0.0
EC1
EC2
EC3
EC4
EC5, β1+
EC6, β2+
EC7, β3+
EC8, β4+
EC9, β5+
EC10, β6+
EC11, β7+
EC12, β8+
EC13, β9+
EC14, β10+
EC15, β11+
EC16, β12+
EC17, β13+
EC18, β14+
EC19, β15+
EC20, β16+
EC21, β17+
EC22, β18+
EC23, β19+
EC24, β20+
EC25, β21+
EC26, β22+
EC27, β23+
EC28, β24+
EC29, β25+
EC30, β26+
EC31, β27+
EC32, β28+
EC33, β29+
EC34, β30+
EC35, β31+
EC36, β32+
205 84Po(1.66h)
9/2- 0.0
201 83Bi(108m)
α1

85-At-208

α: 04-NOV-94
EC, β^+: 13-MAY-86

Half-life = 1.63 h
Decay mode(s): α, EC, β^+

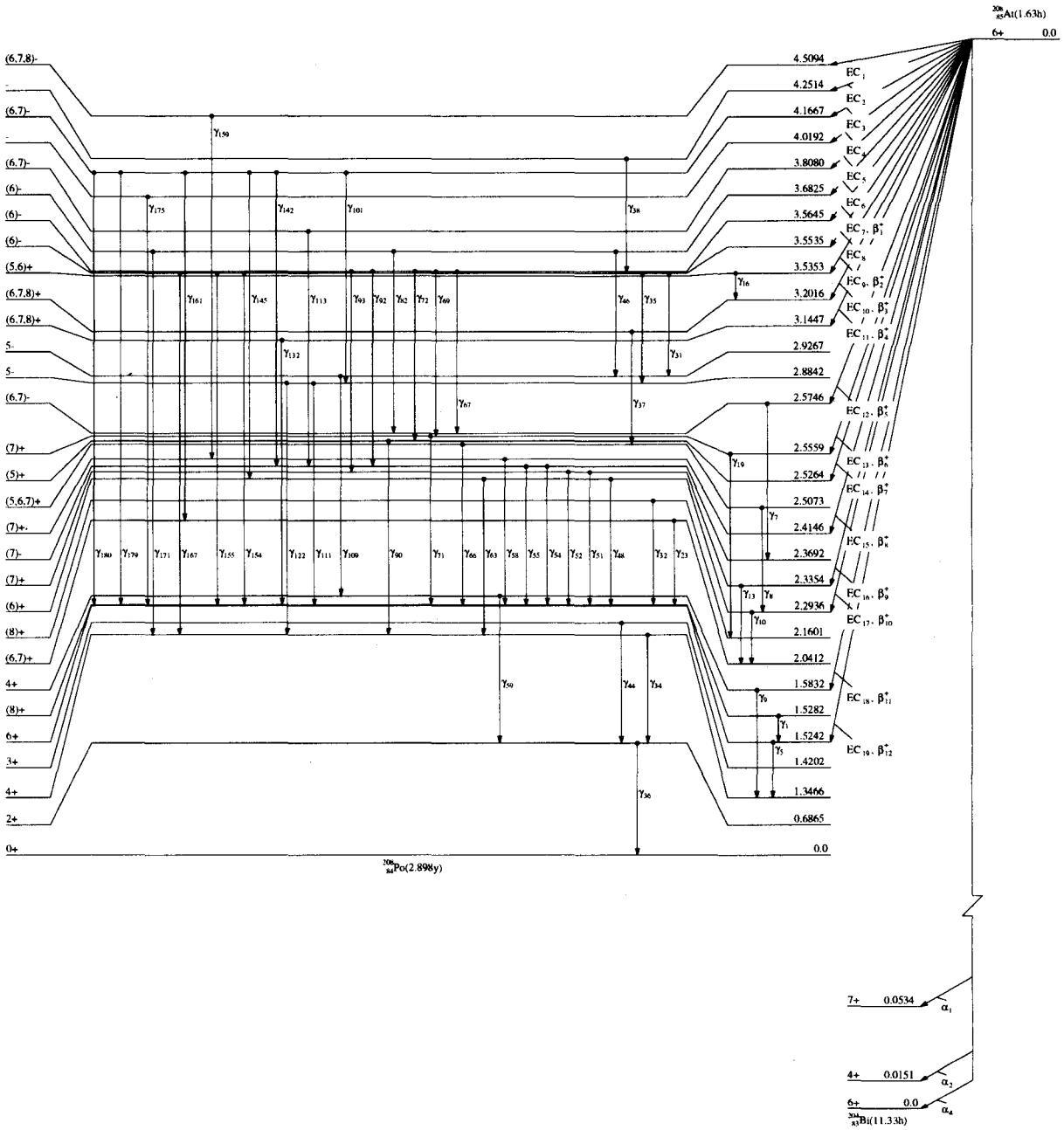
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	4.79E−05	5.588E+00	2.68E−04
α recoil	4.79E−05	1.096E−01	5.25E−06
α 2	1.18E−04	5.626E+00	6.63E−04
α recoil	1.18E−04	1.104E−01	1.30E−05
α 4	5.33E−03	5.640E+00	3.01E−02
α recoil	5.33E−03	1.107E−01	5.90E−04
β^+ 5	9.68E−04	6.391E−01*	6.19E−04
β^+ 6	4.62E−03	6.473E−01*	2.99E−03
β^+ 8	7.96E−04	7.091E−01*	5.64E−04
β^+ 9	2.26E−03	7.438E−01*	1.68E−03
β^+ 10	1.51E−03	7.620E−01*	1.15E−03
β^+ 11	5.06E−03	1.055E+00*	5.34E−03
β^+ 12	1.61E−02	1.101E+00*	1.78E−02
$\gamma^\pm$	6.35E−02	5.110E−01	3.25E−02
ce-N$^+$, γ 1	2.18E−01	4.020E−03*	8.77E−04
γ 5	4.86E−01	1.776E−01	8.63E−02
ce-K, γ 5	1.06E−01	8.449E−02	8.94E−03
ce-L$_1$, γ 5	1.63E−02	1.607E−01	2.62E−03
ce-L$_2$, γ 5	1.06E−01	1.614E−01	1.70E−02
ce-L$_3$, γ 5	6.40E−02	1.638E−01	1.05E−02
ce-M, γ 5	4.91E−02	1.743E−01*	8.55E−03
ce-N$^+$, γ 5	1.66E−02	1.776E−01*	2.95E−03
γ 7	6.34E−02	2.054E−01	1.30E−02
ce-K, γ 7	7.64E−02	1.123E−01	8.58E−03
ce-L$_1$, γ 7	1.21E−02	1.885E−01	2.28E−03
ce-M, γ 7	3.23E−03	2.021E−01*	6.52E−04
ce-K, γ 8	3.04E−03	1.205E−01	3.67E−04
ce-K, γ 9	3.48E−03	1.436E−01	4.99E−04
ce-K, γ 10	3.21E−03	1.592E−01	5.11E−04
ce-K, γ 13	4.83E−03	2.010E−01	9.70E−04
γ 16	2.10E−02	3.337E−01	7.00E−03
ce-K, γ 16	6.53E−03	2.406E−01	1.57E−03
ce-L$_1$, γ 16	1.03E−03	3.167E−01	3.25E−04
ce-K, γ 19	2.09E−03	3.026E−01	6.31E−04
γ 23	6.05E−02	5.171E−01	3.13E−02
ce-K, γ 23	6.02E−03	4.239E−01	2.55E−03
ce-L$_1$, γ 23	9.40E−04	5.001E−01	4.70E−04
ce-K, γ 31	2.54E−03	5.335E−01	1.36E−03
γ 32	3.22E−02	6.318E−01	2.03E−02
ce-K, γ 32	1.84E−03	5.387E−01	9.92E−04
γ 34	8.88E−01	6.600E−01	5.86E−01
ce-K, γ 34	1.14E−02	5.669E−01	6.46E−03
ce-L$_1$, γ 34	1.71E−03	6.431E−01	1.10E−03
ce-L$_2$, γ 34	9.82E−04	6.438E−01	6.32E−04
ce-M, γ 34	7.21E−04	6.567E−01*	4.74E−04
γ 35	9.27E−03	6.694E−01	6.20E−03
ce-K, γ 35	3.98E−03	5.763E−01	2.30E−03
ce-L$_1$, γ 35	6.17E−04	6.525E−01	4.03E−04
γ 36	9.76E−01	6.865E−01	6.70E−01
ce-K, γ 36	1.16E−02	5.934E−01	6.88E−03
ce-L$_1$, γ 36	1.74E−03	6.696E−01	1.17E−03
ce-L$_2$, γ 36	9.36E−04	6.703E−01	6.27E−04
ce-M, γ 36	7.07E−04	6.832E−01*	4.83E−04
γ 37	3.75E−02	6.943E−01	2.60E−02
ce-K, γ 37	9.64E−04	6.012E−01	5.79E−04
γ 38	1.38E−02	6.979E−01	9.60E−03
γ 44	1.40E−02	7.337E−01	1.02E−02
ce-K, γ 44	5.56E−04	6.406E−01	3.56E−04
γ 46	1.50E−02	7.559E−01	1.14E−02
ce-K, γ 46	4.99E−04	6.628E−01	3.30E−04
γ 48	2.08E−02	7.693E−01	1.60E−02
ce-K, γ 48	6.89E−04	6.762E−01	4.66E−04
γ 51	5.85E−02	8.071E−01	4.72E−02
ce-K, γ 51	1.77E−03	7.140E−01	1.27E−03
γ 52	1.21E−02	8.112E−01	9.81E−03
γ 54	8.49E−03	8.412E−01	7.14E−03
γ 55	1.97E−01	8.450E−01	1.67E−01
ce-K, γ 55	1.22E−03	7.519E−01	9.20E−04
γ 58	2.44E−02	8.863E−01	2.16E−02
ce-K, γ 58	4.34E−04	7.932E−01	3.44E−04
γ 59	5.37E−02	8.967E−01	4.81E−02
γ 62	9.56E−03	9.341E−01	8.93E−03
γ 63	1.72E−02	9.471E−01	1.63E−02
γ 66	4.57E−02	9.831E−01	4.49E−02
ce-K, γ 66	7.31E−04	8.900E−01	6.51E−04
γ 67	1.07E−01	9.899E−01	1.06E−01
ce-K, γ 67	1.63E−03	8.968E−01	1.46E−03
γ 69	2.24E−02	1.009E+00	2.26E−02
γ 71	1.68E−01	1.028E+00	1.72E−01
ce-K, γ 71	2.40E−03	9.346E−01	2.25E−03
ce-L$_1$, γ 71	3.69E−04	1.011E+00	3.73E−04
γ 72	6.54E−03	1.038E+00	6.79E−03
γ 82	5.56E−03	1.108E+00	6.16E−03
γ 90	1.07E−02	1.180E+00	1.27E−02
γ 92	1.47E−02	1.195E+00	1.76E−02
γ 93	3.12E−02	1.229E+00	3.84E−02
γ 101	5.37E−03	1.282E+00	6.88E−03
γ 109	2.08E−02	1.343E+00	2.79E−02
γ 111	9.27E−03	1.360E+00	1.26E−02
γ 113	1.16E−02	1.439E+00	1.67E−02
γ 122	1.73E−02	1.538E+00	2.66E−02
γ 125	6.73E−03	1.581E+00	1.06E−02
γ 132	6.63E−03	1.616E+00	1.07E−02
γ 142	7.80E−03	1.797E+00	1.40E−02
γ 145	5.27E−03	1.873E+00	9.87E−03
γ 154	3.41E−03	2.026E+00	6.92E−03
γ 155	1.55E−02	2.029E+00	3.15E−02
γ 157	5.66E−03	2.086E+00	1.18E−02
γ 159	4.29E−03	2.095E+00	8.99E−03
γ 161	8.78E−03	2.126E+00	1.87E−02
γ 162	3.22E−03	2.129E+00	6.85E−03
γ 165	3.90E−03	2.168E+00	8.46E−03
γ 167	4.88E−03	2.207E+00	1.08E−02
γ 171	4.68E−03	2.336E+00	1.09E−02
γ 172	3.71E−03	2.370E+00	8.79E−03
γ 175	7.71E−03	2.495E+00	1.92E−02
γ 179	2.08E−02	2.639E+00	5.48E−02
γ 180	5.27E−03	2.643E+00	1.39E−02
K$_{\alpha_1}$ X-ray	4.84E−01	7.929E−02	3.84E−02
K$_{\alpha_2}$ X-ray	2.89E−01	7.686E−02	2.22E−02
K$_{\beta_1}$ X-ray	1.10E−01	8.980E−02	9.91E−03
Auger-KLL	1.86E−02	6.134E−02*	1.14E−03
Auger-KLX	1.05E−02	7.419E−02*	7.80E−04
Auger-LMM	4.01E−01	8.625E−03*	3.46E−03
Auger-LMX	2.65E−01	1.143E−02*	3.03E−03
Auger-LXY	4.53E−02	1.361E−02*	6.17E−04
Auger-MXY	1.84E+00	3.145E−03*	5.79E−03
ΔE	6.60E−01	6.195E−04*	4.09E−04

Listed X, γ and $\gamma^\pm$ radiations	2.70E+00
Omitted X, γ and $\gamma^\pm$ radiations**	3.47E−01
Listed β, ce and Auger radiations	1.48E−01
Omitted β, ce and Auger radiations**	1.36E−02
Listed α and α recoil radiations	3.16E−02
Listed radiations	2.88E+00
Omitted radiations**	3.61E−01

* Average energy (MeV)
** Each omitted transition contributes <0.200 % to $\sum$y(i)×E(i) in its category.

Bi-204 daughter, yield 5.5E−03, is radioactive.

Po-208 daughter, yield 9.945E−01, is radioactive.



85-At-209

α: 06-OCT-93
EC, β^+: 13-NOV-91

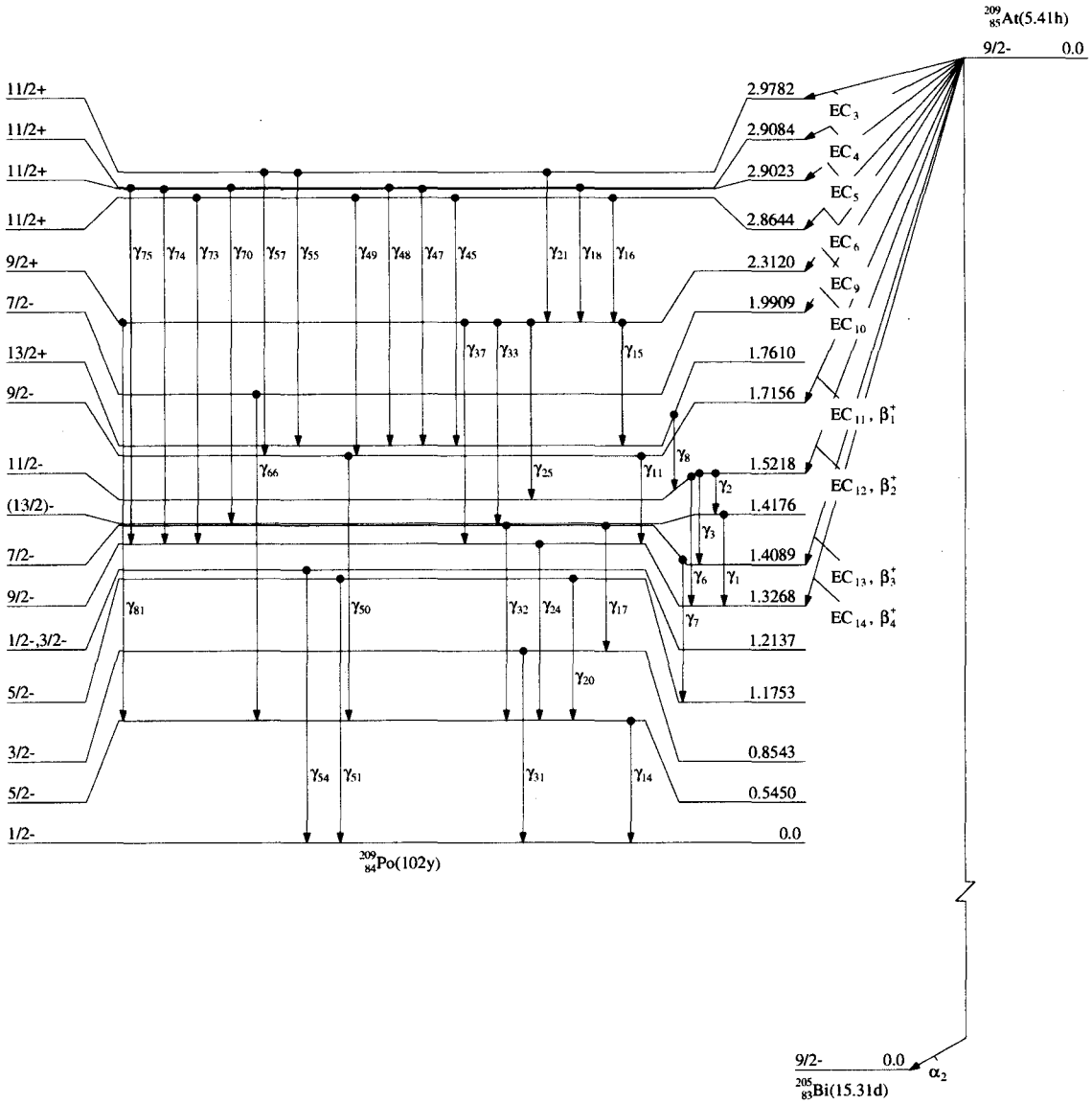
Half-life = 5.41 h
Decay mode(s): α, EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 2	4.10E−02	5.647E+00	2.31E−01
α recoil	4.10E−02	1.103E−01	4.52E−03
β^+ 2	5.64E−04	4.443E−01*	2.51E−04
ce-L$_1$, γ 1	3.18E−03	7.386E−02	2.35E−04
ce-L$_2$, γ 1	8.09E−02	7.456E−02	6.03E−03
ce-L$_3$, γ 1	6.45E−02	7.699E−02	4.96E−03
ce-M, γ 1	3.96E−02	8.750E−02*	3.46E−03
ce-N$^+$, γ 1	1.35E−02	9.080E−02*	1.22E−03
γ 2	2.37E−02	1.042E−01	2.46E−03
ce-K, γ 2	1.37E−01	1.108E−02	1.52E−03
ce-L$_1$, γ 2	2.23E−02	8.725E−02	1.94E−03
ce-L$_2$, γ 2	2.05E−02	8.794E−02	1.80E−03
ce-L$_3$, γ 2	1.40E−02	9.037E−02	1.27E−03
ce-M, γ 2	1.44E−02	1.009E−01*	1.45E−03
ce-N$^+$, γ 2	4.91E−03	1.042E−01*	5.11E−04
ce-L$_2$, γ 3	1.91E−03	9.686E−02	1.85E−04
ce-L$_3$, γ 3	1.41E−03	9.929E−02	1.40E−04
γ 6	2.26E−01	1.950E−01	4.40E−02
ce-K, γ 6	3.18E−01	1.019E−01	3.24E−02
ce-L$_1$, γ 6	5.03E−02	1.781E−01	8.95E−03
ce-L$_2$, γ 6	5.61E−03	1.788E−01	1.00E−03
ce-M, γ 6	1.33E−02	1.917E−01*	2.55E−03
ce-N$^+$, γ 6	4.49E−03	1.950E−01*	8.76E−04
ce-K, γ 7	7.19E−03	1.405E−01	1.01E−03
ce-L$_1$, γ 7	1.14E−03	2.167E−01	2.46E−04
γ 8	1.24E−01	2.392E−01	2.96E−02
ce-K, γ 8	5.38E−03	1.461E−01	7.86E−04
ce-L$_1$, γ 8	6.70E−04	2.223E−01	1.49E−04
ce-K, γ 11	8.80E−04	2.957E−01	2.60E−04
ce-K, γ 13	3.38E−04	3.545E−01	1.20E−04
γ 14	9.10E−01	5.450E−01	4.96E−01
ce-K, γ 14	1.71E−02	4.519E−01	7.71E−03
ce-L$_1$, γ 14	2.59E−03	5.281E−01	1.37E−03
ce-L$_2$, γ 14	2.04E−03	5.288E−01	1.08E−03
ce-L$_3$, γ 14	6.81E−04	5.312E−01	3.62E−04
ce-M, γ 14	1.32E−03	5.417E−01*	7.15E−04
ce-N$^+$, γ 14	4.50E−04	5.450E−01*	2.45E−04
γ 15	4.91E−02	5.510E−01	2.71E−02
ce-K, γ 15	9.01E−04	4.579E−01	4.13E−04
γ 16	1.55E−02	5.525E−01	8.55E−03
ce-K, γ 16	1.08E−03	4.594E−01	4.94E−04
γ 17	5.91E−03	5.546E−01	3.28E−03
γ 18	4.73E−03	5.962E−01	2.82E−03
γ 20	6.82E−03	6.303E−01	4.30E−03
ce-K, γ 20	4.04E−04	5.372E−01	2.17E−04
γ 21	1.87E−02	6.661E−01	1.24E−02
ce-K, γ 21	2.72E−04	5.730E−01	1.56E−04
γ 24	8.35E−01	7.819E−01	6.53E−01
ce-K, γ 24	7.73E−03	6.888E−01	5.33E−03
ce-L$_1$, γ 24	1.16E−03	7.650E−01	8.84E−04
ce-L$_2$, γ 24	5.04E−04	7.657E−01	3.86E−04
ce-M, γ 24	4.17E−04	7.786E−01*	3.25E−04
ce-N$^+$, γ 24	1.62E−04	7.819E−01*	1.27E−04
γ 25	6.35E−01	7.902E−01	5.02E−01
ce-K, γ 25	2.20E−03	6.971E−01	1.54E−03
ce-L$_1$, γ 25	2.98E−04	7.733E−01	2.30E−04
γ 31	5.82E−03	8.544E−01	4.98E−03
ce-K, γ 31	1.57E−04	7.613E−01	1.19E−04
γ 32	2.07E−02	8.639E−01	1.78E−02
ce-K, γ 32	3.37E−04	7.708E−01	2.60E−04
γ 33	3.65E−02	9.030E−01	3.29E−02
γ 37	8.46E−03	9.852E−01	8.34E−03
γ 45	5.40E−02	1.103E+00	5.96E−02
ce-K, γ 45	3.48E−04	1.010E+00	3.52E−04
γ 47	3.28E−03	1.141E+00	3.74E−03
γ 48	1.36E−02	1.148E+00	1.57E−02
γ 49	7.83E−03	1.149E+00	8.99E−03
γ 50	3.09E−02	1.171E+00	3.62E−02
ce-K, γ 50	1.36E−04	1.077E+00	1.46E−04
γ 51	1.91E−02	1.175E+00	2.25E−02
γ 54	4.28E−03	1.214E+00	5.19E−03
γ 55	1.11E−02	1.217E+00	1.35E−02
γ 57	1.89E−02	1.263E+00	2.39E−02
γ 58	2.00E−03	1.273E+00	2.55E−03
γ 66	5.37E−03	1.446E+00	7.76E−03
γ 70	2.73E−03	1.491E+00	4.07E−03
γ 72	1.73E−03	1.533E+00	2.65E−03
γ 73	4.91E−03	1.538E+00	7.56E−03
γ 74	8.64E−03	1.576E+00	1.36E−02
γ 75	1.79E−02	1.582E+00	2.84E−02
γ 76	1.73E−03	1.622E+00	2.80E−03
γ 78	3.73E−03	1.687E+00	6.29E−03
γ 81	5.10E−03	1.767E+00	9.00E−03
K$_{\alpha_1}$ X-ray	5.88E−01	7.929E−02	4.66E−02
K$_{\alpha_2}$ X-ray	3.51E−01	7.686E−02	2.70E−02
K$_{\beta_1}$ X-ray	1.34E−01	8.980E−02	1.20E−02
K$_{\beta_2}$ X-ray	6.35E−02	9.246E−02	5.87E−03
K$_{\beta_3}$ X-ray	6.99E−02	8.925E−02	6.24E−03
L$_\alpha$ X-ray	2.55E−01	1.112E−02*	2.84E−03
L$_\beta$ X-ray	2.58E−01	1.342E−02*	3.46E−03
Auger-KLL	2.26E−02	6.134E−02*	1.39E−03
Auger-KLX	1.28E−02	7.419E−02*	9.47E−04
Auger-KXY	2.09E−03	8.641E−02*	1.81E−04
Auger-LMM	4.82E−01	8.604E−03*	4.15E−03
Auger-LMX	3.19E−01	1.141E−02*	3.64E−03
Auger-LXY	5.46E−02	1.359E−02*	7.42E−04
Auger-MXY	2.08E+00	3.136E−03*	6.52E−03
ΔE	5.31E−01	5.775E−04*	3.07E−04

Listed X, γ and $\gamma^\pm$ radiations	2.23E+00
Omitted X, γ and $\gamma^\pm$ radiations**	6.04E−02
Listed β, ce and Auger radiations	1.14E−01
Omitted β, ce and Auger radiations**	3.70E−03
Listed α and α recoil radiations	2.36E−01
Omitted α and α recoil radiations	2.14E−04
Listed radiations	2.58E+00
Omitted radiations**	6.43E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Bi-205 daughter, yield 4.1E−02, is radioactive.
Po-209 daughter, yield 9.59E−01, is radioactive.


209 85 At(5.41h)
9/2- 0.0
11/2+
11/2+
11/2+
11/2+
9/2+
7/2-
13/2+
9/2-
11/2-
(13/2)-
7/2-
9/2-
1/2-,3/2-
5/2-
3/2-
5/2-
1/2-
2.9782
2.9084
2.9023
2.8644
2.3120
1.9909
1.7610
1.7156
1.5218
1.4176
1.4089
1.3268
1.2137
1.1753
0.8543
0.5450
0.0
EC3
EC4
EC5
EC6
EC9
EC10
EC11, β1+
EC12, β2+
EC13, β3+
EC14, β4+
209 84 Po(102y)
9/2- 0.0
205 83 Bi(15.31d)
α2

85-At-210

α: 10-FEB-94
EC, β^+: 03-MAR-92

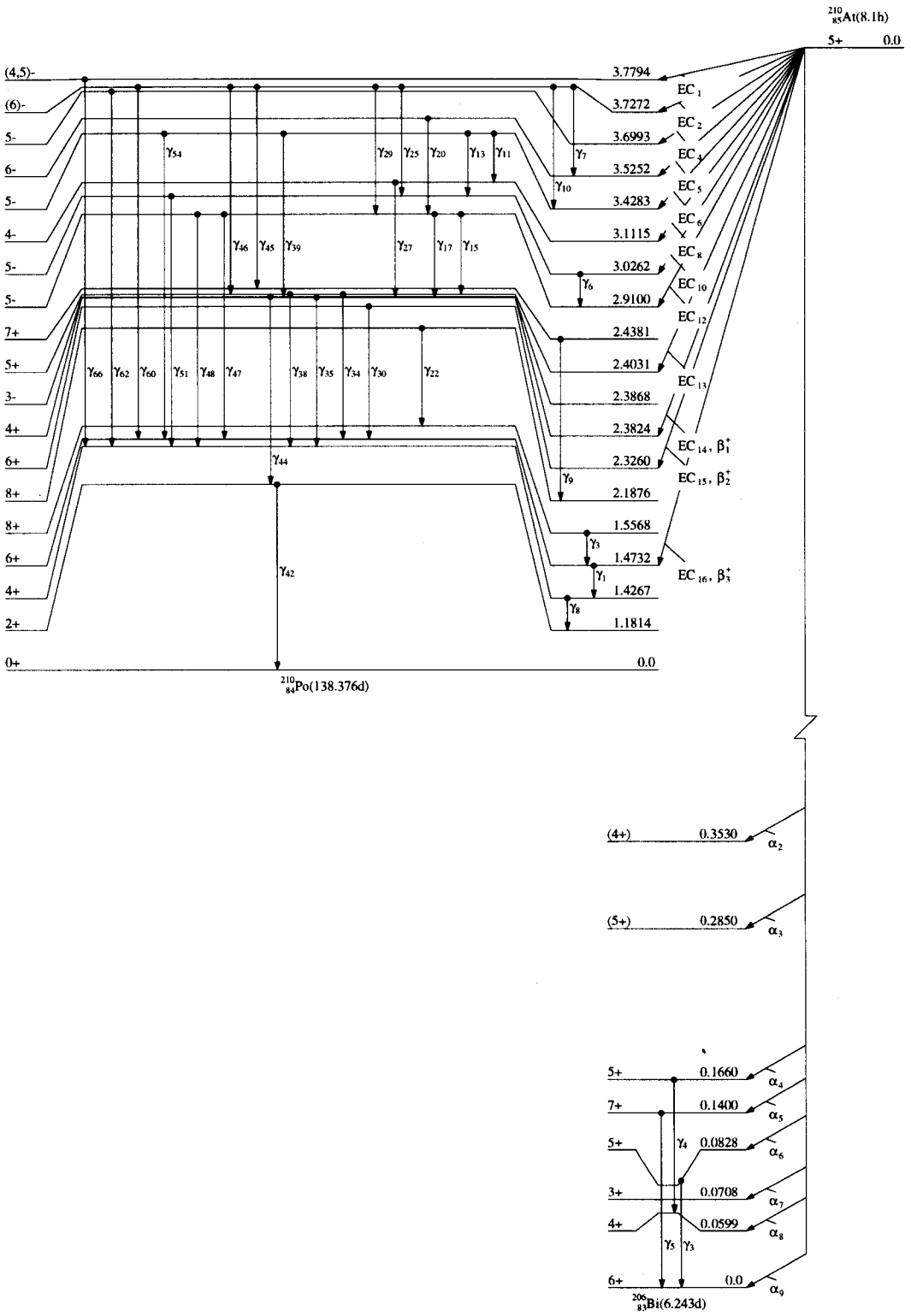
Half-life = 8.1 h
Decay mode(s): α, EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	6.62E−06	5.131E+00	3.40E−05
α recoil	6.62E−06	9.970E−02	6.60E−07
α 2	3.66E−06	5.178E+00	1.90E−05
α recoil	3.66E−06	1.006E−01	3.68E−07
α 3	1.57E−05	5.244E+00	8.23E−05
α recoil	1.57E−05	1.019E−01	1.60E−06
α 4	4.85E−04	5.361E+00	2.60E−03
α recoil	4.85E−04	1.042E−01	5.05E−05
α 5	8.02E−05	5.386E+00	4.32E−04
α recoil	8.02E−05	1.047E−01	8.39E−06
α 6	4.95E−04	5.443E+00	2.69E−03
α recoil	4.95E−04	1.057E−01	5.24E−05
α 7	6.97E−06	5.454E+00	3.80E−05
α recoil	6.97E−06	1.060E−01	7.39E−07
α 8	1.26E−04	5.465E+00	6.86E−04
α recoil	1.26E−04	1.062E−01	1.33E−05
α 9	5.32E−04	5.524E+00	2.94E−03
α recoil	5.32E−04	1.073E−01	5.71E−05
β^+ 3	8.80E−04	6.817E−01*	6.00E−04
ce-L_1, γ 1	3.14E−03	2.954E−02	9.28E−05
ce-L_2, γ 1	1.31E−01	3.024E−02	3.97E−03
ce-L_3, γ 1	1.28E−01	3.267E−02	4.17E−03
ce-M, γ 1	6.91E−02	4.318E−02*	2.98E−03
ce-N^+, γ 1	2.35E−02	4.648E−02*	1.09E−03
ce-L_2, γ 3	1.99E−03	6.730E−02	1.34E−04
ce-L_3, γ 3	1.63E−03	6.973E−02	1.14E−04
ce-K, γ 6	3.97E−02	2.310E−02	9.17E−04
ce-L_1, γ 6	6.33E−03	9.926E−02	6.28E−04
ce-M, γ 6	1.66E−03	1.129E−01*	1.88E−04
ce-K, γ 7	1.92E−03	1.087E−01	2.08E−04
γ 8	7.95E−01	2.453E−01	1.95E−01
ce-K, γ 8	8.48E−02	1.522E−01	1.29E−02
ce-L_1, γ 8	1.28E−02	2.284E−01	2.92E−03
ce-L_2, γ 8	4.32E−02	2.291E−01	9.90E−03
ce-L_3, γ 8	2.23E−02	2.315E−01	5.16E−03
ce-M, γ 8	2.05E−02	2.420E−01*	4.95E−03
ce-N^+, γ 8	6.86E−03	2.453E−01*	1.68E−03
ce-K, γ 9	1.47E−03	1.574E−01	2.32E−04
ce-K, γ 10	4.75E−04	2.057E−01	9.77E−05
ce-K, γ 11	6.25E−04	2.237E−01	1.40E−04
γ 13	7.75E−03	4.020E−01	3.11E−03
ce-K, γ 13	1.51E−03	3.089E−01	4.66E−04
ce-L_1, γ 13	2.36E−04	3.851E−01	9.09E−05
γ 15	6.85E−03	5.068E−01	3.47E−03
γ 17	1.14E−02	5.276E−01	6.03E−03
ce-K, γ 20	2.20E−04	5.222E−01	1.15E−04
ce-K, γ 22	1.52E−04	5.378E−01	8.20E−05
γ 25	4.67E−03	7.010E−01	3.27E−03
ce-K, γ 25	2.10E−04	6.079E−01	1.27E−04
γ 29	1.71E−02	8.172E−01	1.40E−02
ce-K, γ 29	4.34E−04	7.241E−01	3.14E−04
γ 30	1.38E−02	8.527E−01	1.18E−02
ce-K, γ 30	3.05E−04	7.596E−01	2.32E−04
γ 34	7.55E−03	9.299E−01	7.02E−03
ce-K, γ 34	1.25E−04	8.368E−01	1.05E−04
γ 35	1.80E−02	9.558E−01	1.72E−02
ce-K, γ 35	3.18E−04	8.627E−01	2.74E−04
γ 38	8.05E−03	9.765E−01	7.86E−03
ce-K, γ 38	1.26E−04	8.834E−01	1.11E−04
γ 39	2.98E−03	1.042E+00	3.10E−03
γ 42	9.93E−01	1.181E+00	1.17E+00
ce-K, γ 42	4.28E−03	1.088E+00	4.66E−03
ce-L_1, γ 42	6.32E−04	1.164E+00	7.36E−04
ce-L_2, γ 42	1.48E−04	1.165E+00	1.73E−04
ce-M, γ 42	1.51E−04	1.178E+00*	1.78E−04
ce-N^+, γ 42	9.52E−05	1.181E+00*	1.12E−04
γ 44	7.95E−03	1.205E+00	9.58E−03
γ 45	5.16E−03	1.289E+00	6.66E−03
γ 46	4.67E−03	1.324E+00	6.18E−03
γ 47	2.90E−01	1.437E+00	4.17E−01
ce-K, γ 47	3.50E−04	1.344E+00	4.70E−04
γ 48	4.65E−01	1.483E+00	6.90E−01
ce-K, γ 48	5.32E−04	1.390E+00	7.39E−04
ce-L_1, γ 48	7.29E−05	1.466E+00	1.07E−04
γ 51	1.34E−01	1.599E+00	2.14E−01
ce-K, γ 51	1.13E−04	1.506E+00	1.71E−04
γ 54	4.07E−03	1.955E+00	7.96E−03
γ 60	1.52E−02	2.254E+00	3.43E−02
γ 62	3.48E−03	2.273E+00	7.90E−03
γ 66	1.39E−03	2.353E+00	3.27E−03
K_{α_1} X-ray	4.29E−01	7.929E−02	3.40E−02
K_{α_2} X-ray	2.56E−01	7.686E−02	1.97E−02
K_{β_1} X-ray	9.77E−02	8.980E−02	8.77E−03
K_{β_2} X-ray	4.63E−02	9.246E−02	4.28E−03
K_{β_3} X-ray	5.10E−02	8.925E−02	4.55E−03
L_β X-ray	2.29E−01	1.342E−02*	3.08E−03
Auger-KLL	1.65E−02	6.134E−02*	1.01E−03
Auger-KLX	9.31E−03	7.419E−02*	6.90E−04
Auger-KXY	1.53E−03	8.641E−02*	1.32E−04
Auger-LMM	4.21E−01	8.635E−03*	3.63E−03
Auger-LMX	2.78E−01	1.144E−02*	3.18E−03
Auger-LXY	4.75E−02	1.362E−02*	6.48E−04
Auger-MXY	1.82E+00	3.108E−03*	5.66E−03
ΔE	4.76E−01	5.804E−04*	2.76E−04

Listed X, γ and $\gamma^\pm$ radiations	2.92E+00
Omitted X, γ and $\gamma^\pm$ radiations**	5.01E−02
Listed β, ce and Auger radiations	7.76E−02
Omitted β, ce and Auger radiations**	1.98E−03
Listed α and α recoil radiations	9.71E−03
Listed radiations	3.00E+00
Omitted radiations**	5.20E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Bi-206 daughter, yield 1.75E−03, is radioactive.
Po-210 daughter, yield 9.9825E−01, is radioactive.


210 85At(8.1h)
5+ 0.0
(4,5)- 3.7794
(6)- 3.7272
5- 3.6993
6- 3.5252
5- 3.4283
4- 3.1115
5- 3.0262
5- 2.9100
7+ 2.4381
5+ 2.4031
3- 2.3868
4+ 2.3824
6+ 2.3260
8+ 2.1876
8+ 1.5568
6+ 1.4732
4+ 1.4267
2+ 1.1814
0+ 0.0
210 84Po(138.376d)
EC 1
EC 2
EC 4
EC 5
EC 6
EC 8
EC 10
EC 12
EC 13
EC 14, β1+
EC 15, β2+
EC 16, β3+
γ54 γ29 γ25 γ20 γ13 γ11 γ7 γ10
γ46 γ45 γ39 γ27 γ17 γ15 γ6
γ66 γ62 γ60 γ51 γ48 γ47 γ38 γ35 γ34 γ30 γ22
γ44 γ9 γ3 γ1 γ8 γ42
(4+) 0.3530 α2
(5+) 0.2850 α3
5+ 0.1660 α4
7+ 0.1400 α5
5+ 0.0828 α6
3+ 0.0708 α7
4+ 0.0599 α8
6+ 0.0 α9
γ4 γ5 γ3
206 83Bi(6.243d)

86-Rn-209

13-NOV-91

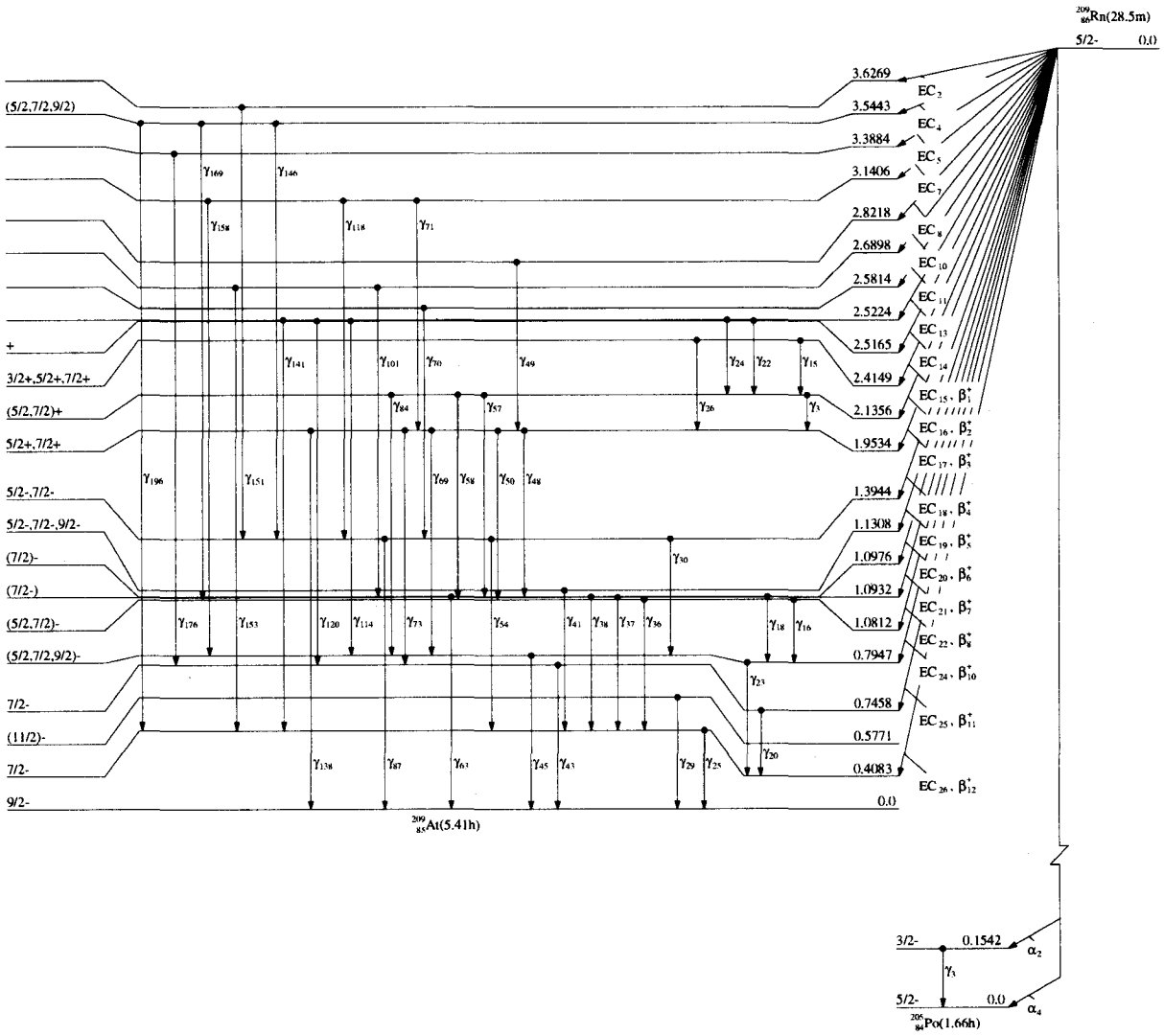
Half-life = 28.5 m
Decay mode(s): α, EC, β^+

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 2	3.74E−04	5.888E+00	2.20E−03
α recoil	3.74E−04	1.150E−01	4.30E−05
α 4	1.69E−01	6.039E+00	1.02E+00
α recoil	1.69E−01	1.179E−01	2.00E−02
β^+ 4	5.48E−04	6.943E−01*	3.81E−04
β^+ 6	5.00E−04	8.242E−01*	4.12E−04
β^+ 7	6.54E−04	8.261E−01*	5.41E−04
β^+ 8	6.16E−04	8.314E−01*	5.12E−04
β^+ 9	2.89E−04	8.957E−01*	2.59E−04
β^+ 10	1.73E−03	9.572E−01*	1.66E−03
β^+ 11	3.66E−02	9.787E−01*	3.58E−02
β^+ 12	1.83E−02	1.128E+00*	2.06E−02
$\gamma^\pm$	1.19E−01	5.110E−01	6.10E−02
ce-K, γ 3	3.00E−03	8.631E−02	2.59E−04
γ 15	1.11E−02	2.792E−01	3.09E−03
ce-K, γ 15	5.86E−03	1.835E−01	1.08E−03
ce-K, γ 16	1.60E−03	1.908E−01	3.05E−04
ce-K, γ 18	2.13E−03	2.071E−01	4.42E−04
γ 20	1.45E−01	3.374E−01	4.90E−02
ce-K, γ 20	4.93E−02	2.417E−01	1.19E−02
ce-L_1, γ 20	7.83E−03	3.200E−01	2.50E−03
ce-L_2, γ 20	8.39E−04	3.207E−01	2.69E−04
ce-M, γ 20	2.05E−03	3.340E−01*	6.86E−04
ce-K, γ 22	1.17E−03	2.850E−01	3.34E−04
γ 23	2.06E−02	3.864E−01	7.97E−03
ce-K, γ 23	4.86E−03	2.906E−01	1.41E−03
ce-L_1, γ 23	7.71E−04	3.689E−01	2.84E−04
γ 24	2.06E−02	3.868E−01	7.98E−03
γ 25	5.03E−01	4.083E−01	2.05E−01
ce-K, γ 25	1.77E−02	3.126E−01	5.52E−03
ce-L_1, γ 25	2.75E−03	3.908E−01	1.07E−03
ce-L_2, γ 25	3.77E−03	3.915E−01	1.48E−03
ce-L_3, γ 25	1.43E−03	3.941E−01	5.65E−04
ce-M, γ 25	2.04E−03	4.049E−01*	8.27E−04
ce-N^+, γ 25	6.91E−04	4.083E−01*	2.82E−04
γ 26	1.44E−02	4.614E−01	6.65E−03
ce-K, γ 26	1.91E−03	3.657E−01	6.98E−04
γ 29	9.78E−03	5.771E−01	5.64E−03
ce-K, γ 29	6.09E−04	4.814E−01	2.93E−04
γ 30	5.80E−03	5.994E−01	3.48E−03
γ 36	3.27E−02	6.728E−01	2.20E−02
ce-K, γ 37	1.06E−02	5.892E−01	6.23E−03
ce-L_1, γ 37	1.84E−03	6.674E−01	1.23E−03
ce-M, γ 37	4.39E−04	6.815E−01*	2.99E−04
γ 38	9.67E−02	6.893E−01	6.67E−02
ce-K, γ 38	4.65E−03	5.935E−01	2.76E−03
ce-L_1, γ 38	7.28E−04	6.718E−01	4.89E−04
γ 41	4.13E−03	7.225E−01	2.98E−03
γ 43	2.28E−01	7.458E−01	1.70E−01
ce-K, γ 43	8.67E−03	6.501E−01	5.64E−03
ce-L_1, γ 43	1.36E−03	7.283E−01	9.88E−04
ce-M, γ 43	3.65E−04	7.424E−01*	2.71E−04
γ 44	5.59E−03	7.616E−01	4.26E−03
γ 45	3.36E−02	7.947E−01	2.67E−02
γ 48	4.87E−02	8.558E−01	4.17E−02
γ 49	3.33E−03	8.684E−01	2.89E−03
γ 50	6.99E−03	8.724E−01	6.10E−03
γ 54	5.37E−03	9.859E−01	5.30E−03
γ 57	4.16E−02	1.038E+00	4.32E−02
γ 58	1.63E−02	1.055E+00	1.72E−02
γ 59	5.59E−03	1.059E+00	5.92E−03
γ 60	1.70E−02	1.066E+00	1.81E−02
γ 63	2.36E−03	1.098E+00	2.60E−03
γ 69	8.38E−03	1.159E+00	9.72E−03
γ 70	4.19E−03	1.187E+00	4.97E−03
γ 71	4.19E−03	1.187E+00	4.97E−03
γ 73	2.43E−03	1.207E+00	2.93E−03
γ 80	2.17E−03	1.298E+00	2.82E−03
γ 84	4.94E−03	1.341E+00	6.63E−03
γ 87	9.78E−03	1.394E+00	1.36E−02
γ 97	8.06E−03	1.543E+00	1.24E−02
γ 101	1.88E−03	1.592E+00	2.99E−03
γ 113	6.66E−03	1.709E+00	1.14E−02
γ 114	1.40E−03	1.722E+00	2.41E−03
γ 118	1.46E−03	1.746E+00	2.55E−03
γ 120	1.91E−03	1.771E+00	3.39E−03
γ 125	1.64E−03	1.796E+00	2.95E−03
γ 136	2.71E−03	1.926E+00	5.22E−03
γ 138	1.30E−03	1.954E+00	2.54E−03
γ 141	3.30E−03	2.114E+00	6.98E−03
γ 146	1.52E−03	2.150E+00	3.26E−03
γ 149	1.10E−03	2.195E+00	2.41E−03
γ 151	1.07E−03	2.233E+00	2.40E−03
γ 152	1.07E−03	2.251E+00	2.42E−03
γ 153	1.11E−03	2.282E+00	2.53E−03
γ 157	1.07E−03	2.336E+00	2.51E−03
γ 158	1.16E−03	2.346E+00	2.72E−03
γ 159	1.07E−03	2.369E+00	2.55E−03
γ 161	1.07E−03	2.404E+00	2.58E−03
γ 164	1.07E−03	2.437E+00	2.62E−03
γ 168	1.73E−03	2.461E+00	4.26E−03
γ 169	1.00E−03	2.464E+00	2.46E−03
γ 170	1.00E−03	2.476E+00	2.47E−03
γ 171	9.57E−04	2.486E+00	2.38E−03
γ 172	1.07E−03	2.496E+00	2.68E−03
γ 174	1.14E−03	2.556E+00	2.91E−03
γ 176	3.12E−03	2.643E+00	8.24E−03
γ 184	1.07E−03	2.810E+00	3.02E−03
γ 188	1.07E−03	2.932E+00	3.15E−03
γ 190	1.31E−03	2.942E+00	3.86E−03
γ 196	1.29E−03	3.136E+00	4.04E−03
K_{α_1} X-ray	3.44E−01	8.152E−02	2.80E−02
K_{α_2} X-ray	2.06E−01	7.895E−02	1.63E−02
K_{β_1} X-ray	7.84E−02	9.230E−02	7.24E−03
K_{β_2} X-ray	3.80E−02	9.506E−02	3.61E−03
K_{β_3} X-ray	4.10E−02	9.172E−02	3.76E−03
Auger-KLL	1.28E−02	6.292E−02*	8.04E−04
Auger-KLX	7.25E−03	7.621E−02*	5.52E−04
Auger-LMM	2.42E−01	8.799E−03*	2.13E−03
Auger-LMX	1.61E−01	1.170E−02*	1.89E−03
Auger-LXY	2.77E−02	1.395E−02*	3.87E−04
Auger-MXY	1.05E+00	3.288E−03*	3.46E−03

Listed X, γ and $\gamma^\pm$ radiations	1.01E+00
Omitted X, γ and $\gamma^\pm$ radiations**	1.79E−01
Listed β, ce and Auger radiations	1.18E−01
Omitted β, ce and Auger radiations**	8.13E−03
Listed α and α recoil radiations	1.04E+00
Omitted α and α recoil radiations	1.67E−03
Listed radiations	2.17E+00
Omitted radiations**	1.89E−01

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Po-205 daughter, yield 1.70E−01, is radioactive.
At-209 daughter, yield 8.30E−01, is radioactive.


209 86 Rn(28.5m)
5/2- 0.0
3.6269
3.5443
3.3884
3.1406
2.8218
2.6898
2.5814
2.5224
2.5165
2.4149
2.1356
1.9534
1.3944
1.1308
1.0976
1.0932
1.0812
0.7947
0.7458
0.5771
0.4083
0.0
(5/2,7/2,9/2)
+
3/2+,5/2+,7/2+
(5/2,7/2)+
5/2+,7/2+
5/2-,7/2-
5/2-,7/2-,9/2-
(7/2)-
(7/2-)
(5/2,7/2)-
(5/2,7/2,9/2)-
7/2-
(11/2)-
7/2-
9/2-
209 85 At(5.41h)
3/2- 0.1542
5/2- 0.0
205 84 Po(1.66h)

86-Rn-210

03-MAR-92

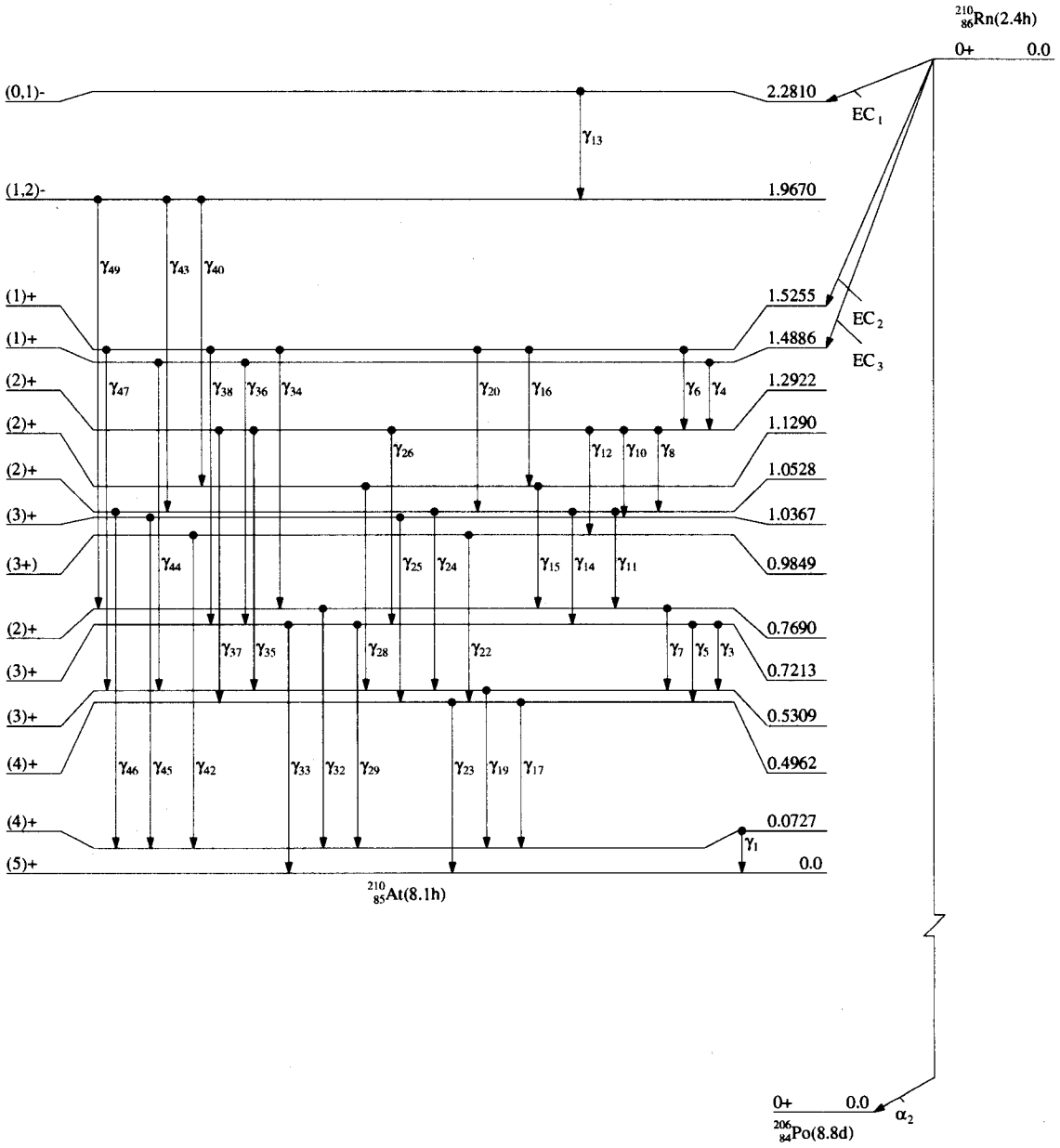
Half-life = 2.4 h
Decay mode(s): α, EC

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 2	9.60E−01	6.041E+00	5.80E+00
α recoil	9.60E−01	1.174E−01	1.13E−01
γ 1	5.90E−03	7.270E−02	4.29E−04
ce-L_1, γ 1	2.48E−02	5.521E−02	1.37E−03
ce-L_2, γ 1	2.65E−03	5.592E−02	1.48E−04
ce-L_3, γ 1	1.90E−04	5.849E−02	1.11E−05
ce-M, γ 1	6.55E−03	6.927E−02*	4.54E−04
ce-N^+, γ 1	2.25E−03	7.270E−02*	1.63E−04
ce-L_2, γ 2	8.56E−05	1.305E−01	1.12E−05
γ 3	1.46E−03	1.903E−01	2.78E−04
ce-K, γ 3	2.41E−03	9.462E−02	2.28E−04
ce-L_1, γ 3	3.87E−04	1.729E−01	6.68E−05
ce-M, γ 3	1.02E−04	1.869E−01*	1.91E−05
γ 4	3.33E−03	1.963E−01	6.54E−04
ce-K, γ 4	5.04E−03	1.006E−01	5.07E−04
ce-L_1, γ 4	8.06E−04	1.788E−01	1.44E−04
ce-L_2, γ 4	8.74E−05	1.795E−01	1.57E−05
ce-M, γ 4	2.14E−04	1.929E−01*	4.12E−05
ce-N^+, γ 4	7.31E−05	1.963E−01*	1.43E−05
γ 5	5.10E−04	2.251E−01	1.15E−04
ce-K, γ 5	5.24E−04	1.294E−01	6.78E−05
ce-L_1, γ 5	8.40E−05	2.076E−01	1.74E−05
γ 6	5.24E−03	2.333E−01	1.22E−03
ce-K, γ 6	4.88E−03	1.376E−01	6.71E−04
ce-L_1, γ 6	7.80E−04	2.158E−01	1.68E−04
ce-L_2, γ 6	8.45E−05	2.165E−01	1.83E−05
ce-M, γ 6	2.06E−04	2.299E−01*	4.75E−05
ce-N^+, γ 6	7.06E−05	2.333E−01*	1.65E−05
γ 7	1.50E−03	2.381E−01	3.56E−04
ce-K, γ 7	1.32E−03	1.424E−01	1.88E−04
ce-L_1, γ 7	2.11E−04	2.206E−01	4.64E−05
ce-M, γ 7	5.57E−05	2.347E−01*	1.31E−05
ce-K, γ 8	1.48E−04	1.438E−01	2.12E−05
γ 10	9.86E−04	2.555E−01	2.52E−04
ce-K, γ 10	7.18E−04	1.598E−01	1.15E−04
ce-L_1, γ 10	1.14E−04	2.380E−01	2.72E−05
γ 11	5.10E−04	2.837E−01	1.45E−04
ce-K, γ 11	2.78E−04	1.880E−01	5.23E−05
ce-L_1, γ 11	4.42E−05	2.663E−01	1.18E−05
γ 12	7.99E−04	3.073E−01	2.46E−04
ce-K, γ 12	3.50E−04	2.116E−01	7.41E−05
ce-L_1, γ 12	5.57E−05	2.898E−01	1.61E−05
γ 13	3.84E−03	3.140E−01	1.21E−03
ce-K, γ 13	1.59E−03	2.183E−01	3.47E−04
ce-L_1, γ 13	2.52E−04	2.965E−01	7.48E−05
ce-M, γ 13	6.63E−05	3.106E−01*	2.06E−05
ce-K, γ 14	6.05E−05	2.360E−01	1.43E−05
γ 15	4.88E−04	3.600E−01	1.76E−04
ce-K, γ 15	1.39E−04	2.643E−01	3.68E−05
γ 16	4.68E−04	3.965E−01	1.85E−04
ce-K, γ 16	1.03E−04	3.008E−01	3.09E−05
γ 17	1.55E−03	4.235E−01	6.55E−04
ce-K, γ 17	2.85E−04	3.278E−01	9.34E−05
ce-L_1, γ 17	4.51E−05	4.060E−01	1.83E−05
γ 18	3.57E−04	4.378E−01	1.56E−04
ce-K, γ 18	6.02E−05	3.421E−01	2.06E−05
γ 19	1.70E−02	4.582E−01	7.79E−03
ce-K, γ 19	1.88E−03	3.625E−01	6.83E−04
ce-L_1, γ 19	2.97E−04	4.408E−01	1.31E−04
ce-L_2, γ 19	5.45E−05	4.415E−01	2.41E−05
ce-M, γ 19	8.65E−05	4.548E−01*	3.93E−05
ce-N^+, γ 19	2.95E−05	4.582E−01*	1.35E−05
γ 20	1.27E−03	4.728E−01	6.03E−04
ce-K, γ 20	1.75E−04	3.771E−01	6.61E−05
ce-L_1, γ 20	2.76E−05	4.553E−01	1.26E−05
γ 22	3.74E−04	4.887E−01	1.83E−04
ce-K, γ 22	4.71E−05	3.930E−01	1.85E−05
γ 23	1.46E−03	4.961E−01	7.25E−04
ce-K, γ 23	1.77E−04	4.004E−01	7.08E−05
ce-L_1, γ 23	2.78E−05	4.787E−01	1.33E−05
γ 24	1.21E−03	5.219E−01	6.30E−04
ce-K, γ 24	1.28E−04	4.262E−01	5.44E−05
ce-L_1, γ 24	2.01E−05	5.044E−01	1.01E−05
γ 25	6.46E−04	5.400E−01	3.49E−04
ce-K, γ 25	6.24E−05	4.443E−01	2.77E−05
γ 26	8.40E−03	5.709E−01	4.79E−03
ce-K, γ 26	7.00E−04	4.752E−01	3.33E−04
ce-L_1, γ 26	1.10E−04	5.535E−01	6.09E−05
ce-M, γ 26	2.89E−05	5.675E−01*	1.64E−05
γ 27	3.91E−04	5.919E−01	2.31E−04
γ 28	7.65E−04	5.982E−01	4.58E−04
ce-K, γ 28	5.64E−05	5.025E−01	2.83E−05
γ 29	8.43E−03	6.487E−01	5.47E−03
ce-K, γ 29	5.02E−04	5.530E−01	2.78E−04
ce-L_1, γ 29	7.88E−05	6.312E−01	4.98E−05
ce-M, γ 29	2.08E−05	6.453E−01*	1.34E−05
γ 30	3.40E−04	6.730E−01	2.29E−04
γ 31	1.70E−04	6.890E−01	1.17E−04
γ 32	2.92E−03	6.963E−01	2.04E−03
ce-K, γ 32	3.51E−05	6.005E−01	2.11E−05
γ 33	6.90E−04	7.212E−01	4.98E−04
γ 34	1.67E−03	7.566E−01	1.26E−03
ce-K, γ 34	6.65E−05	6.609E−01	4.39E−05
γ 35	5.39E−03	7.614E−01	4.10E−03
ce-K, γ 35	2.12E−04	6.657E−01	1.41E−04
ce-L_1, γ 35	3.31E−05	7.439E−01	2.46E−05
γ 36	3.31E−03	7.673E−01	2.54E−03
ce-K, γ 36	3.32E−05	6.716E−01	2.23E−05
γ 37	1.36E−04	7.960E−01	1.08E−04
γ 38	1.39E−03	8.042E−01	1.12E−03
ce-K, γ 38	1.28E−05	7.085E−01	9.05E−06
γ 40	1.53E−04	8.370E−01	1.28E−04
γ 41	4.76E−04	8.797E−01	4.19E−04
γ 42	5.95E−04	9.119E−01	5.43E−04
ce-K, γ 42	1.47E−05	8.162E−01	1.20E−05
γ 43	2.96E−03	9.142E−01	2.70E−03
γ 44	2.82E−03	9.578E−01	2.70E−03
ce-K, γ 44	1.87E−05	8.620E−01	1.61E−05
γ 45	1.29E−03	9.641E−01	1.25E−03
ce-K, γ 45	2.76E−05	8.683E−01	2.39E−05
γ 46	2.77E−03	9.801E−01	2.72E−03
ce-K, γ 46	1.76E−05	8.844E−01	1.56E−05
γ 47	2.94E−03	9.946E−01	2.93E−03
ce-K, γ 47	1.82E−05	8.989E−01	1.64E−05
γ 48	1.02E−04	1.164E+00	1.19E−04
γ 49	2.35E−03	1.198E+00	2.81E−03
γ 50	4.59E−04	1.202E+00	5.52E−04
K_{α_1} X-ray	2.32E−02	8.152E−02	1.89E−03
K_{α_2} X-ray	1.39E−02	7.895E−02	1.10E−03
K_{β_1} X-ray	5.29E−03	9.230E−02	4.88E−04
K_{β_2} X-ray	2.56E−03	9.506E−02	2.43E−04
K_{β_3} X-ray	2.76E−03	9.172E−02	2.53E−04
L_α X-ray	1.44E−02	1.141E−02*	1.65E−04
L_β X-ray	1.53E−02	1.382E−02*	2.11E−04
Auger-KLL	8.61E−04	6.292E−02*	5.42E−05
Auger-KLX	4.88E−04	7.621E−02*	3.72E−05
Auger-LMM	2.61E−02	8.876E−03*	2.32E−04
Auger-LMX	1.75E−02	1.178E−02*	2.06E−04
Auger-LXY	3.02E−03	1.404E−02*	4.24E−05
Auger-MXY	1.15E−01	3.223E−03*	3.72E−04
ΔE	3.13E−02	6.255E−04*	1.96E−05
Listed X, γ and $\gamma^{\pm}$ radiations			6.05E−02

Omitted X, γ and $\gamma^{\pm}$ radiations**	3.13E−04
Listed β, ce and Auger radiations	8.67E−03
Omitted β, ce and Auger radiations**	3.31E−04
Listed α and α recoil radiations	5.91E+00
Omitted α and α recoil radiations	2.93E−04
Listed radiations	5.98E+00
Omitted radiations**	9.37E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Po-206 daughter, yield 9.60E−01, is radioactive.
At-210 daughter, yield 4.0E−02, is radioactive.



86-Rn-211

08-NOV-96

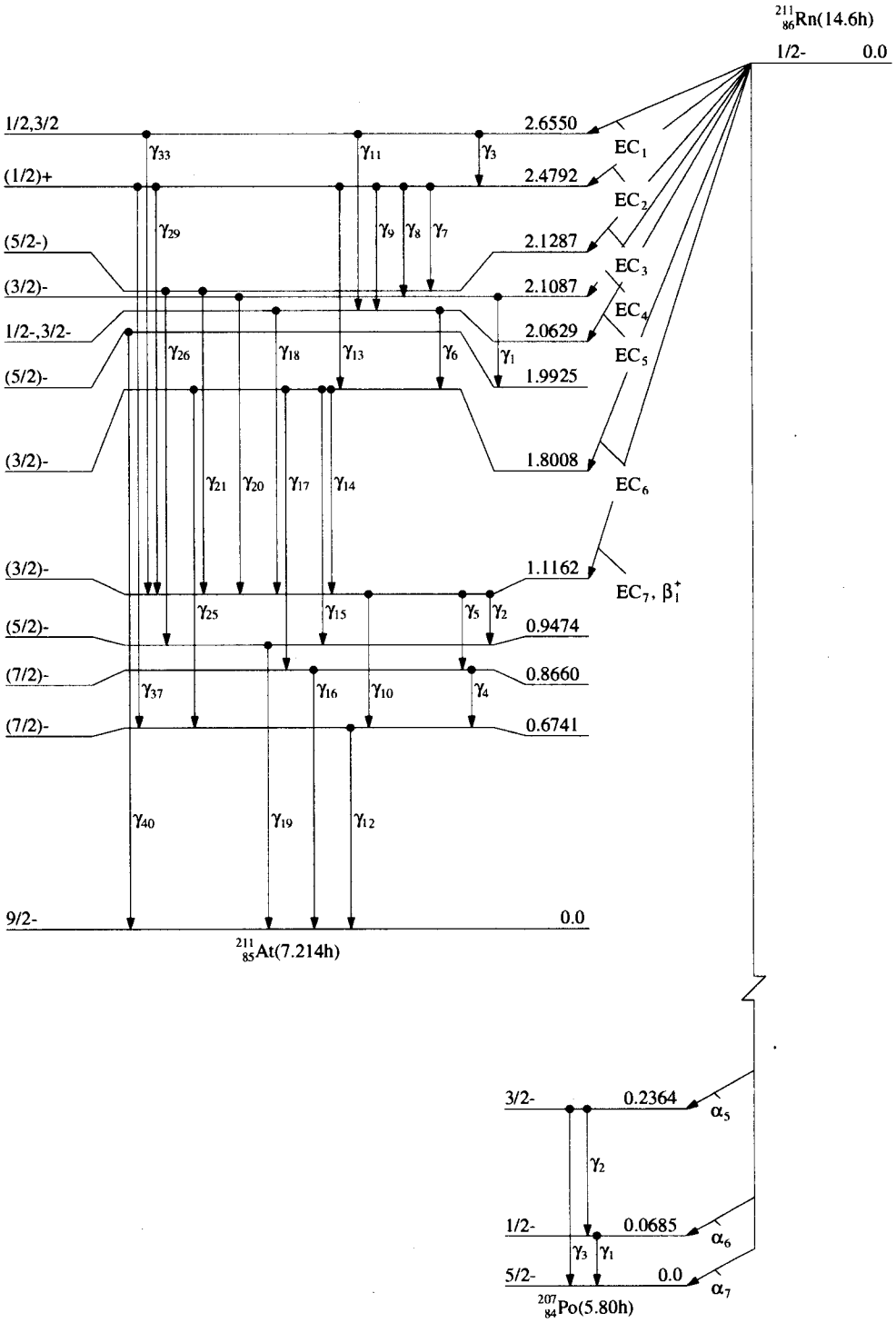
Half-life = 14.6 h
Decay mode(s): α, EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 5	7.42E−03	5.619E+00	4.17E−02
α recoil	7.42E−03	1.086E−01	8.06E−04
α 6	1.73E−01	5.784E+00	1.00E+00
α recoil	1.73E−01	1.118E−01	1.94E−02
α 7	9.34E−02	5.851E+00	5.47E−01
α recoil	9.34E−02	1.131E−01	1.06E−02
ce-L$_1$, γ 1	1.84E−03	5.156E−02	9.51E−05
ce-L$_2$, γ 1	6.81E−02	5.226E−02	3.56E−03
ce-L$_3$, γ 1	5.96E−02	5.469E−02	3.26E−03
ce-M, γ 1	3.44E−02	6.520E−02*	2.25E−03
ce-N$^+$, γ 1	1.16E−02	6.850E−02*	7.96E−04
ce-K, γ 2	1.44E−03	7.479E−02	1.08E−04
ce-K, γ 3	5.08E−04	1.433E−01	7.27E−05
Auger-LMM	4.39E−02	8.823E−03*	3.87E−04
Auger-LMX	2.89E−02	1.162E−02*	3.36E−04
Auger-LXY	4.91E−03	1.380E−02*	6.77E−05
Auger-MXY	1.94E−01	2.970E−03*	5.77E−04
ce-K, γ 1	5.45E−03	2.027E−02	1.10E−04
ce-L$_1$, γ 1	8.82E−04	9.851E−02	8.69E−05
γ 2	6.72E−02	1.687E−01	1.13E−02
ce-K, γ 2	3.08E−02	7.297E−02	2.25E−03
ce-L$_1$, γ 2	5.02E−03	1.512E−01	7.59E−04
ce-L$_2$, γ 2	1.82E−02	1.519E−01	2.76E−03
ce-L$_3$, γ 2	1.09E−02	1.545E−01	1.69E−03
ce-M, γ 2	8.97E−03	1.653E−01*	1.48E−03
ce-N$^+$, γ 2	3.08E−03	1.687E−01*	5.19E−04
ce-K, γ 3	1.30E−03	8.027E−02	1.04E−04
ce-K, γ 4	1.45E−02	9.607E−02	1.39E−03
ce-L$_1$, γ 4	2.33E−03	1.743E−01	4.05E−04
ce-M, γ 4	6.17E−04	1.884E−01*	1.16E−04
γ 5	6.00E−02	2.502E−01	1.50E−02
ce-K, γ 5	6.18E−03	1.545E−01	9.55E−04
ce-L$_1$, γ 5	9.62E−04	2.327E−01	2.24E−04
ce-L$_2$, γ 5	3.29E−03	2.334E−01	7.69E−04
ce-L$_3$, γ 5	1.65E−03	2.360E−01	3.88E−04
ce-M, γ 5	1.55E−03	2.468E−01*	3.82E−04
ce-N$^+$, γ 5	5.28E−04	2.502E−01*	1.32E−04
ce-K, γ 6	1.50E−03	1.664E−01	2.50E−04
ce-K, γ 7	3.71E−03	2.548E−01	9.46E−04
ce-L$_1$, γ 7	7.63E−04	3.330E−01	2.54E−04
ce-M, γ 7	2.28E−04	3.471E−01*	7.93E−05
γ 8	1.35E−02	3.705E−01	5.01E−03
γ 9	3.47E−02	4.164E−01	1.45E−02
ce-K, γ 9	4.46E−04	3.207E−01	1.43E−04
γ 10	2.30E−01	4.422E−01	1.02E−01
ce-K, γ 10	6.83E−03	3.465E−01	2.37E−03
ce-L$_1$, γ 10	1.06E−03	4.247E−01	4.51E−04
ce-L$_2$, γ 10	1.26E−03	4.254E−01	5.37E−04
ce-L$_3$, γ 10	4.59E−04	4.280E−01	1.97E−04
ce-M, γ 10	7.11E−04	4.388E−01*	3.12E−04
ce-N$^+$, γ 10	2.41E−04	4.422E−01*	1.06E−04
ce-K, γ 11	1.98E−04	4.966E−01	9.82E−05
γ 12	4.51E−01	6.741E−01	3.04E−01
ce-K, γ 12	1.88E−02	5.784E−01	1.09E−02
ce-L$_1$, γ 12	2.94E−03	6.566E−01	1.93E−03
ce-L$_2$, γ 12	4.23E−04	6.573E−01	2.78E−04
ce-M, γ 12	8.18E−04	6.707E−01*	5.49E−04
ce-N$^+$, γ 12	2.81E−04	6.741E−01*	1.90E−04
γ 13	2.89E−01	6.784E−01	1.96E−01
ce-K, γ 13	3.20E−03	5.827E−01	1.86E−03
ce-L$_1$, γ 13	5.16E−04	6.609E−01	3.41E−04
ce-M, γ 13	1.46E−04	6.750E−01*	9.89E−05
γ 14	5.86E−03	6.847E−01	4.01E−03
ce-K, γ 14	3.03E−04	5.890E−01	1.79E−04
γ 15	4.60E−02	8.534E−01	3.92E−02
ce-K, γ 15	1.22E−03	7.577E−01	9.26E−04
ce-L$_1$, γ 15	1.91E−04	8.359E−01	1.59E−04
γ 16	7.89E−02	8.660E−01	6.83E−02
ce-K, γ 16	6.30E−04	7.703E−01	4.85E−04
ce-L$_1$, γ 16	9.52E−05	8.485E−01	8.07E−05
γ 17	3.65E−02	9.347E−01	3.41E−02
ce-K, γ 17	2.53E−04	8.390E−01	2.13E−04
γ 18	4.96E−02	9.467E−01	4.69E−02
ce-K, γ 18	1.11E−03	8.510E−01	9.44E−04
ce-L$_1$, γ 18	1.73E−04	9.292E−01	1.61E−04
γ 19	1.62E−01	9.474E−01	1.54E−01
ce-K, γ 19	1.10E−03	8.517E−01	9.35E−04
ce-L$_1$, γ 19	1.65E−04	9.299E−01	1.54E−04
γ 20	1.35E−02	9.925E−01	1.34E−02
ce-K, γ 20	2.68E−04	8.968E−01	2.40E−04
γ 21	2.12E−03	1.013E+00	2.15E−03
γ 25	2.21E−01	1.127E+00	2.49E−01
ce-K, γ 25	1.09E−03	1.031E+00	1.12E−03
ce-L$_1$, γ 25	1.63E−04	1.109E+00	1.80E−04
γ 26	1.44E−02	1.181E+00	1.70E−02
ce-K, γ 26	1.83E−04	1.086E+00	1.98E−04
γ 29	3.25E−01	1.363E+00	4.42E−01
ce-K, γ 29	4.51E−04	1.267E+00	5.72E−04
ce-L$_1$, γ 29	6.43E−05	1.345E+00	8.65E−05
γ 33	4.69E−02	1.539E+00	7.22E−02
ce-K, γ 33	3.02E−04	1.443E+00	4.35E−04
ce-L$_1$, γ 33	4.70E−05	1.521E+00	7.15E−05
γ 37	1.17E−03	1.805E+00	2.12E−03
γ 40	5.00E−03	1.993E+00	9.97E−03
K$_{\alpha_1}$ X-ray	2.94E−01	8.152E−02	2.39E−02
K$_{\alpha_2}$ X-ray	1.76E−01	7.895E−02	1.39E−02
K$_{\beta_1}$ X-ray	6.70E−02	9.230E−02	6.18E−03
K$_{\beta_2}$ X-ray	3.25E−02	9.506E−02	3.09E−03
K$_{\beta_3}$ X-ray	3.50E−02	9.172E−02	3.21E−03
Auger-KLL	1.09E−02	6.292E−02*	6.87E−04
Auger-KLX	6.19E−03	7.621E−02*	4.72E−04
Auger-KXY	1.02E−03	8.879E−02*	9.06E−05
Auger-LMM	2.30E−01	8.831E−03*	2.03E−03
Auger-LMX	1.54E−01	1.173E−02*	1.80E−03
Auger-LXY	2.64E−02	1.398E−02*	3.69E−04
Auger-MXY	1.01E+00	3.269E−03*	3.30E−03
ΔE	2.59E−01	6.134E−04*	1.59E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.85E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.94E−02
Listed β, ce and Auger radiations	6.39E−02
Omitted β, ce and Auger radiations**	1.72E−03
Listed α and α recoil radiations	1.62E+00
Omitted α and α recoil radiations	4.82E−04
Listed radiations	3.54E+00
Omitted radiations**	2.17E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Po-207 daughter, yield 2.74E−01, is radioactive.
At-211 daughter, yield 7.26E−01, is radioactive.


$^{211}_{86}$Rn(14.6h)
1/2- 0.0
1/2,3/2 2.6550
(1/2)+ 2.4792
(5/2-) 2.1287
(3/2)- 2.1087
1/2-,3/2- 2.0629
(5/2)- 1.9925
(3/2)- 1.8008
(3/2)- 1.1162
(5/2)- 0.9474
(7/2)- 0.8660
(7/2)- 0.6741
9/2- 0.0
$^{211}_{85}$At(7.214h)
EC1
EC2
EC3
EC4
EC5
EC6
EC7, β+1
γ33 γ11 γ3
γ29 γ9 γ8 γ7
γ26 γ18 γ13 γ6 γ1
γ21 γ20 γ17 γ14
γ25 γ15 γ5 γ2
γ37 γ16 γ10 γ4
γ40 γ19 γ12
3/2- 0.2364
1/2- 0.0685
5/2- 0.0
α5
α6
α7
γ2
γ3 γ1
$^{207}_{84}$Po(5.80h)

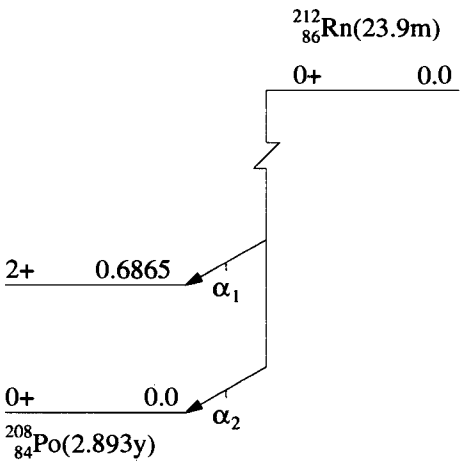
86-Rn-212

13-MAY-92

Half-life = 23.9 m
Decay mode(s): α

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	5.00E−04	5.591E+00	2.80E−03
α recoil	5.00E−04	1.076E−01	5.38E−05
α 2	9.99E−01	6.264E+00	6.26E+00
α recoil	9.99E−01	1.205E−01	1.20E−01
Listed α and α recoil radiations			6.38E+00
Listed radiations			6.38E+00

Po-208 daughter is radioactive.



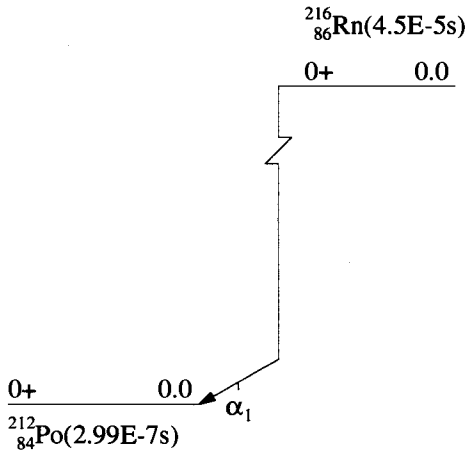
86-Rn-216

13-MAY-92

Half-life = 45 μs
Decay mode(s): α

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E+00	8.049E+00	8.05E+00
α recoil	1.00E+00	1.520E−01	1.52E−01
Listed α and α recoil radiations			8.20E+00
Listed radiations			8.20E+00

Po-212 daughter is radioactive.



86-Rn-221

α: 07-AUG-91
β^-: 17-DEC-90

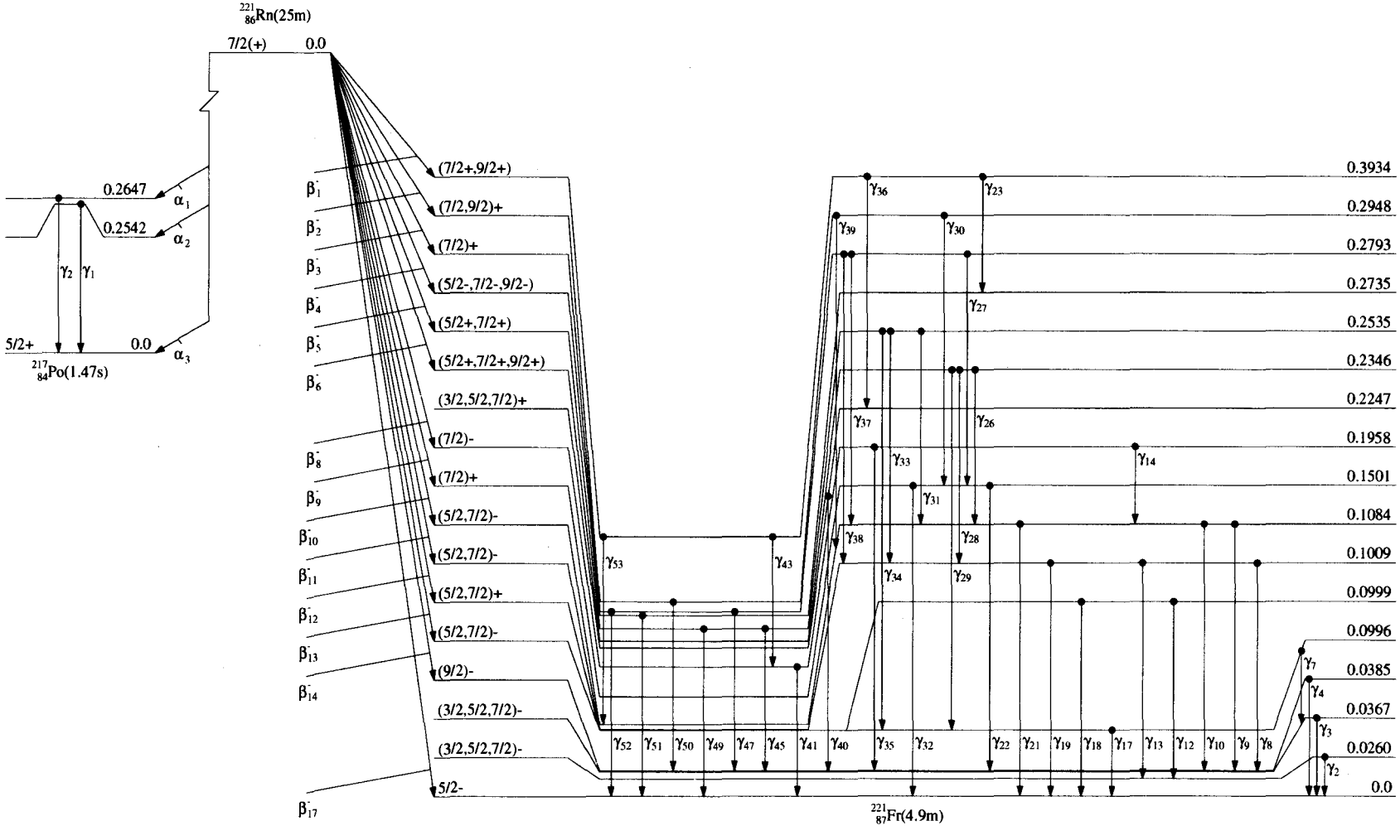
Half-life = 25 m
Decay mode(s): α, β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.80E−02	5.775E+00	1.04E−01
α recoil	1.80E−02	1.065E−01	1.92E−03
α 2	2.16E−02	5.785E+00	1.25E−01
α recoil	2.16E−02	1.067E−01	2.30E−03
α 3	1.80E−01	6.035E+00	1.09E+00
α recoil	1.80E−01	1.113E−01	2.01E−02
γ 1	1.76E−02	2.542E−01	4.46E−03
γ 2	9.45E−03	2.647E−01	2.50E−03
ce-K, γ 2	5.74E−03	1.716E−01	9.85E−04
K_{α_1} X-ray	3.52E−03	7.929E−02	2.79E−04
K_{α_2} X-ray	2.10E−03	7.686E−02	1.61E−04
β^- 1	2.27E−02	2.286E−01*	5.20E−03
β^- 2	2.69E−01	2.641E−01*	7.10E−02
β^- 3	5.84E−02	2.697E−01*	1.57E−02
β^- 4	3.96E−03	2.718E−01*	1.08E−03
β^- 5	6.03E−02	2.791E−01*	1.68E−02
β^- 6	1.84E−02	2.861E−01*	5.26E−03
β^- 8	2.08E−02	3.004E−01*	6.24E−03
β^- 9	3.56E−02	3.174E−01*	1.13E−02
β^- 10	8.01E−02	3.331E−01*	2.67E−02
β^- 11	8.70E−02	3.359E−01*	2.92E−02
β^- 12	2.27E−02	3.363E−01*	7.65E−03
β^- 13	8.90E−03	3.364E−01*	2.99E−03
β^- 14	1.29E−02	3.595E−01*	4.62E−03
β^- 17	7.91E−02	3.742E−01*	2.96E−02
ce-L_3, γ 2	3.21E−02	1.097E−02	3.52E−04
ce-M, γ 2	1.70E−02	2.234E−02*	3.79E−04
ce-L_2, γ 3	4.38E−02	1.879E−02	8.23E−04
ce-L_3, γ 3	4.28E−02	2.167E−02	9.28E−04
ce-M, γ 3	2.35E−02	3.304E−02*	7.76E−04
ce-N^+, γ 3	8.58E−03	3.670E−02*	3.15E−04
ce-L_2, γ 4	3.32E−02	2.062E−02	6.84E−04
ce-L_3, γ 4	3.21E−02	2.350E−02	7.54E−04
ce-M, γ 4	1.77E−02	3.487E−02*	6.17E−04
ce-L_1, γ 7	1.18E−02	4.431E−02	5.21E−04
γ 8	2.81E−03	6.424E−02	1.81E−04
ce-L_1, γ 8	1.68E−02	4.560E−02	7.67E−04
ce-L_2, γ 8	1.83E−02	4.633E−02	8.47E−04
ce-L_3, γ 8	1.42E−02	4.921E−02	6.96E−04
ce-M, γ 8	1.27E−02	6.058E−02*	7.71E−04
ce-N^+, γ 8	4.46E−03	6.424E−02*	2.87E−04
ce-L_2, γ 9	8.34E−03	5.188E−02	4.33E−04
ce-L_3, γ 9	6.92E−03	5.476E−02	3.79E−04
ce-L_2, γ 10	2.17E−02	5.376E−02	1.17E−03
ce-L_3, γ 10	1.79E−02	5.664E−02	1.01E−03
ce-M, γ 10	1.09E−02	6.801E−02*	7.42E−04
γ 12	5.62E−03	7.386E−02	4.15E−04
γ 13	1.62E−03	7.490E−02	1.21E−04
ce-L_1, γ 13	6.20E−03	5.626E−02	3.49E−04
ce-L_2, γ 13	5.17E−03	5.699E−02	2.95E−04
γ 14	1.95E−03	8.741E−02	1.70E−04
ce-L_1, γ 14	5.79E−03	6.877E−02	3.98E−04
γ 17	2.05E−03	9.963E−02	2.05E−04
ce-L_1, γ 17	4.05E−03	8.099E−02	3.28E−04
γ 18	1.51E−02	9.991E−02	1.51E−03
γ 19	3.24E−03	1.010E−01	3.27E−04
ce-L_1, γ 19	4.45E−03	8.232E−02	3.66E−04
ce-L_2, γ 19	4.23E−03	8.305E−02	3.52E−04
ce-M, γ 19	2.94E−03	9.730E−02*	2.86E−04
γ 21	2.29E−02	1.084E−01	2.49E−03
ce-K, γ 21	1.75E−01	7.303E−03	1.27E−03
ce-L_1, γ 21	2.92E−02	8.980E−02	2.62E−03
ce-L_2, γ 21	1.60E−02	9.053E−02	1.45E−03
ce-L_3, γ 21	9.27E−03	9.341E−02	8.66E−04
ce-M, γ 21	1.37E−02	1.048E−01*	1.44E−03
ce-N^+, γ 21	4.86E−03	1.084E−01*	5.27E−04
γ 22	2.29E−02	1.116E−01	2.56E−03
γ 23	3.03E−03	1.199E−01	3.63E−04
γ 26	2.38E−03	1.262E−01	3.00E−04
γ 27	2.38E−03	1.293E−01	3.07E−04
γ 28	5.73E−03	1.337E−01	7.66E−04
γ 29	6.92E−03	1.350E−01	9.34E−04
γ 30	5.84E−03	1.447E−01	8.45E−04
ce-K, γ 30	1.58E−02	4.356E−02	6.87E−04
ce-L_1, γ 30	2.62E−03	1.261E−01	3.31E−04
γ 31	6.81E−03	1.452E−01	9.89E−04
γ 32	4.54E−02	1.501E−01	6.81E−03
ce-K, γ 32	6.42E−03	4.892E−02	3.14E−04
γ 33	2.16E−03	1.526E−01	3.30E−04
γ 34	8.65E−03	1.539E−01	1.33E−03
γ 35	2.38E−03	1.573E−01	3.74E−04
ce-K, γ 35	7.65E−03	5.612E−02	4.29E−04
γ 36	2.81E−03	1.689E−01	4.75E−04
ce-K, γ 36	4.98E−03	6.772E−02	3.37E−04
γ 37	4.97E−03	1.710E−01	8.50E−04
γ 38	9.08E−03	1.784E−01	1.62E−03
γ 39	2.16E−01	1.864E−01	4.03E−02
ce-K, γ 39	1.82E−02	8.524E−02	1.55E−03
ce-L_1, γ 39	2.23E−03	1.677E−01	3.74E−04
γ 40	2.16E−03	1.880E−01	4.06E−04
γ 41	1.08E−03	1.957E−01	2.12E−04
γ 43	7.78E−03	1.978E−01	1.54E−03
γ 45	2.59E−02	2.169E−01	5.63E−03
γ 47	7.24E−03	2.406E−01	1.74E−03
γ 49	5.73E−03	2.535E−01	1.45E−03
γ 50	3.46E−03	2.560E−01	8.86E−04
γ 51	4.86E−03	2.735E−01	1.33E−03
ce-K, γ 51	2.12E−03	1.724E−01	3.65E−04
γ 52	1.97E−02	2.793E−01	5.49E−03
γ 53	6.59E−04	2.848E−01	1.88E−04
K_{α_1} X-ray	1.23E−01	8.611E−02	1.06E−02
K_{α_2} X-ray	7.47E−02	8.323E−02	6.21E−03
K_{β_1} X-ray	2.83E−02	9.747E−02	2.75E−03
K_{β_2} X-ray	1.42E−02	1.004E−01	1.42E−03
K_{β_3} X-ray	1.48E−02	9.681E−02	1.43E−03
L_α X-ray	1.14E−01	1.202E−02*	1.38E−03
L_β X-ray	1.48E−01	1.470E−02*	2.17E−03
L_γ X-ray	3.25E−02	1.744E−02*	5.68E−04
Auger-KLL	4.43E−03	6.616E−02*	2.93E−04
Auger-LMM	2.02E−01	9.368E−03*	1.89E−03
Auger-LMX	1.36E−01	1.244E−02*	1.70E−03
Auger-LXY	2.33E−02	1.485E−02*	3.46E−04
Auger-MXY	9.74E−01	3.413E−03*	3.33E−03

Listed X, γ and $\gamma^\pm$ radiations	1.17E−01
Omitted X, γ and $\gamma^\pm$ radiations**	1.08E−03
Listed β, ce and Auger radiations	2.70E−01
Omitted β, ce and Auger radiations**	1.02E−02
Listed α and α recoil radiations	1.34E+00
Listed radiations	1.73E+00
Omitted radiations**	1.13E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Po-217 daughter, yield 2.20E−01, is radioactive.
Fr-221 daughter, yield 7.80E−01, is radioactive.


221 86 Rn(25m)
7/2(+)
0.0
0.2647
0.2542
α1
α2
γ2
γ1
5/2+
0.0
α3
217 84 Po(1.47s)
β-1
β-2
β-3
β-4
β-5
β-6
β-8
β-9
β-10
β-11
β-12
β-13
β-14
β-17
(7/2+,9/2+)
(7/2,9/2)+
(7/2)+
(5/2-,7/2-,9/2-)
(5/2+,7/2+)
(5/2+,7/2+,9/2+)
(3/2,5/2,7/2)+
(7/2)-
(7/2)+
(5/2,7/2)-
(5/2,7/2)-
(5/2,7/2)+
(5/2,7/2)-
(9/2)-
(3/2,5/2,7/2)-
(3/2,5/2,7/2)-
5/2-
0.3934
0.2948
0.2793
0.2735
0.2535
0.2346
0.2247
0.1958
0.1501
0.1084
0.1009
0.0999
0.0996
0.0385
0.0367
0.0260
0.0
γ53 γ52 γ51 γ50 γ49 γ47 γ45 γ43 γ41 γ40 γ39 γ38 γ37 γ36 γ35 γ34 γ33 γ32 γ31 γ30 γ29 γ28 γ27 γ26 γ23 γ22 γ21 γ19 γ18 γ17 γ14 γ13 γ12 γ10 γ9 γ8 γ7 γ4 γ3 γ2
221 87 Fr(4.9m)

87-Fr-212

13-MAY-92

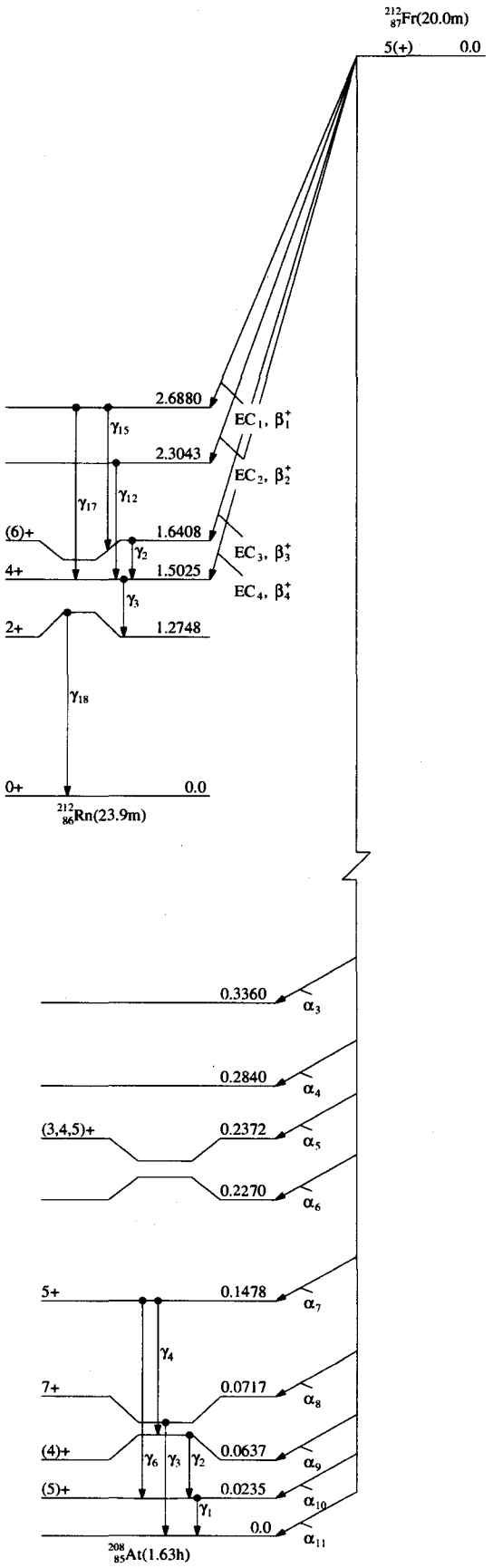
Half-life = 20.0 m
Decay mode(s): α, EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 3	1.83E−03	6.077E+00	1.11E−02
α recoil	1.83E−03	1.169E−01	2.14E−04
α 4	4.86E−03	6.128E+00	2.98E−02
α recoil	4.86E−03	1.179E−01	5.73E−04
α 5	4.69E−03	6.173E+00	2.89E−02
α recoil	4.69E−03	1.188E−01	5.57E−04
α 6	5.54E−03	6.184E+00	3.43E−02
α recoil	5.54E−03	1.190E−01	6.59E−04
α 7	1.60E−01	6.261E+00	1.00E+00
α recoil	1.60E−01	1.205E−01	1.93E−02
α 8	4.35E−02	6.336E+00	2.75E−01
α recoil	4.35E−02	1.219E−01	5.30E−03
α 9	1.32E−02	6.344E+00	8.38E−02
α recoil	1.32E−02	1.221E−01	1.61E−03
α 10	1.02E−01	6.383E+00	6.53E−01
α recoil	1.02E−01	1.228E−01	1.26E−02
α 11	9.38E−02	6.406E+00	6.01E−01
α recoil	9.38E−02	1.233E−01	1.16E−02
ce-L_1, γ 1	1.92E−01	6.007E−03	1.16E−03
ce-L_2, γ 1	2.43E−02	6.715E−03	1.63E−04
ce-M, γ 1	5.29E−02	2.007E−02*	1.06E−03
ce-N^+, γ 1	2.26E−02	2.350E−02*	5.30E−04
ce-L_1, γ 2	5.81E−02	2.261E−02	1.31E−03
ce-M, γ 2	1.55E−02	3.667E−02*	5.69E−04
ce-N^+, γ 2	5.52E−03	4.010E−02*	2.21E−04
ce-L_1, γ 3	2.45E−02	5.421E−02	1.33E−03
ce-M, γ 3	6.46E−03	6.827E−02*	4.41E−04
ce-N^+, γ 3	2.22E−03	7.170E−02*	1.59E−04
ce-L_1, γ 4	1.77E−02	6.661E−02	1.18E−03
ce-M, γ 4	4.68E−03	8.067E−02*	3.78E−04
γ 6	2.02E−02	1.243E−01	2.51E−03
ce-K, γ 6	8.42E−02	2.852E−02	2.40E−03
ce-L_1, γ 6	1.37E−02	1.068E−01	1.46E−03
ce-L_2, γ 6	7.59E−03	1.075E−01	8.16E−04
ce-L_3, γ 6	4.40E−03	1.100E−01	4.84E−04
ce-M, γ 6	6.41E−03	1.208E−01*	7.74E−04
ce-N^+, γ 6	2.21E−03	1.243E−01*	2.75E−04
K_{α_1} X-ray	4.05E−02	8.152E−02	3.30E−03
K_{α_2} X-ray	2.43E−02	7.895E−02	1.92E−03
L_β X-ray	8.60E−02	1.381E−02*	1.19E−03
Auger-LMM	1.37E−01	8.967E−03*	1.23E−03
Auger-LMX	9.27E−02	1.189E−02*	1.10E−03
Auger-LXY	1.60E−02	1.415E−02*	2.26E−04
Auger-MXY	6.12E−01	3.150E−03*	1.93E−03
β^+ 1	4.78E−03	6.535E−01*	3.12E−03
β^+ 2	1.71E−03	8.211E−01*	1.40E−03
β^+ 3	2.05E−02	1.113E+00*	2.28E−02
β^+ 4	1.99E−02	1.174E+00*	2.34E−02
$\gamma^\pm$	9.37E−02	5.110E−01	4.79E−02
γ 1	2.77E−02	9.750E−02	2.70E−03
ce-L_1, γ 1	4.62E−03	7.945E−02	3.67E−04
ce-L_2, γ 1	1.05E−01	8.016E−02	8.39E−03
ce-L_3, γ 1	7.87E−02	8.288E−02	6.52E−03
ce-M, γ 1	5.06E−02	9.396E−02*	4.76E−03
ce-N^+, γ 1	1.77E−02	9.750E−02*	1.73E−03
γ 2	7.75E−02	1.383E−01	1.07E−02
ce-K, γ 2	2.49E−02	3.990E−02	9.93E−04
ce-L_1, γ 2	5.13E−03	1.203E−01	6.16E−04
ce-L_2, γ 2	6.05E−02	1.210E−01	7.32E−03
ce-L_3, γ 2	3.96E−02	1.237E−01	4.90E−03
ce-M, γ 2	2.83E−02	1.348E−01*	3.81E−03
ce-N^+, γ 2	9.91E−03	1.383E−01*	1.37E−03
γ 3	4.26E−01	2.277E−01	9.70E−02
ce-K, γ 3	5.39E−02	1.293E−01	6.97E−03
ce-L_1, γ 3	8.84E−03	2.097E−01	1.85E−03
ce-L_2, γ 3	3.81E−02	2.104E−01	8.02E−03
ce-L_3, γ 3	1.96E−02	2.131E−01	4.19E−03
ce-M, γ 3	1.76E−02	2.242E−01*	3.95E−03
ce-N^+, γ 3	6.11E−03	2.277E−01*	1.39E−03
γ 4	1.02E−02	3.091E−01	3.16E−03
γ 5	1.36E−02	3.115E−01	4.24E−03
ce-K, γ 5	8.74E−04	2.131E−01	1.86E−04
γ 6	4.26E−03	3.225E−01	1.37E−03
γ 8	8.09E−03	4.220E−01	3.41E−03
γ 9	2.81E−02	5.320E−01	1.50E−02
ce-K, γ 9	5.91E−04	4.336E−01	2.56E−04
γ 10	9.79E−03	5.644E−01	5.53E−03
γ 11	8.09E−03	6.201E−01	5.02E−03
γ 12	3.58E−02	8.019E−01	2.87E−02
ce-K, γ 12	3.44E−04	7.035E−01	2.42E−04
γ 13	7.66E−03	8.240E−01	6.32E−03
γ 14	6.81E−03	9.022E−01	6.15E−03
γ 15	7.24E−02	1.047E+00	7.58E−02
ce-K, γ 15	4.26E−04	9.489E−01	4.05E−04
γ 16	1.36E−02	1.178E+00	1.61E−02
γ 17	1.41E−01	1.186E+00	1.67E−01
ce-K, γ 17	6.62E−04	1.087E+00	7.19E−04
γ 18	4.60E−01	1.275E+00	5.86E−01
ce-K, γ 18	1.90E−03	1.176E+00	2.24E−03
ce-L_1, γ 18	2.86E−04	1.257E+00	3.59E−04
K_{α_1} X-ray	2.35E−01	8.378E−02	1.97E−02
K_{α_2} X-ray	1.41E−01	8.107E−02	1.15E−02
K_{β_1} X-ray	5.35E−02	9.487E−02	5.08E−03
K_{β_2} X-ray	2.65E−02	9.771E−02	2.59E−03
K_{β_3} X-ray	2.80E−02	9.425E−02	2.64E−03
L_α X-ray	1.39E−01	1.171E−02*	1.63E−03
L_β X-ray	1.83E−01	1.427E−02*	2.61E−03
Auger-KLL	8.42E−03	6.452E−02*	5.43E−04
Auger-KLX	4.79E−03	7.826E−02*	3.75E−04
Auger-LMM	2.64E−01	9.166E−03*	2.42E−03
Auger-LMX	1.77E−01	1.214E−02*	2.15E−03
Auger-LXY	3.02E−02	1.447E−02*	4.38E−04
Auger-MXY	1.20E+00	3.324E−03*	4.00E−03
ΔE	3.26E−01	6.513E−04*	2.13E−04

Listed X, γ and $\gamma^\pm$ radiations	1.14E+00
Omitted X, γ and $\gamma^\pm$ radiations**	5.90E−03
Listed β, ce and Auger radiations	1.52E−01
Omitted β, ce and Auger radiations**	3.29E−03
Listed α and α recoil radiations	2.77E+00
Omitted α and α recoil radiations	3.09E−03
Listed radiations	4.06E+00
Omitted radiations**	1.23E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

At-208 daughter, yield 4.30E−01, is radioactive.
Rn-212 daughter, yield 5.70E−01, is radioactive.



88-Ra-220

06-MAR-97

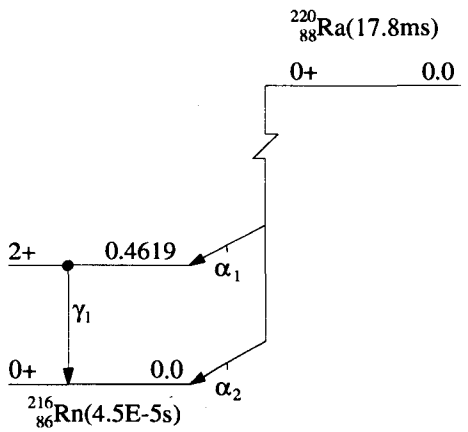
Half-life = 17.8 ms
Decay mode(s): α

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.00E−02	7.003E+00	7.00E−02
α recoil	1.00E−02	1.298E−01	1.30E−03
α 2	9.90E−01	7.457E+00	7.38E+00
α recoil	9.90E−01	1.382E−01	1.37E−01
γ 1	1.00E−02	4.650E−01	4.65E−03
ce-K, γ 1	2.76E−04	3.666E−01	1.01E−04
ce-L$_1$, γ 1	4.37E−05	4.470E−01	1.95E−05
ce-L$_2$, γ 1	4.98E−05	4.477E−01	2.23E−05
ce-L$_3$, γ 1	1.71E−05	4.504E−01	7.71E−06
ce-M, γ 1	2.83E−05	4.615E−01*	1.30E−05
ce-N$^+$, γ 1	9.74E−06	4.650E−01*	4.53E−06
K$_{\alpha_1}$ X-ray	1.29E−04	8.378E−02	1.08E−05
K$_{\alpha_2}$ X-ray	7.79E−05	8.107E−02	6.32E−06
Auger-KLL	4.64E−06	6.452E−02*	3.00E−07
Auger-KLX	2.64E−06	7.826E−02*	2.07E−07
Auger-LMM	1.04E−04	9.125E−03*	9.47E−07
Auger-LMX	6.96E−05	1.210E−02*	8.42E−07
Auger-MXY	4.69E−04	3.378E−03*	1.58E−06

Listed X, γ and $\gamma^{\pm}$ radiations	4.67E−03
Omitted X, γ and $\gamma^{\pm}$ radiations**	7.74E−06
Listed β, ce and Auger radiations	1.72E−04
Omitted β, ce and Auger radiations**	2.91E−07
Listed α and α recoil radiations	7.59E+00
Listed radiations	7.60E+00
Omitted radiations**	8.03E−06

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Rn-216 daughter is radioactive.



88-Ra-230

08-JUL-93

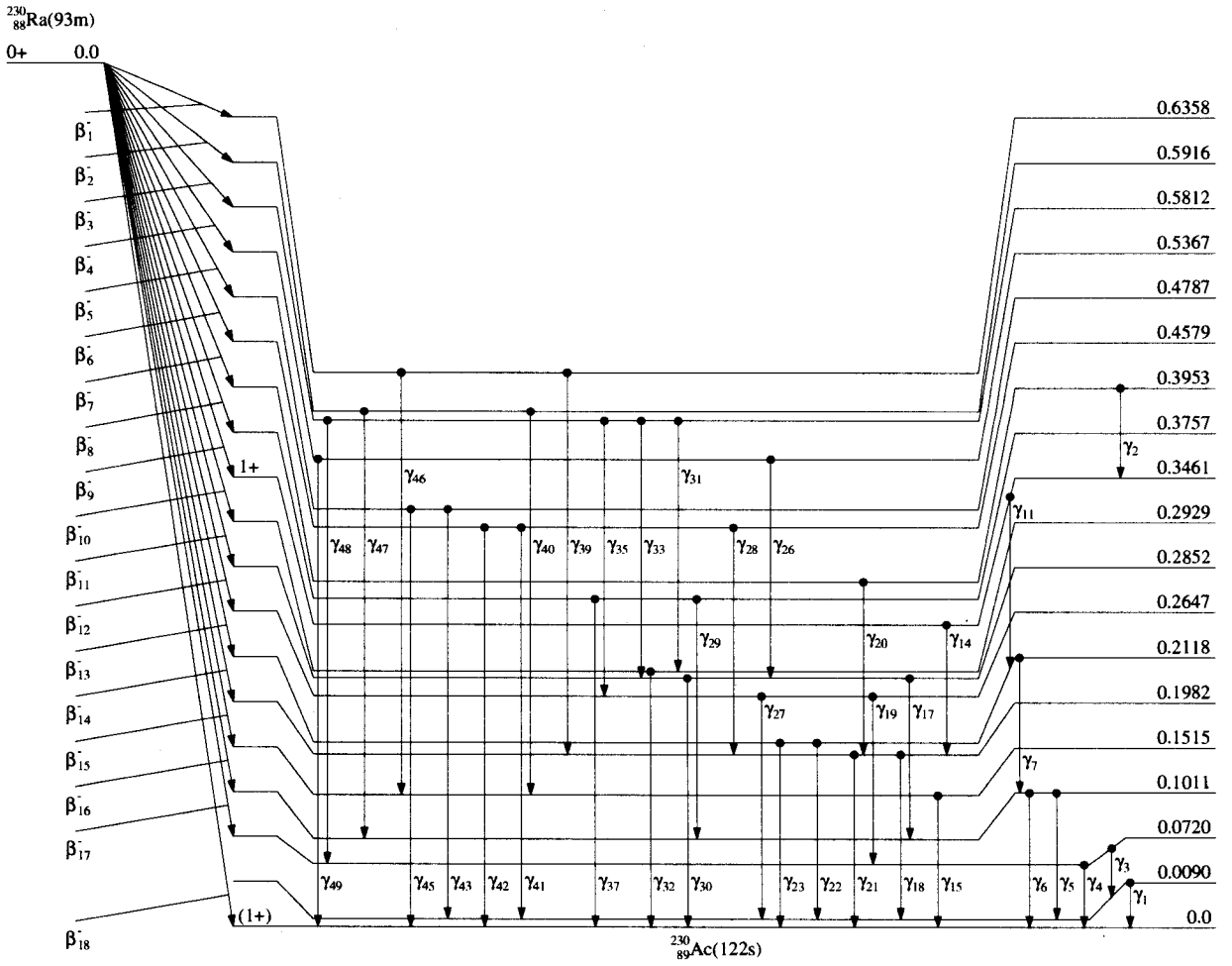
Half-life = 93 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 2	3.87E−03	1.140E−01*	4.42E−04
β^- 3	8.64E−03	1.173E−01*	1.01E−03
β^- 4	1.69E−02	1.316E−01*	2.22E−03
β^- 5	4.57E−02	1.506E−01*	6.88E−03
β^- 6	3.18E−02	1.575E−01*	5.01E−03
β^- 7	4.77E−03	1.786E−01*	8.51E−04
β^- 8	3.58E−03	1.853E−01*	6.62E−04
β^- 9	2.78E−02	1.955E−01*	5.44E−03
β^- 10	8.04E−03	2.139E−01*	1.72E−03
β^- 11	4.07E−02	2.166E−01*	8.82E−03
β^- 12	2.38E−03	2.238E−01*	5.34E−04
β^- 13	2.38E−02	2.426E−01*	5.78E−03
β^- 14	4.17E−02	2.475E−01*	1.03E−02
β^- 15	3.48E−03	2.642E−01*	9.18E−04
β^- 16	8.94E−02	2.826E−01*	2.53E−02
β^- 17	1.79E−01	2.932E−01*	5.24E−02
β^- 18	4.67E−01	3.198E−01*	1.49E−01
ce-M, γ 1	1.42E−01	5.091E−03*	7.21E−04
ce-N$^+$, γ 1	8.95E−02	9.000E−03*	8.05E−04
γ 2	1.82E−03	4.920E−02	8.95E−05
γ 3	2.80E−02	6.300E−02	1.76E−03
γ 4	7.91E−02	7.200E−02	5.70E−03
ce-L$_1$, γ 4	2.04E−02	5.216E−02	1.06E−03
ce-L$_2$, γ 4	1.38E−02	5.292E−02	7.30E−04
ce-L$_3$, γ 4	1.37E−02	5.613E−02	7.66E−04
ce-M, γ 4	1.16E−02	6.809E−02*	7.90E−04
γ 5	1.47E−02	9.210E−02	1.35E−03
ce-L$_1$, γ 5	4.58E−02	7.226E−02	3.31E−03
ce-L$_2$, γ 5	5.18E−03	7.302E−02	3.78E−04
ce-M, γ 5	1.23E−02	8.819E−02*	1.08E−03
ce-N$^+$, γ 5	4.45E−03	9.210E−02*	4.10E−04
γ 6	1.12E−02	1.010E−01	1.13E−03
ce-L$_1$, γ 6	2.67E−02	8.116E−02	2.17E−03
ce-M, γ 6	7.17E−03	9.709E−02*	6.96E−04
γ 7	2.17E−03	1.107E−01	2.40E−04
γ 11	3.15E−03	1.343E−01	4.23E−04
ce-K, γ 11	1.96E−02	2.754E−02	5.41E−04
ce-L$_1$, γ 11	3.30E−03	1.145E−01	3.78E−04
γ 14	3.92E−03	1.479E−01	5.80E−04
γ 15	1.40E−03	1.515E−01	2.12E−04
γ 17	8.05E−03	1.841E−01	1.48E−03
ce-K, γ 17	2.05E−02	7.734E−02	1.59E−03
ce-L$_1$, γ 17	3.43E−03	1.643E−01	5.64E−04
γ 18	1.17E−02	1.892E−01	2.21E−03
ce-K, γ 18	2.76E−02	8.244E−02	2.27E−03
ce-L$_1$, γ 18	4.62E−03	1.694E−01	7.82E−04
γ 19	9.80E−04	1.926E−01	1.89E−04
γ 20	9.10E−04	1.971E−01	1.79E−04
γ 21	2.38E−03	1.982E−01	4.72E−04
ce-K, γ 21	4.92E−03	9.144E−02	4.50E−04
γ 22	2.16E−02	2.028E−01	4.37E−03
γ 23	7.91E−03	2.118E−01	1.68E−03
ce-K, γ 23	1.36E−02	1.050E−01	1.43E−03
ce-L$_1$, γ 23	2.28E−03	1.920E−01	4.37E−04
γ 26	6.93E−03	2.515E−01	1.74E−03
ce-K, γ 26	7.42E−03	1.447E−01	1.07E−03
γ 27	1.12E−03	2.557E−01	2.86E−04
γ 28	2.38E−03	2.599E−01	6.19E−04
ce-K, γ 28	2.33E−03	1.531E−01	3.56E−04
γ 29	7.00E−04	2.746E−01	1.92E−04
γ 30	1.27E−02	2.852E−01	3.63E−03
ce-K, γ 30	9.62E−03	1.784E−01	1.72E−03
ce-L$_1$, γ 30	1.60E−03	2.654E−01	4.23E−04
γ 31	7.00E−04	2.882E−01	2.02E−04
γ 32	3.01E−03	2.929E−01	8.82E−04
ce-K, γ 32	2.11E−03	1.861E−01	3.93E−04
γ 33	8.40E−04	2.961E−01	2.49E−04
γ 34	3.50E−04	2.976E−01	1.04E−04
γ 35	7.00E−04	3.164E−01	2.21E−04
γ 36	4.20E−04	3.639E−01	1.53E−04
γ 37	2.10E−04	3.758E−01	7.89E−05
γ 38	6.30E−04	4.129E−01	2.60E−04
γ 39	2.10E−04	4.377E−01	9.19E−05
γ 40	2.10E−04	4.400E−01	9.24E−05
γ 41	1.05E−02	4.489E−01	4.71E−03
γ 42	1.29E−02	4.579E−01	5.93E−03
ce-K, γ 42	2.70E−03	3.511E−01	9.49E−04
γ 43	2.05E−02	4.697E−01	9.63E−03
ce-K, γ 43	4.00E−03	3.629E−01	1.45E−03
γ 44	2.10E−04	4.735E−01	9.94E−05
γ 45	1.69E−02	4.787E−01	8.11E−03
ce-K, γ 45	3.14E−03	3.719E−01	1.17E−03
γ 46	1.33E−03	4.842E−01	6.44E−04
γ 47	3.01E−03	4.905E−01	1.48E−03
γ 48	4.55E−03	5.094E−01	2.32E−03
γ 49	8.40E−04	5.369E−01	4.51E−04
K$_{\alpha_1}$ X-ray	6.30E−02	9.088E−02	5.73E−03
K$_{\alpha_2}$ X-ray	3.85E−02	8.767E−02	3.37E−03
K$_{\beta_1}$ X-ray	1.46E−02	1.028E−01	1.50E−03
K$_{\beta_2}$ X-ray	7.47E−03	1.060E−01	7.92E−04
K$_{\beta_3}$ X-ray	7.64E−03	1.021E−01	7.80E−04
L$_\alpha$ X-ray	5.28E−02	1.264E−02*	6.67E−04
L$_\beta$ X-ray	6.39E−02	1.557E−02*	9.96E−04
L$_\gamma$ X-ray	1.54E−02	1.865E−02*	2.87E−04
Auger-LMM	7.67E−02	9.721E−03*	7.45E−04
Auger-LMX	5.28E−02	1.300E−02*	6.86E−04
Auger-MXY	5.17E−01	3.759E−03*	1.94E−03

Listed X, γ and $\gamma^\pm$ radiations	7.84E−02
Omitted X, γ and $\gamma^\pm$ radiations**	4.83E−04
Listed β, ce and Auger radiations	3.10E−01
Omitted β, ce and Auger radiations**	8.51E−03
Listed radiations	3.88E−01
Omitted radiations**	9.00E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ac-230 daughter is radioactive.


230 88 Ra(93m)
0+ 0.0
β-1
β-2
β-3
β-4
β-5
β-6
β-7
β-8
β-9
β-10
β-11
β-12
β-13
β-14
β-15
β-16
β-17
β-18
1+
(1+)
0.6358
0.5916
0.5812
0.5367
0.4787
0.4579
0.3953
0.3757
0.3461
0.2929
0.2852
0.2647
0.2118
0.1982
0.1515
0.1011
0.0720
0.0090
0.0
γ46
γ31
γ48 γ47
γ40 γ39 γ35 γ33
γ28 γ26
γ29
γ20
γ14
γ27
γ19 γ17
γ11
γ7
γ2
γ3
γ1
γ49
γ45 γ43 γ42 γ41
γ37
γ32 γ30
γ23 γ22 γ21
γ18 γ15
γ6 γ5 γ4
230 89 Ac(122s)

89-Ac-229

16-FEB-90

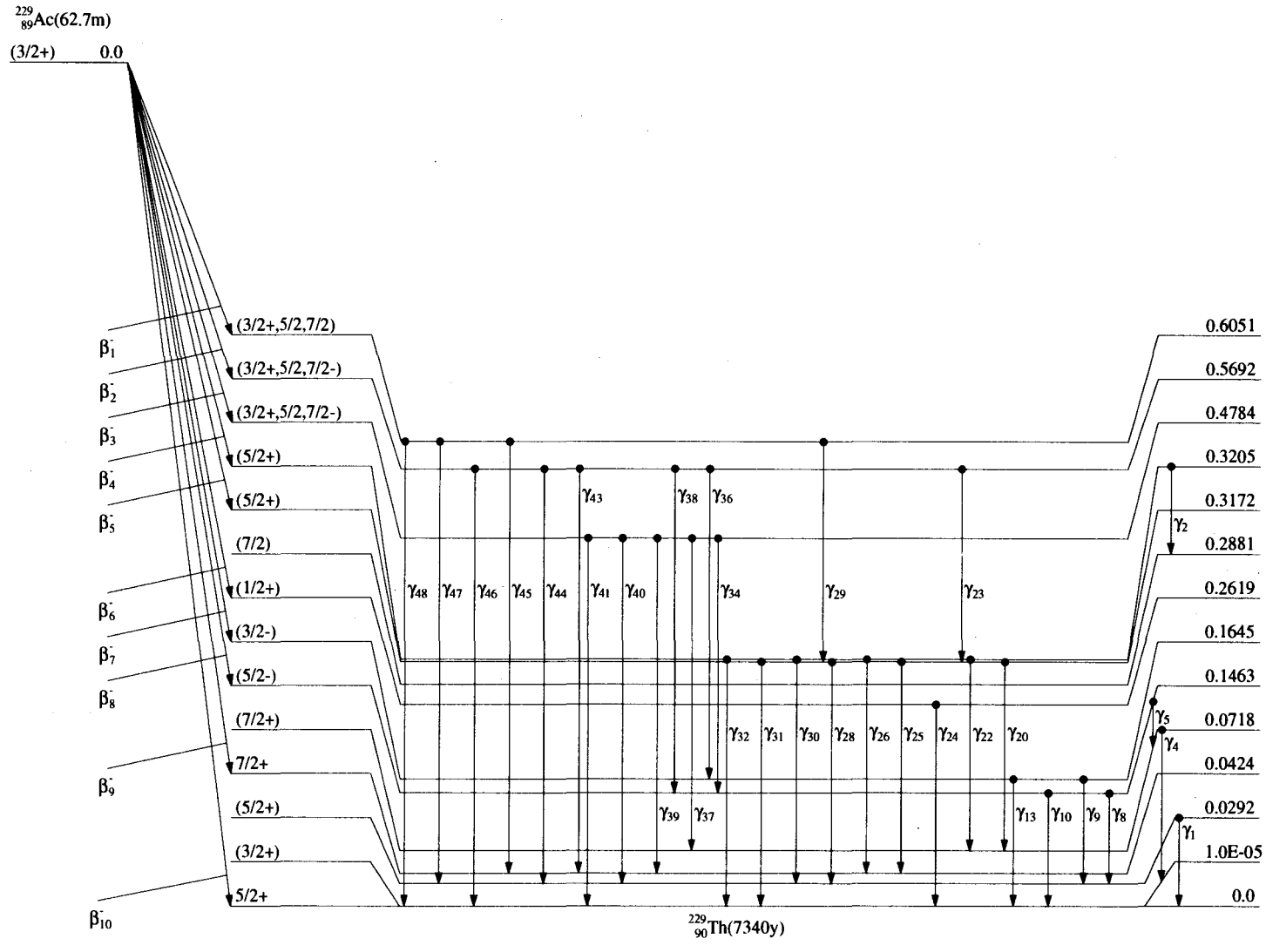
Half-life = 62.7 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.34E−02	1.450E−01*	1.95E−03
β^- 2	5.28E−02	1.569E−01*	8.29E−03
β^- 3	1.63E−02	1.875E−01*	3.06E−03
β^- 4	7.30E−02	2.426E−01*	1.77E−02
β^- 5	1.34E−02	2.438E−01*	3.28E−03
β^- 6	2.98E−02	2.636E−01*	7.85E−03
β^- 7	5.00E−02	2.990E−01*	1.49E−02
β^- 8	2.11E−02	3.057E−01*	6.46E−03
β^- 9	5.76E−02	3.354E−01*	1.93E−02
β^- 10	6.72E−01	3.603E−01*	2.42E−01
ce-L_1, γ 1	6.98E−02	8.828E−03	6.16E−04
ce-M, γ 1	1.88E−02	2.525E−02*	4.74E−04
ce-L_1, γ 2	4.14E−02	1.193E−02	4.94E−04
ce-L_2, γ 4	2.05E−02	5.171E−02	1.06E−03
ce-L_3, γ 4	1.62E−02	5.510E−02	8.90E−04
ce-M, γ 4	1.02E−02	6.735E−02*	6.90E−04
γ 5	2.13E−03	7.440E−02	1.59E−04
γ 8	5.95E−03	1.174E−01	6.99E−04
γ 9	1.19E−02	1.353E−01	1.61E−03
γ 10	1.22E−02	1.464E−01	1.79E−03
γ 13	3.50E−02	1.646E−01	5.76E−03
γ 19	1.43E−03	2.393E−01	3.43E−04
γ 20	2.73E−03	2.454E−01	6.70E−04
ce-K, γ 20	3.40E−03	1.357E−01	4.62E−04
γ 21	2.38E−03	2.487E−01	5.92E−04
γ 22	8.75E−04	2.487E−01	2.18E−04
γ 23	8.40E−03	2.522E−01	2.12E−03
ce-K, γ 23	9.70E−03	1.425E−01	1.38E−03
ce-L_1, γ 23	1.63E−03	2.317E−01	3.77E−04
γ 24	1.37E−02	2.619E−01	3.57E−03
ce-K, γ 24	1.42E−02	1.522E−01	2.16E−03
ce-L_1, γ 24	2.38E−03	2.414E−01	5.74E−04
γ 25	5.95E−04	2.750E−01	1.64E−04
γ 26	9.80E−04	2.782E−01	2.73E−04
γ 27	1.50E−03	2.850E−01	4.29E−04
γ 28	1.01E−03	2.883E−01	2.93E−04
γ 29	2.06E−03	2.883E−01	5.95E−04
γ 30	3.26E−03	2.914E−01	9.49E−04
ce-K, γ 30	2.51E−03	1.817E−01	4.57E−04
γ 31	8.05E−03	3.170E−01	2.55E−03
ce-K, γ 31	4.94E−03	2.073E−01	1.02E−03
γ 32	2.28E−03	3.203E−01	7.29E−04
γ 33	1.23E−03	3.229E−01	3.96E−04
γ 34	7.00E−04	3.321E−01	2.32E−04
γ 35	9.45E−04	3.657E−01	3.46E−04
γ 36	3.05E−03	4.047E−01	1.23E−03
γ 37	2.06E−03	4.065E−01	8.39E−04
γ 38	2.38E−03	4.229E−01	1.01E−03
γ 39	2.21E−03	4.359E−01	9.61E−04
γ 40	5.57E−03	4.493E−01	2.50E−03
ce-K, γ 40	1.33E−03	3.396E−01	4.51E−04
γ 41	5.95E−03	4.785E−01	2.85E−03
ce-K, γ 41	1.20E−03	3.688E−01	4.42E−04
γ 42	1.05E−03	5.086E−01	5.34E−04
γ 43	2.21E−03	5.268E−01	1.16E−03
γ 44	7.00E−03	5.399E−01	3.78E−03
ce-K, γ 44	1.02E−03	4.302E−01	4.39E−04
γ 45	2.24E−03	5.624E−01	1.26E−03
γ 46	3.18E−02	5.691E−01	1.81E−02
ce-K, γ 46	4.03E−03	4.594E−01	1.85E−03
ce-L_1, γ 46	6.70E−04	5.486E−01	3.68E−04
γ 47	1.82E−03	5.756E−01	1.05E−03
γ 48	8.05E−03	6.052E−01	4.87E−03
ce-K, γ 48	8.63E−04	4.955E−01	4.28E−04
K_{α_1} X-ray	2.82E−02	9.335E−02	2.63E−03
K_{α_2} X-ray	1.73E−02	8.996E−02	1.56E−03
K_{β_1} X-ray	6.54E−03	1.056E−01	6.91E−04
K_{β_2} X-ray	3.38E−03	1.088E−01	3.68E−04
K_{β_3} X-ray	3.43E−03	1.048E−01	3.60E−04
L_α X-ray	4.27E−02	1.295E−02*	5.53E−04
L_β X-ray	5.68E−02	1.603E−02*	9.10E−04
L_γ X-ray	1.46E−02	1.924E−02*	2.80E−04
Auger-LMM	5.84E−02	9.994E−03*	5.84E−04
Auger-LMX	4.05E−02	1.338E−02*	5.42E−04
Auger-MXY	3.01E−01	3.788E−03*	1.14E−03

Listed X, γ and $\gamma^\pm$ radiations	7.20E−02
Omitted X, γ and $\gamma^\pm$ radiations**	2.44E−04
Listed β, ce and Auger radiations	3.42E−01
Omitted β, ce and Auger radiations**	6.44E−03
Listed radiations	4.14E−01
Omitted radiations**	6.69E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Th-229 daughter is radioactive.


229 89 Ac(62.7m)
(3/2+) 0.0
β-1
β-2
β-3
β-4
β-5
β-6
β-7
β-8
β-9
β-10
(3/2+,5/2,7/2)
(3/2+,5/2,7/2-)
(3/2+,5/2,7/2-)
(5/2+)
(5/2+)
(7/2)
(1/2+)
(3/2-)
(5/2-)
(7/2+)
7/2+
(5/2+)
(3/2+)
5/2+
0.6051
0.5692
0.4784
0.3205
0.3172
0.2881
0.2619
0.1645
0.1463
0.0718
0.0424
0.0292
1.0E-05
0.0
229 90 Th(7340y)

89-Ac-230

08-JUL-93

Half-life = 122 s
Decay mode(s): β^-

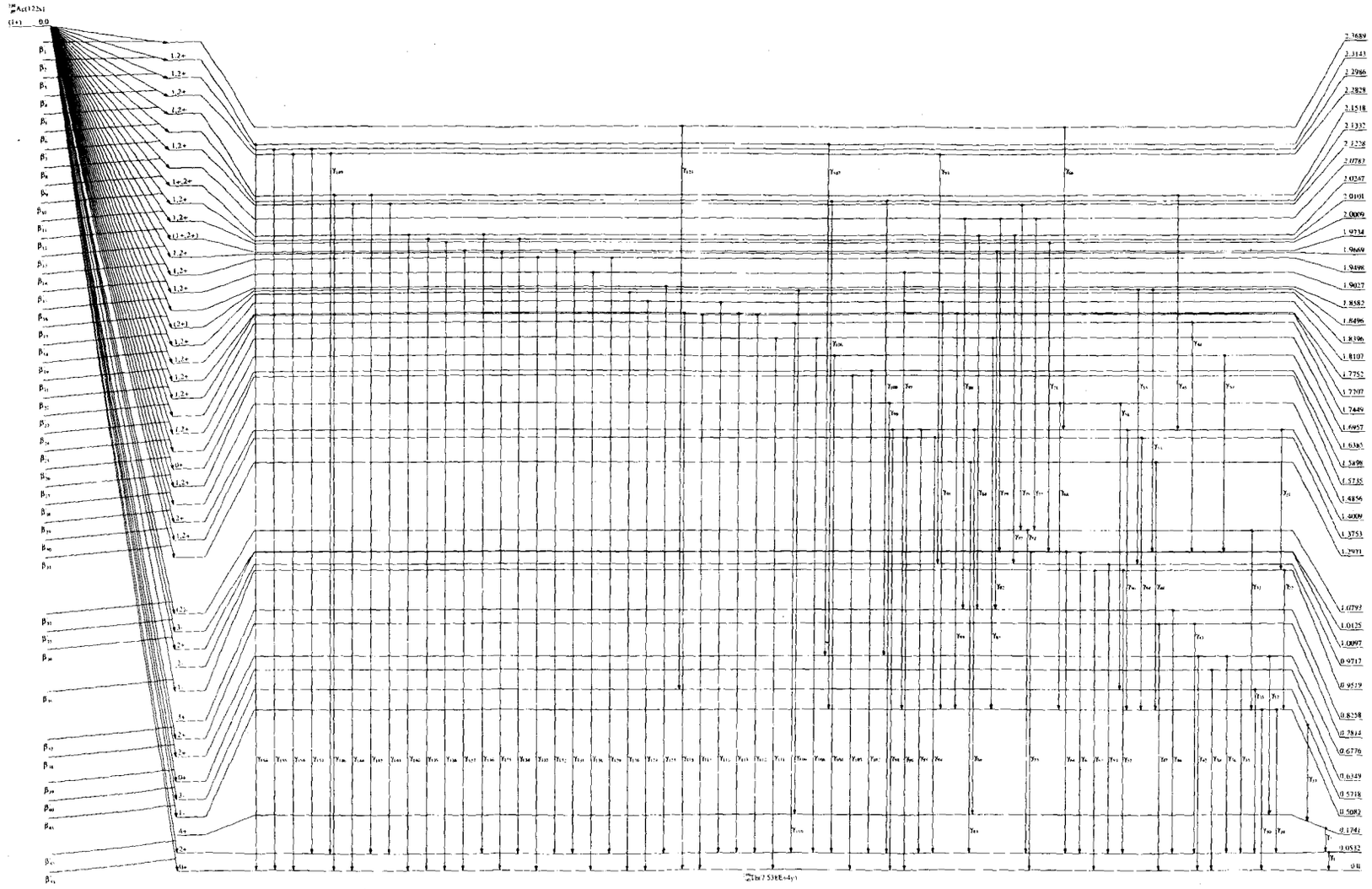
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 5	7.05E−03	1.627E−01*	1.15E−03
β^- 7	9.93E−03	1.724E−01*	1.71E−03
β^- 10	5.06E−03	2.111E−01*	1.07E−03
β^- 11	4.57E−03	2.143E−01*	9.79E−04
β^- 12	8.54E−03	2.239E−01*	1.91E−03
β^- 13	6.35E−03	2.262E−01*	1.44E−03
β^- 14	1.79E−02	2.322E−01*	4.15E−03
β^- 15	9.03E−03	2.489E−01*	2.25E−03
β^- 17	3.97E−03	2.680E−01*	1.06E−03
β^- 19	1.59E−02	2.821E−01*	4.48E−03
β^- 21	2.18E−02	2.951E−01*	6.45E−03
β^- 22	7.35E−03	2.967E−01*	2.18E−03
β^- 23	5.66E−03	3.062E−01*	1.73E−03
β^- 24	4.27E−03	3.244E−01*	1.39E−03
β^- 25	4.07E−03	3.458E−01*	1.41E−03
β^- 28	2.98E−03	4.037E−01*	1.20E−03
β^- 29	3.38E−02	4.363E−01*	1.47E−02
β^- 30	2.48E−02	4.463E−01*	1.11E−02
β^- 31	3.97E−02	4.767E−01*	1.89E−02
β^- 33	2.88E−03	5.643E−01*	1.62E−03
β^- 34	1.69E−03	5.905E−01*	9.97E−04
β^- 36	1.09E−02	6.137E−01*	6.70E−03
β^- 37	7.45E−03	6.825E−01*	5.08E−03
β^- 38	8.94E−03	7.248E−01*	6.48E−03
β^- 39	1.19E−02	7.422E−01*	8.84E−03
β^- 40	4.96E−03	7.342E−01*	3.64E−03
β^- 41	9.93E−02	7.941E−01*	7.88E−02
β^- 42	1.99E−01	9.823E−01*	1.95E−01
β^- 43	3.97E−01	1.004E+00*	3.99E−01
ce-L_2, γ 1	1.76E−01	3.351E−02	5.91E−03
ce-L_3, γ 1	1.52E−01	3.690E−02	5.60E−03
ce-M, γ 1	9.11E−02	4.915E−02*	4.48E−03
ce-N^+, γ 1	3.36E−02	5.320E−02*	1.79E−03
γ 17	4.10E−03	3.977E−01	1.63E−03
γ 22	1.80E−03	4.439E−01	8.01E−04
γ 23	1.23E−03	4.489E−01	5.52E−04
γ 24	8.20E−02	4.549E−01	3.73E−02
γ 27	1.39E−03	5.035E−01	7.02E−04
γ 30	5.15E−02	5.082E−01	2.62E−02
γ 31	4.18E−03	5.185E−01	2.17E−03
γ 32	1.07E−03	5.711E−01	6.09E−04
γ 33	5.33E−03	5.817E−01	3.10E−03
ce-K, γ 36	7.21E−03	5.147E−01	3.71E−03
γ 37	2.38E−03	6.288E−01	1.50E−03
ce-K, γ 38	5.12E−03	5.252E−01	2.69E−03
γ 41	1.80E−03	6.714E−01	1.21E−03
γ 42	1.80E−03	6.776E−01	1.22E−03
γ 43	4.67E−03	7.280E−01	3.40E−03
γ 44	9.84E−04	7.351E−01	7.23E−04
γ 45	1.48E−03	7.507E−01	1.11E−03
γ 46	2.38E−03	7.726E−01	1.84E−03
γ 47	3.77E−03	7.815E−01	2.95E−03
γ 48	5.33E−03	7.890E−01	4.21E−03
γ 49	1.15E−03	7.980E−01	9.16E−04
γ 50	3.20E−03	8.167E−01	2.61E−03
γ 53	1.80E−03	8.399E−01	1.52E−03
γ 54	4.67E−03	8.671E−01	4.05E−03
γ 55	8.20E−04	8.780E−01	7.20E−04
γ 56	6.89E−03	8.927E−01	6.15E−03
γ 57	2.54E−03	8.985E−01	2.28E−03
γ 58	9.84E−04	9.137E−01	8.99E−04
γ 59	2.87E−03	9.186E−01	2.64E−03
γ 60	8.20E−04	9.392E−01	7.70E−04
γ 61	8.20E−04	9.463E−01	7.76E−04
γ 62	8.28E−03	9.520E−01	7.88E−03
γ 63	4.35E−03	9.565E−01	4.16E−03
γ 64	1.89E−03	9.591E−01	1.81E−03
γ 65	1.07E−03	9.630E−01	1.03E−03
γ 66	9.84E−04	9.680E−01	9.53E−04
γ 67	1.15E−03	9.735E−01	1.12E−03
γ 68	5.74E−04	9.776E−01	5.61E−04
γ 71	9.84E−04	9.912E−01	9.75E−04
γ 72	2.21E−03	9.991E−01	2.21E−03
γ 73	2.46E−03	1.010E+00	2.48E−03
γ 74	1.64E−03	1.026E+00	1.68E−03
γ 75	8.20E−04	1.043E+00	8.55E−04
γ 77	1.48E−03	1.053E+00	1.55E−03
γ 79	6.56E−04	1.068E+00	7.01E−04
γ 80	1.48E−03	1.094E+00	1.61E−03
γ 81	5.74E−04	1.106E+00	6.35E−04
γ 82	3.94E−03	1.148E+00	4.52E−03
γ 83	1.07E−03	1.188E+00	1.27E−03
γ 84	1.48E−03	1.199E+00	1.77E−03
γ 85	1.48E−03	1.212E+00	1.79E−03
γ 86	9.59E−03	1.227E+00	1.18E−02
γ 87	3.50E−02	1.244E+00	4.36E−02
γ 88	6.56E−04	1.253E+00	8.22E−04
γ 89	4.10E−03	1.267E+00	5.20E−03
γ 90	2.05E−03	1.268E+00	2.60E−03
γ 91	5.41E−03	1.303E+00	7.05E−03
γ 92	1.15E−03	1.306E+00	1.50E−03
γ 93	1.48E−03	1.311E+00	1.94E−03
γ 94	7.05E−03	1.322E+00	9.32E−03
γ 95	1.57E−02	1.348E+00	2.11E−02
γ 96	1.21E−02	1.375E+00	1.67E−02
γ 97	1.64E−03	1.395E+00	2.29E−03
γ 98	3.28E−03	1.401E+00	4.60E−03
γ 99	1.97E−03	1.432E+00	2.82E−03
γ 100	1.48E−03	1.456E+00	2.15E−03
γ 101	8.20E−04	1.525E+00	1.25E−03
γ 102	6.56E−04	1.537E+00	1.01E−03
γ 103	1.89E−03	1.574E+00	2.97E−03
γ 104	1.72E−03	1.585E+00	2.73E−03
γ 105	1.31E−03	1.597E+00	2.10E−03
γ 106	1.15E−03	1.625E+00	1.87E−03
γ 107	1.56E−03	1.637E+00	2.55E−03
γ 108	9.02E−04	1.643E+00	1.48E−03
γ 109	8.20E−04	1.675E+00	1.37E−03
γ 110	5.99E−03	1.692E+00	1.01E−02
γ 111	2.38E−03	1.696E+00	4.03E−03
γ 112	6.40E−03	1.717E+00	1.10E−02
γ 113	6.56E−03	1.722E+00	1.13E−02
γ 116	8.69E−03	1.758E+00	1.53E−02
γ 117	9.84E−04	1.770E+00	1.74E−03
γ 118	1.12E−02	1.775E+00	1.98E−02
γ 121	8.20E−04	1.797E+00	1.47E−03
γ 122	6.56E−04	1.800E+00	1.18E−03
γ 123	4.92E−04	1.805E+00	8.88E−04
γ 124	1.72E−03	1.811E+00	3.12E−03
γ 125	5.74E−04	1.818E+00	1.04E−03
γ 126	9.02E−04	1.840E+00	1.66E−03
γ 127	4.92E−04	1.854E+00	9.12E−04
γ 128	1.64E−03	1.869E+00	3.07E−03
γ 129	5.25E−03	1.897E+00	9.95E−03
γ 130	7.46E−03	1.903E+00	1.42E−02
γ 131	5.58E−03	1.914E+00	1.07E−02
γ 132	4.26E−03	1.920E+00	8.19E−03
γ 133	1.25E−02	1.950E+00	2.45E−02
γ 134	4.35E−03	1.957E+00	8.50E−03
γ 135	8.20E−04	1.967E+00	1.61E−03
γ 136	4.10E−04	1.971E+00	8.08E−04
γ 137	4.10E−04	1.974E+00	8.09E−04
γ 138	3.61E−03	2.001E+00	7.22E−03

γ 139	7.38E−04	2.010E+00	1.48E−03
γ 140	4.92E−04	2.025E+00	9.96E−04
γ 141	2.95E−03	2.069E+00	6.11E−03
γ 142	2.54E−03	2.085E+00	5.30E−03
γ 143	5.25E−03	2.099E+00	1.10E−02
γ 144	5.82E−03	2.123E+00	1.24E−02
γ 145	3.28E−04	2.150E+00	7.05E−04
γ 146	3.28E−04	2.152E+00	7.06E−04
γ 147	6.56E−04	2.188E+00	1.44E−03
γ 148	4.92E−04	2.203E+00	1.08E−03
γ 149	9.02E−04	2.230E+00	2.01E−03
γ 150	4.92E−04	2.233E+00	1.10E−03
γ 151	3.28E−04	2.245E+00	7.36E−04
γ 153	4.10E−04	2.277E+00	9.34E−04
γ 154	1.15E−03	2.283E+00	2.62E−03
γ 155	5.74E−04	2.299E+00	1.32E−03
γ 156	4.10E−04	2.314E+00	9.49E−04
γ 157	5.74E−04	2.330E+00	1.34E−03
K_{α_1} X-ray	8.91E−03	9.335E−02	8.31E−04
L_α X-ray	6.45E−02	1.295E−02*	8.36E−04
L_β X-ray	9.73E−02	1.610E−02*	1.57E−03
Auger-LMM	9.68E−02	1.013E−02*	9.81E−04
Auger-LMX	6.64E−02	1.348E−02*	8.96E−04
Auger-MXY	5.06E−01	3.683E−03*	1.86E−03

Listed X, γ and $\gamma^{\pm}$ radiations	5.33E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	9.49E−03
Listed β, ce and Auger radiations	8.13E−01
Omitted β, ce and Auger radiations**	1.34E−02
Listed radiations	1.35E+00
Omitted radiations**	2.29E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Th-230 daughter is radioactive.



90-Th-224

06-MAR-97

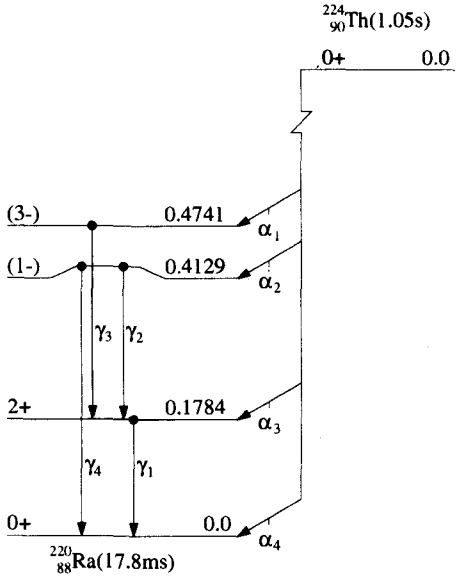
Half-life = 1.05 s
Decay mode(s): α

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	2.99E−03	6.708E+00	2.00E−02
α recoil	2.99E−03	1.220E−01	3.64E−04
α 2	1.19E−02	6.768E+00	8.08E−02
α recoil	1.19E−02	1.231E−01	1.47E−03
α 3	1.69E−01	6.998E+00	1.18E+00
α recoil	1.69E−01	1.273E−01	2.15E−02
α 4	8.16E−01	7.173E+00	5.85E+00
α recoil	8.16E−01	1.305E−01	1.06E−01
γ 1	9.00E−02	1.770E−01	1.59E−02
ce-K, γ 1	1.85E−02	7.308E−02	1.35E−03
ce-L_1, γ 1	3.70E−03	1.578E−01	5.83E−04
ce-L_2, γ 1	2.85E−02	1.585E−01	4.51E−03
ce-L_3, γ 1	1.60E−02	1.616E−01	2.58E−03
ce-M, γ 1	1.30E−02	1.732E−01*	2.26E−03
ce-N^+, γ 1	4.70E−03	1.770E−01*	8.31E−04
γ 2	4.00E−03	2.350E−01	9.40E−04
ce-K, γ 2	1.99E−04	1.311E−01	2.61E−05
γ 3	3.00E−03	2.970E−01	8.91E−04
ce-K, γ 3	8.75E−05	1.931E−01	1.69E−05
γ 4	8.00E−03	4.100E−01	3.28E−03
ce-K, γ 4	1.16E−04	3.061E−01	3.56E−05
K_{α_1} X-ray	8.83E−03	8.848E−02	7.81E−04
K_{α_2} X-ray	5.37E−03	8.544E−02	4.59E−04
K_{β_1} X-ray	2.03E−03	1.001E−01	2.03E−04
K_{β_2} X-ray	1.03E−03	1.031E−01	1.07E−04
K_{β_3} X-ray	1.06E−03	9.943E−02	1.06E−04
L_α X-ray	9.46E−03	1.233E−02*	1.17E−04
L_β X-ray	1.63E−02	1.517E−02*	2.48E−04
L_γ X-ray	3.82E−03	1.796E−02*	6.86E−05
Auger-KLL	3.06E−04	6.782E−02*	2.08E−05
Auger-KLX	1.75E−04	8.249E−02*	1.44E−05
Auger-LMM	1.83E−02	9.846E−03*	1.80E−04
Auger-LMX	1.24E−02	1.301E−02*	1.61E−04
Auger-LXY	2.11E−03	1.549E−02*	3.26E−05
Auger-MXY	8.93E−02	3.501E−03*	3.13E−04
ΔE	2.58E−02	7.314E−04*	1.89E−05

Listed X, γ and $\gamma^{\pm}$ radiations	2.31E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.72E−05
Listed β, ce and Auger radiations	1.29E−02
Omitted β, ce and Auger radiations**	3.04E−05
Listed α and α recoil radiations	7.27E+00
Listed radiations	7.30E+00
Omitted radiations**	4.76E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i)\times E(i)$ in its category.

Ra-220 daughter is radioactive.



90-Th-233

23-AUG-90

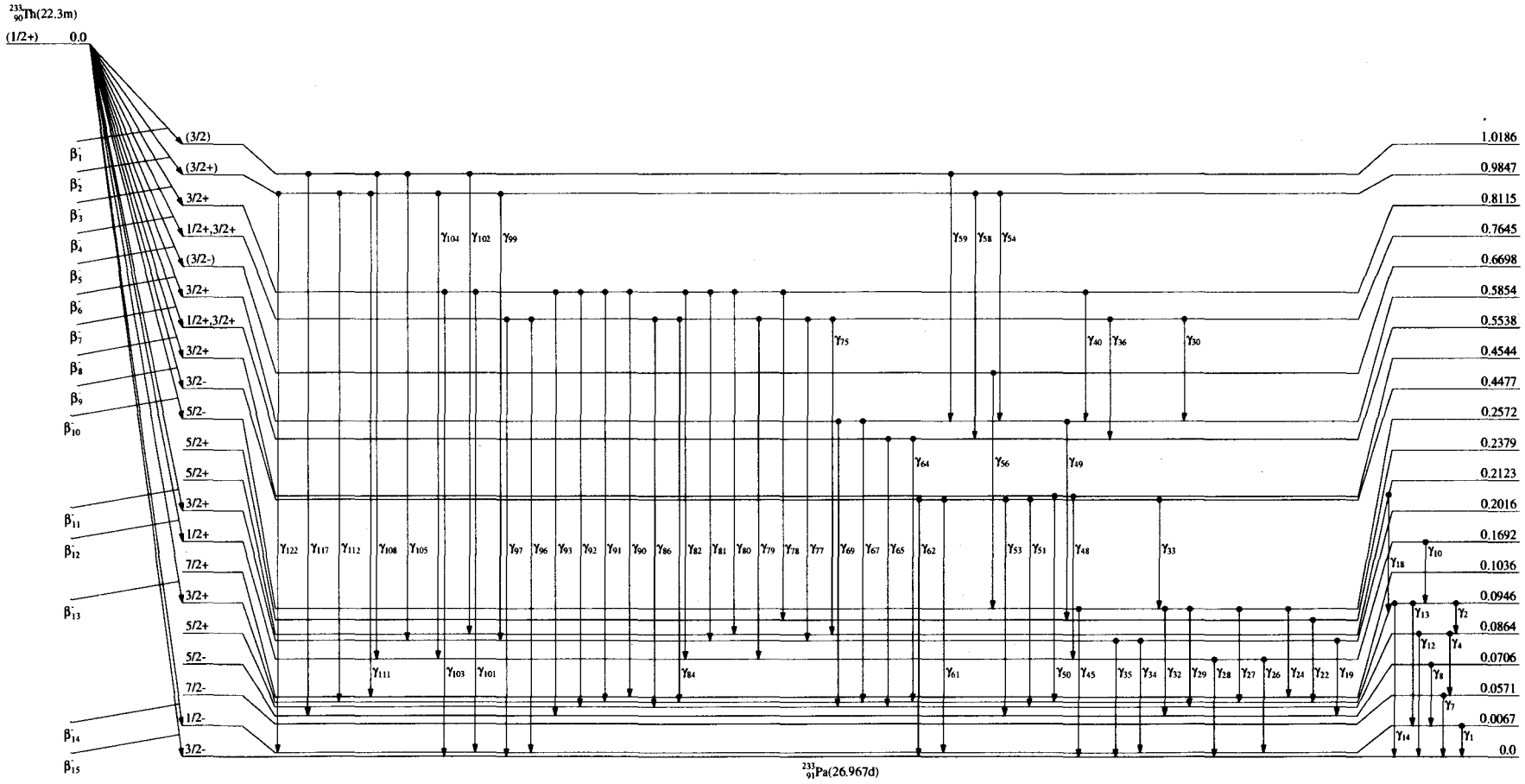
Half-life = 22.3 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 3	5.25E−03	1.250E−01*	6.56E−04
β^- 4	1.54E−02	1.402E−01*	2.15E−03
β^- 6	2.14E−03	2.002E−01*	4.28E−04
β^- 7	1.65E−02	2.112E−01*	3.49E−03
β^- 8	2.62E−03	2.461E−01*	6.46E−04
β^- 9	1.15E−02	2.485E−01*	2.85E−03
β^- 12	8.75E−03	3.504E−01*	3.06E−03
β^- 13	1.55E−01	3.784E−01*	5.88E−02
β^- 14	4.86E−01	4.119E−01*	2.00E−01
β^- 15	2.92E−01	4.145E−01*	1.21E−01
ce-M, γ 1	2.32E−01	2.506E−03*	5.82E−04
ce-N^+, γ 1	2.87E−01	6.680E−03*	1.92E−03
ce-N^+, γ 2	9.19E−02	8.220E−03*	7.56E−04
γ 4	2.48E−02	2.936E−02	7.29E−04
ce-L_2, γ 7	3.76E−02	3.680E−02	1.38E−03
ce-L_3, γ 7	3.12E−02	4.038E−02	1.26E−03
ce-M, γ 7	1.93E−02	5.294E−02*	1.02E−03
γ 10	5.16E−04	7.470E−02	3.86E−05
γ 12	2.76E−02	8.648E−02	2.38E−03
ce-L_1, γ 12	1.34E−02	6.538E−02	8.77E−04
ce-L_2, γ 12	8.46E−03	6.617E−02	5.60E−04
ce-L_3, γ 12	7.78E−03	6.975E−02	5.43E−04
ce-M, γ 12	7.23E−03	8.231E−02*	5.95E−04
γ 13	1.71E−03	8.800E−02	1.50E−04
γ 14	7.88E−03	9.468E−02	7.46E−04
γ 15	4.30E−04	1.052E−01	4.52E−05
γ 19	6.63E−04	1.311E−01	8.70E−05
γ 24	6.60E−04	1.536E−01	1.01E−04
γ 26	1.73E−03	1.625E−01	2.80E−04
γ 27	1.47E−03	1.625E−01	2.38E−04
γ 28	3.41E−03	1.692E−01	5.76E−04
γ 29	1.31E−03	1.707E−01	2.24E−04
γ 30	3.90E−04	1.790E−01	6.98E−05
γ 32	3.64E−04	1.868E−01	6.79E−05
γ 33	1.30E−03	1.906E−01	2.48E−04
γ 34	1.63E−03	1.949E−01	3.18E−04
γ 35	3.10E−04	2.016E−01	6.26E−05
γ 36	3.50E−04	2.106E−01	7.37E−05
γ 37	1.90E−04	2.113E−01	4.01E−05
γ 40	2.30E−04	2.261E−01	5.19E−05
γ 45	6.84E−04	2.573E−01	1.76E−04
γ 48	2.08E−04	2.855E−01	5.94E−05
γ 49	1.15E−04	3.473E−01	3.99E−05
γ 50	1.19E−03	3.597E−01	4.29E−04
γ 51	3.80E−04	3.614E−01	1.37E−04
γ 53	3.68E−04	3.770E−01	1.39E−04
γ 54	1.38E−04	3.988E−01	5.51E−05
γ 56	1.28E−04	4.125E−01	5.27E−05
γ 57	1.20E−04	4.184E−01	5.02E−05
γ 58	2.27E−04	4.309E−01	9.80E−05
γ 59	1.10E−04	4.332E−01	4.78E−05
γ 61	2.28E−03	4.409E−01	1.00E−03
γ 62	1.53E−03	4.478E−01	6.84E−04
γ 63	4.00E−04	4.542E−01	1.82E−04
γ 64	1.38E−02	4.592E−01	6.33E−03
ce-K, γ 64	3.37E−03	3.466E−01	1.17E−03
γ 65	1.78E−04	4.675E−01	8.32E−05
γ 67	1.67E−03	4.908E−01	8.20E−04
γ 68	2.10E−04	4.971E−01	1.04E−04
γ 69	2.09E−03	4.990E−01	1.04E−03
γ 71	2.00E−04	5.134E−01	1.03E−04
γ 75	2.43E−04	5.521E−01	1.34E−04
γ 77	6.96E−04	5.628E−01	3.92E−04
γ 78	4.19E−04	5.737E−01	2.40E−04
γ 79	1.56E−03	5.952E−01	9.29E−04
γ 80	4.69E−04	5.991E−01	2.81E−04
γ 81	8.48E−04	6.100E−01	5.17E−04
γ 82	2.84E−04	6.423E−01	1.83E−04
γ 84	6.83E−03	6.699E−01	4.58E−03
γ 86	8.69E−04	6.780E−01	5.89E−04
γ 87	1.60E−04	6.812E−01	1.09E−04
γ 88	1.20E−04	6.985E−01	8.38E−05
γ 89	1.10E−04	7.037E−01	7.74E−05
γ 90	1.18E−04	7.080E−01	8.32E−05
γ 91	5.58E−04	7.169E−01	4.00E−04
γ 92	8.71E−04	7.250E−01	6.31E−04
γ 93	3.08E−04	7.409E−01	2.28E−04
γ 94	6.80E−05	7.449E−01	5.07E−05
γ 96	4.18E−04	7.578E−01	3.16E−04
γ 97	1.19E−03	7.644E−01	9.12E−04
γ 98	1.40E−04	7.740E−01	1.08E−04
γ 99	6.05E−04	7.827E−01	4.74E−04
γ 100	4.90E−05	7.842E−01	3.84E−05
γ 101	3.08E−04	8.048E−01	2.48E−04
γ 102	1.22E−04	8.064E−01	9.81E−05
γ 103	7.76E−05	8.116E−01	6.30E−05
γ 104	2.81E−04	8.159E−01	2.29E−04
γ 105	1.50E−04	8.170E−01	1.23E−04
γ 106	8.10E−05	8.320E−01	6.74E−05
γ 108	4.43E−05	8.493E−01	3.77E−05
γ 110	6.20E−05	8.740E−01	5.42E−05
γ 111	7.79E−05	8.809E−01	6.87E−05
γ 112	1.42E−03	8.901E−01	1.27E−03
γ 114	7.00E−05	9.189E−01	6.43E−05
γ 115	4.90E−04	9.352E−01	4.58E−04
γ 116	7.80E−05	9.419E−01	7.35E−05
γ 117	7.18E−05	9.480E−01	6.81E−05
γ 118	5.40E−05	9.550E−01	5.16E−05
γ 119	6.80E−05	9.608E−01	6.53E−05
γ 121	1.10E−04	9.682E−01	1.07E−04
γ 122	7.47E−05	9.783E−01	7.31E−05
γ 127	4.00E−05	1.011E+00	4.04E−05
γ 128	8.10E−05	1.026E+00	8.31E−05
γ 129	7.00E−05	1.092E+00	7.65E−05
γ 131	7.00E−05	1.201E+00	8.41E−05
K_{α_1} X-ray	8.20E−03	9.587E−02	7.86E−04
K_{α_2} X-ray	5.05E−03	9.229E−02	4.66E−04
K_{β_1} X-ray	1.91E−03	1.084E−01	2.07E−04
K_{β_2} X-ray	9.96E−04	1.117E−01	1.11E−04
K_{β_3} X-ray	1.01E−03	1.076E−01	1.08E−04
L_α X-ray	3.66E−02	1.327E−02*	4.86E−04
L_β X-ray	4.73E−02	1.654E−02*	7.83E−04
L_γ X-ray	1.11E−02	1.974E−02*	2.18E−04
Auger-LMM	4.79E−02	1.026E−02*	4.92E−04
Auger-LMX	3.32E−02	1.373E−02*	4.56E−04
Auger-MXY	5.83E−01	4.024E−03*	2.34E−03
ΔE	4.57E−01	9.805E−04*	4.48E−04

Listed X, γ and $\gamma^\pm$ radiations	3.62E−02
Omitted X, γ and $\gamma^\pm$ radiations**	6.25E−04
Listed β, ce and Auger radiations	4.08E−01
Omitted β, ce and Auger radiations**	7.72E−03
Listed radiations	4.44E−01
Omitted radiations**	8.35E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pa-233 daughter is radioactive.


233 90 Th(22.3m)
(1/2+) 0.0
(3/2)
(3/2+)
3/2+
1/2+,3/2+
(3/2-)
3/2+
1/2+,3/2+
3/2+
3/2-
5/2-
5/2+
5/2+
3/2+
1/2+
7/2+
3/2+
5/2+
5/2-
7/2-
1/2-
3/2-
1.0186
0.9847
0.8115
0.7645
0.6698
0.5854
0.5538
0.4544
0.4477
0.2572
0.2379
0.2123
0.2016
0.1692
0.1036
0.0946
0.0864
0.0706
0.0571
0.0067
0.0
233 91 Pa(26.967d)

90-Th-236

07-AUG-91

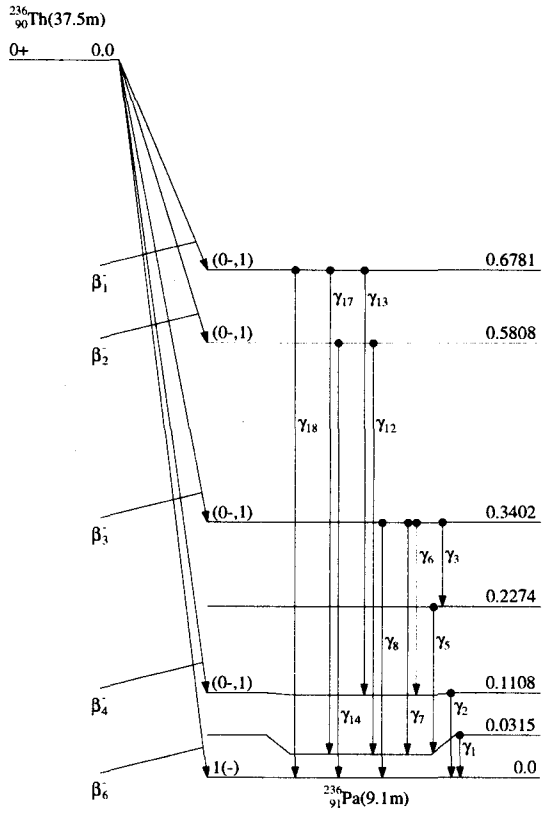
Half-life = 37.5 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.53E−02	7.790E−02*	1.19E−03
β^- 2	6.12E−03	1.077E−01*	6.59E−04
β^- 3	5.10E−02	1.866E−01*	9.51E−03
β^- 4	9.17E−02	2.671E−01*	2.45E−02
β^- 6	8.36E−01	3.074E−01*	2.57E−01
γ 2	4.20E−02	1.108E−01	4.65E−03
ce-L_1, γ 2	4.78E−02	8.970E−02	4.29E−03
ce-L_2, γ 2	5.61E−03	9.049E−02	5.07E−04
ce-M, γ 2	1.29E−02	1.066E−01*	1.38E−03
ce-N^+, γ 2	4.77E−03	1.108E−01*	5.29E−04
γ 3	2.40E−03	1.128E−01	2.71E−04
ce-L_1, γ 3	5.08E−03	9.170E−02	4.66E−04
γ 4	5.60E−03	1.316E−01	7.37E−04
ce-L_2, γ 4	8.56E−03	1.113E−01	9.52E−04
ce-L_3, γ 4	5.21E−03	1.149E−01	5.98E−04
ce-M, γ 4	3.96E−03	1.274E−01*	5.04E−04
γ 5	6.90E−03	1.960E−01	1.35E−03
ce-K, γ 5	1.75E−02	8.340E−02	1.46E−03
ce-L_1, γ 5	3.00E−03	1.749E−01	5.24E−04
γ 6	5.60E−03	2.295E−01	1.29E−03
ce-K, γ 6	9.14E−03	1.169E−01	1.07E−03
ce-L_1, γ 6	1.56E−03	2.084E−01	3.25E−04
γ 7	4.20E−03	3.087E−01	1.30E−03
ce-K, γ 7	1.67E−03	1.961E−01	3.28E−04
γ 8	6.70E−03	3.401E−01	2.28E−03
ce-K, γ 8	2.14E−03	2.275E−01	4.86E−04
γ 9	1.70E−03	3.924E−01	6.67E−04
γ 10	1.30E−03	4.148E−01	5.39E−04
γ 11	6.70E−03	4.343E−01	2.91E−03
γ 12	3.20E−03	5.492E−01	1.76E−03
ce-K, γ 13	1.22E−03	4.545E−01	5.55E−04
γ 14	2.00E−03	5.811E−01	1.16E−03
γ 15	9.00E−04	5.864E−01	5.28E−04
γ 16	2.40E−03	5.997E−01	1.44E−03
γ 17	7.20E−03	6.466E−01	4.66E−03
γ 18	4.70E−03	6.781E−01	3.19E−03
γ 19	2.10E−03	7.199E−01	1.51E−03
K_{α_1} X-ray	2.95E−02	9.587E−02	2.83E−03
K_{α_2} X-ray	1.82E−02	9.229E−02	1.68E−03
K_{β_1} X-ray	6.88E−03	1.084E−01	7.46E−04
K_{β_2} X-ray	3.59E−03	1.117E−01	4.01E−04
K_{β_3} X-ray	3.62E−03	1.076E−01	3.89E−04
L_α X-ray	3.16E−02	1.327E−02*	4.19E−04
L_β X-ray	3.94E−02	1.651E−02*	6.51E−04
L_γ X-ray	9.65E−03	1.979E−02*	1.91E−04
Auger-LMM	4.03E−02	1.023E−02*	4.12E−04
Auger-LMX	2.81E−02	1.371E−02*	3.85E−04
Auger-MXY	2.11E−01	3.939E−03*	8.29E−04

Listed X, γ and $\gamma^\pm$ radiations	3.75E−02
Omitted X, γ and $\gamma^\pm$ radiations**	5.88E−05
Listed β, ce and Auger radiations	3.08E−01
Omitted β, ce and Auger radiations**	3.30E−03
Listed radiations	3.46E−01
Omitted radiations**	3.36E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pa-236 daughter is radioactive.



91-Pa-229

α: 28-AUG-90
EC: 16-FEB-90

Half-life = 1.5 d
Decay mode(s): α, EC

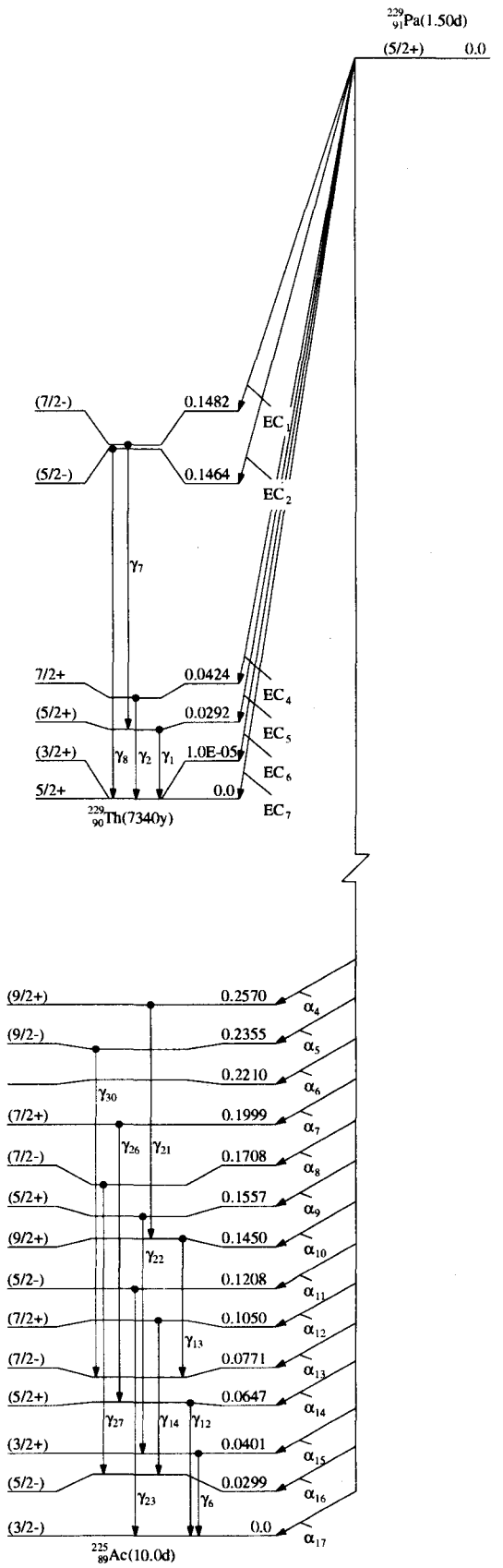
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 4	8.27E−05	5.481E+00	4.53E−04
α recoil	8.27E−05	9.751E−02	8.06E−06
α 5	3.40E−05	5.502E+00	1.87E−04
α recoil	3.40E−05	9.788E−02	3.33E−06
α 6	2.92E−05	5.516E+00	1.61E−04
α recoil	2.92E−05	9.813E−02	2.86E−06
α 7	4.13E−04	5.537E+00	2.29E−03
α recoil	4.13E−04	9.850E−02	4.07E−05
α 8	1.90E−04	5.566E+00	1.06E−03
α recoil	1.90E−04	9.901E−02	1.88E−05
α 9	1.75E−03	5.581E+00	9.77E−03
α recoil	1.75E−03	9.928E−02	1.74E−04
α 10	2.24E−04	5.591E+00	1.25E−03
α recoil	2.24E−04	9.946E−02	2.22E−05
α 11	6.47E−04	5.615E+00	3.63E−03
α recoil	6.47E−04	9.989E−02	6.46E−05
α 12	4.72E−04	5.630E+00	2.66E−03
α recoil	4.72E−04	1.002E−01	4.72E−05
α 13	4.86E−06	5.658E+00	2.75E−05
α recoil	4.86E−06	1.006E−01	4.89E−07

α 14	9.00E−04	5.670E+00	5.10E−03
α recoil	9.00E−04	1.009E−01	9.07E−05
α 15	9.72E−06	5.694E+00	5.54E−05
α recoil	9.72E−06	1.013E−01	9.85E−07
α 16	9.72E−06	5.704E+00	5.55E−05
α recoil	9.72E−06	1.015E−01	9.87E−07
α 17	2.43E−05	5.734E+00	1.39E−04
α recoil	2.43E−05	1.020E−01	2.48E−06
ce-K, γ 22	1.75E−03	8.795E−03	1.54E−05
ce-L_1, γ 22	2.94E−04	9.571E−02	2.81E−05
ce-L_1, γ 23	1.33E−04	1.010E−01	1.35E−05
K_{α_1} X-ray	1.37E−03	9.088E−02	1.25E−04
K_{α_2} X-ray	8.39E−04	8.767E−02	7.36E−05
Auger-MXY	6.04E−03	3.732E−03*	2.26E−05
ce-L_1, γ 1	5.96E−03	8.720E−03	5.20E−05
ce-M, γ 1	1.60E−03	2.515E−02*	4.03E−05
ce-N^+, γ 1	6.29E−04	2.919E−02*	1.84E−05
ce-L_1, γ 2	1.32E−02	2.197E−02	2.90E−04
ce-L_2, γ 2	1.75E−02	2.275E−02	3.97E−04
ce-L_3, γ 2	1.47E−02	2.614E−02	3.84E−04
ce-M, γ 2	1.19E−02	3.839E−02*	4.57E−04
ce-N^+, γ 2	4.44E−03	4.244E−02*	1.88E−04
γ 7	1.30E−03	1.190E−01	1.55E−04
γ 8	9.75E−04	1.464E−01	1.43E−04
K_{α_1} X-ray	2.93E−01	9.335E−02	2.73E−02
K_{α_2} X-ray	1.79E−01	8.996E−02	1.61E−02
K_{β_1} X-ray	6.79E−02	1.056E−01	7.17E−03
K_{β_2} X-ray	3.51E−02	1.088E−01	3.82E−03
K_{β_3} X-ray	3.56E−02	1.048E−01	3.74E−03
K_{β_5} X-ray	2.41E−03	1.062E−01	2.56E−04
L_α X-ray	1.69E−01	1.295E−02*	2.19E−03
L_β X-ray	1.93E−01	1.603E−02*	3.10E−03
L_γ X-ray	4.52E−02	1.920E−02*	8.68E−04
L_ℓ X-ray	8.05E−03	1.112E−02	8.95E−05
Auger-KLL	9.41E−03	7.119E−02*	6.70E−04
Auger-KLX	5.40E−03	8.688E−02*	4.69E−04
Auger-KXY	9.15E−04	1.015E−01*	9.28E−05
Auger-LMM	2.20E−01	9.849E−03*	2.17E−03
Auger-LMX	1.52E−01	1.323E−02*	2.01E−03
Auger-LXY	2.59E−02	1.587E−02*	4.12E−04
Auger-MXY	1.12E+00	3.907E−03*	4.37E−03
ΔE	3.03E−01	8.058E−04*	2.44E−04

Listed X, γ and $\gamma^{\pm}$ radiations	6.52E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.79E−04
Listed β, ce and Auger radiations	1.23E−02
Omitted β, ce and Auger radiations**	2.09E−04
Listed α and α recoil radiations	2.73E−02
Omitted α and α recoil radiations	5.87E−05
Listed radiations	1.05E−01
Omitted radiations**	7.47E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Ac-225 daughter, yield 4.8E−03, is radioactive.
Th-229 daughter, yield 9.952E−01, is radioactive.



91-Pa-236

07-AUG-91

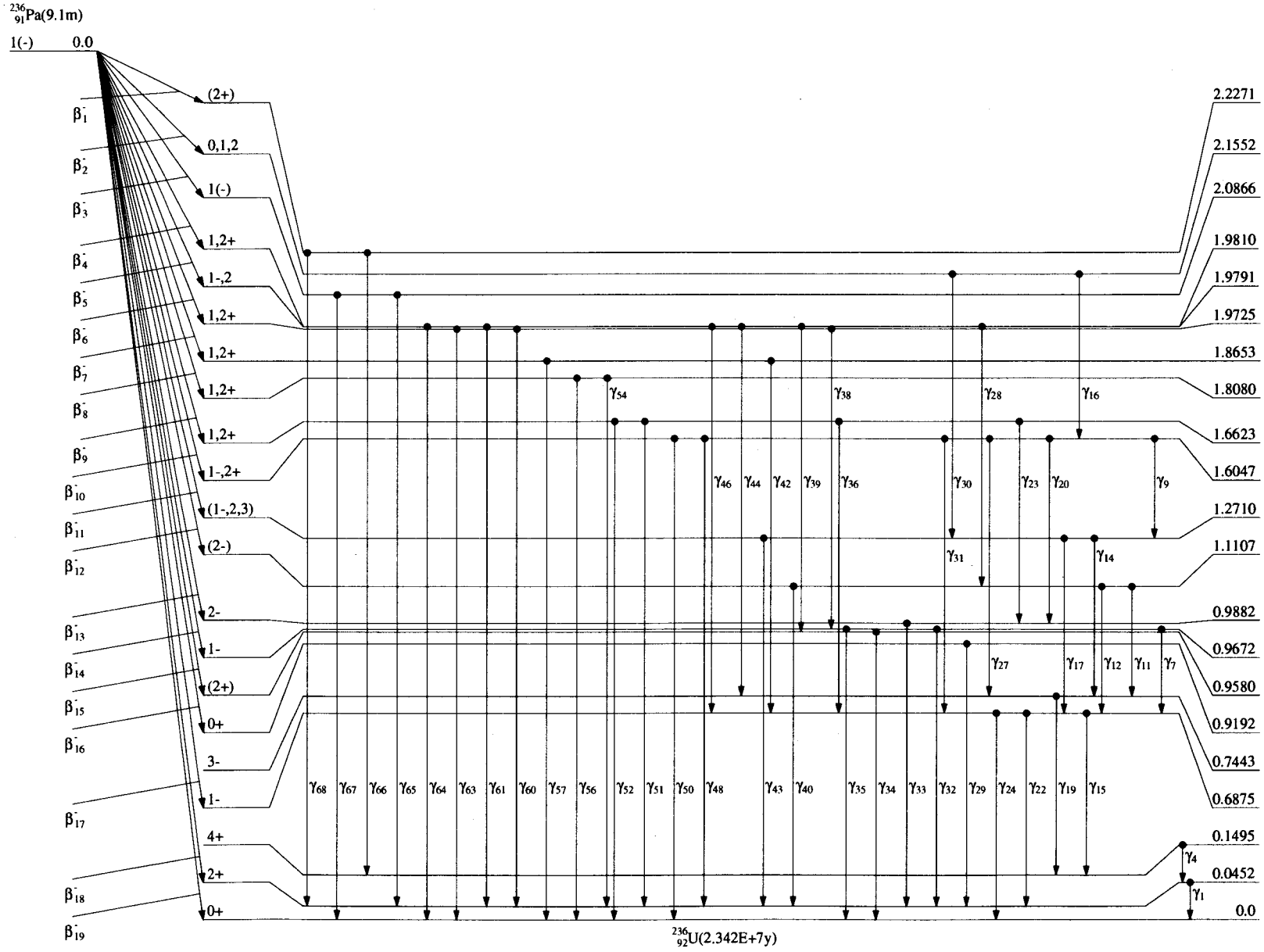
Half-life = 9.1 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 2	1.20E−02	2.295E−01*	2.76E−03
β^- 3	2.61E−02	2.537E−01*	6.61E−03
β^- 4	1.80E−02	2.917E−01*	5.26E−03
β^- 5	3.31E−02	2.924E−01*	9.67E−03
β^- 6	2.10E−02	2.948E−01*	6.20E−03
β^- 7	6.01E−03	3.342E−01*	2.01E−03
β^- 8	8.22E−02	3.556E−01*	2.92E−02
β^- 9	1.90E−02	4.106E−01*	7.82E−03
β^- 10	5.11E−02	4.326E−01*	2.21E−02
β^- 11	4.01E−03	5.627E−01*	2.26E−03
β^- 12	2.20E−02	6.264E−01*	1.38E−02
β^- 13	1.10E−02	6.755E−01*	7.45E−03
β^- 14	2.30E−02	6.840E−01*	1.58E−02
β^- 15	2.61E−03	6.877E−01*	1.79E−03
β^- 16	5.11E−03	7.033E−01*	3.59E−03
β^- 17	4.71E−01	7.973E−01*	3.75E−01
β^- 18	9.02E−02	1.061E+00*	9.57E−02
β^- 19	1.00E−01	1.080E+00*	1.08E−01
ce-L_2, γ 1	2.58E−01	2.429E−02	6.28E−03
ce-L_3, γ 1	2.25E−01	2.808E−02	6.32E−03
ce-M, γ 1	1.36E−01	4.094E−02*	5.55E−03
ce-N^+, γ 1	5.11E−02	4.524E−02*	2.31E−03
ce-L_2, γ 3	9.59E−02	4.785E−02	4.59E−03
ce-L_3, γ 3	7.38E−02	5.163E−02	3.81E−03
ce-M, γ 3	4.79E−02	6.450E−02*	3.09E−03
ce-N^+, γ 3	1.78E−02	6.880E−02*	1.23E−03
γ 7	5.30E−03	2.790E−01	1.48E−03
γ 9	8.20E−03	3.337E−01	2.74E−03
γ 11	7.80E−03	3.666E−01	2.86E−03
ce-K, γ 11	3.82E−03	2.510E−01	9.60E−04
γ 12	9.50E−03	4.231E−01	4.02E−03
ce-K, γ 12	3.16E−03	3.075E−01	9.70E−04
γ 13	5.00E−03	4.534E−01	2.27E−03
γ 14	3.10E−03	5.267E−01	1.63E−03
γ 15	5.80E−03	5.381E−01	3.12E−03
γ 16	1.08E−02	5.506E−01	5.95E−03
γ 17	2.00E−03	5.835E−01	1.17E−03
γ 18	2.00E−03	5.870E−01	1.17E−03
γ 19	3.20E−03	5.945E−01	1.90E−03
γ 20	2.10E−03	6.171E−01	1.30E−03
γ 21	2.30E−03	6.269E−01	1.44E−03
γ 22	3.70E−01	6.423E−01	2.38E−01
ce-K, γ 22	4.50E−02	5.267E−01	2.37E−02
ce-L_1, γ 22	6.35E−03	6.205E−01	3.94E−03
ce-M, γ 22	1.91E−03	6.380E−01*	1.22E−03
γ 23	2.10E−03	6.745E−01	1.42E−03
γ 24	9.90E−02	6.875E−01	6.81E−02
ce-K, γ 24	2.49E−02	5.719E−01	1.42E−02
ce-L_1, γ 24	3.53E−03	6.657E−01	2.35E−03
γ 25	1.90E−03	6.963E−01	1.32E−03
γ 26	3.30E−03	7.408E−01	2.44E−03
γ 27	7.60E−03	8.606E−01	6.54E−03
γ 28	6.90E−03	8.704E−01	6.01E−03
γ 29	5.10E−03	8.741E−01	4.46E−03
γ 30	1.50E−03	8.840E−01	1.33E−03
γ 31	1.37E−02	9.170E−01	1.26E−02
γ 32	4.00E−03	9.212E−01	3.68E−03
γ 33	8.70E−03	9.424E−01	8.20E−03
γ 34	8.40E−03	9.580E−01	8.05E−03
γ 35	9.10E−03	9.668E−01	8.80E−03
γ 36	1.90E−03	9.750E−01	1.85E−03
γ 37	5.50E−03	9.909E−01	5.45E−03
γ 38	1.50E−03	1.006E+00	1.51E−03
γ 39	5.80E−03	1.023E+00	5.93E−03
γ 40	3.20E−03	1.065E+00	3.41E−03
γ 41	4.00E−03	1.156E+00	4.62E−03
γ 42	3.60E−03	1.178E+00	4.24E−03
γ 43	8.00E−03	1.226E+00	9.81E−03
γ 44	1.09E−02	1.235E+00	1.35E−02
γ 45	1.14E−02	1.284E+00	1.46E−02
γ 46	1.09E−02	1.292E+00	1.41E−02
γ 47	1.25E−02	1.518E+00	1.90E−02
γ 48	2.20E−02	1.560E+00	3.43E−02
γ 49	6.60E−03	1.587E+00	1.05E−02
γ 50	4.00E−03	1.605E+00	6.42E−03
γ 51	9.10E−03	1.617E+00	1.47E−02
γ 52	6.00E−03	1.662E+00	9.97E−03
γ 53	3.30E−03	1.749E+00	5.77E−03
γ 54	6.00E−02	1.763E+00	1.06E−01
γ 55	3.00E−03	1.773E+00	5.32E−03
γ 56	2.24E−02	1.808E+00	4.05E−02
γ 57	2.40E−03	1.865E+00	4.48E−03
γ 58	6.00E−03	1.908E+00	1.14E−02
γ 59	6.00E−04	1.917E+00	1.15E−03
γ 60	1.02E−02	1.927E+00	1.97E−02
γ 61	1.07E−02	1.934E+00	2.07E−02
γ 62	9.10E−03	1.948E+00	1.77E−02
γ 63	1.02E−02	1.973E+00	2.01E−02
γ 64	5.10E−03	1.981E+00	1.01E−02
γ 65	1.67E−02	2.041E+00	3.41E−02
γ 66	9.00E−04	2.079E+00	1.87E−03
γ 67	9.30E−03	2.086E+00	1.94E−02
γ 68	1.80E−03	2.182E+00	3.93E−03
K_{α_1} X-ray	4.20E−02	9.844E−02	4.13E−03
K_{α_2} X-ray	2.60E−02	9.466E−02	2.46E−03
K_{β_1} X-ray	9.83E−03	1.113E−01	1.09E−03
L_α X-ray	1.52E−01	1.360E−02*	2.06E−03
L_β X-ray	2.11E−01	1.706E−02*	3.59E−03
L_γ X-ray	4.86E−02	2.030E−02*	9.86E−04
Auger-LMM	2.01E−01	1.058E−02*	2.13E−03
Auger-LMX	1.40E−01	1.414E−02*	1.98E−03
Auger-MXY	1.08E+00	3.946E−03*	4.27E−03

Listed X, γ and $\gamma^\pm$ radiations	9.12E−01
Omitted X, γ and $\gamma^\pm$ radiations**	4.01E−03
Listed β, ce and Auger radiations	8.05E−01
Omitted β, ce and Auger radiations**	1.63E−02
Listed radiations	1.72E+00
Omitted radiations**	2.03E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

U-236 daughter is radioactive.


236 91 Pa(9.1m)
1(-) 0.0
β-1 β-2 β-3 β-4 β-5 β-6 β-7 β-8 β-9 β-10 β-11 β-12 β-13 β-14 β-15 β-16 β-17 β-18 β-19
(2+)
0,1,2
1(-)
1,2+
1-,2
1,2+
1,2+
1,2+
1,2+
1-,2+
(1-,2,3)
(2-)
2-
1-
(2+)
0+
3-
1-
4+
2+
0+
2.2271
2.1552
2.0866
1.9810
1.9791
1.9725
1.8653
1.8080
1.6623
1.6047
1.2710
1.1107
0.9882
0.9672
0.9580
0.9192
0.7443
0.6875
0.1495
0.0452
0.0
γ54 γ38 γ28 γ16
γ46 γ44 γ42 γ39 γ36 γ30 γ23 γ20 γ9
γ31 γ14
γ27 γ17 γ12 γ11 γ7
γ68 γ67 γ66 γ65 γ64 γ63 γ61 γ60 γ57 γ56 γ52 γ51 γ50 γ48 γ43 γ40 γ35 γ34 γ33 γ32 γ29 γ24 γ22 γ19 γ15
γ4
γ1
236 92 U(2.342E+7y)

92-U-228

06-MAR-97

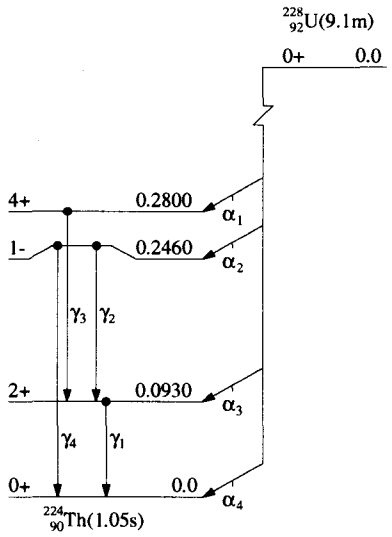
Half-life = 9.1 m
Decay mode(s): α

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	5.45E−03	6.409E+00	3.49E−02
α recoil	5.45E−03	1.145E−01	6.24E−04
α 2	6.42E−03	6.443E+00	4.14E−02
α recoil	6.42E−03	1.151E−01	7.39E−04
α 3	2.82E−01	6.593E+00	1.86E+00
α recoil	2.82E−01	1.178E−01	3.32E−02
α 4	6.81E−01	6.685E+00	4.55E+00
α recoil	6.81E−01	1.194E−01	8.13E−02
γ 1	2.08E−02	9.300E−02	1.93E−03
ce-L_1, γ 1	4.74E−03	7.253E−02	3.44E−04
ce-L_2, γ 1	1.08E−01	7.331E−02	7.92E−03
ce-L_3, γ 1	7.75E−02	7.670E−02	5.95E−03
ce-M, γ 1	5.22E−02	8.895E−02*	4.64E−03
ce-N^+, γ 1	1.94E−02	9.300E−02*	1.80E−03
γ 2	1.95E−03	1.520E−01	2.96E−04
γ 3	2.92E−03	1.870E−01	5.47E−04
ce-K, γ 3	5.28E−04	7.735E−02	4.08E−05
ce-L_2, γ 3	8.75E−04	1.673E−01	1.46E−04
ce-L_3, γ 3	4.59E−04	1.707E−01	7.84E−05
ce-M, γ 3	3.96E−04	1.830E−01*	7.25E−05
ce-N^+, γ 3	1.47E−04	1.870E−01*	2.74E−05
γ 4	3.90E−03	2.460E−01	9.59E−04
ce-K, γ 4	1.82E−04	1.363E−01	2.49E−05
K_{α_1} X-ray	4.60E−04	9.335E−02	4.30E−05
K_{α_2} X-ray	2.82E−04	8.996E−02	2.54E−05
K_{β_1} X-ray	1.07E−04	1.056E−01	1.13E−05
K_{β_2} X-ray	5.52E−05	1.088E−01	6.01E−06
K_{β_3} X-ray	5.61E−05	1.048E−01	5.88E−06
L_α X-ray	3.16E−02	1.295E−02*	4.09E−04
L_β X-ray	5.44E−02	1.611E−02*	8.77E−04
L_γ X-ray	1.29E−02	1.910E−02*	2.46E−04
L_η X-ray	1.15E−03	1.451E−02	1.67E−05
L_ℓ X-ray	1.51E−03	1.112E−02	1.67E−05
Auger-LMM	5.06E−02	1.026E−02*	5.19E−04
Auger-LMX	3.47E−02	1.362E−02*	4.72E−04
Auger-LXY	5.87E−03	1.625E−02*	9.53E−05
Auger-MXY	2.68E−01	3.672E−03*	9.84E−04
ΔE	8.24E−02	8.110E−04*	6.68E−05

Listed X, γ and $\gamma^\pm$ radiations	5.39E−03
Omitted X, γ and $\gamma^\pm$ radiations**	4.79E−07
Listed β, ce and Auger radiations	2.32E−02
Omitted β, ce and Auger radiations**	5.50E−05
Listed α and α recoil radiations	6.60E+00
Listed radiations	6.63E+00
Omitted radiations**	5.55E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Th-224 daughter, yield 9.75E−01, is radioactive.



92-U-235m

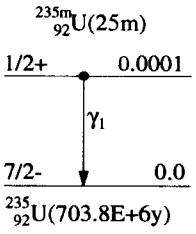
14-NOV-98
(prepared)

Half-life = 25 m
Decay mode(s): IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	1.00E+00	7.680E−05	7.68E−05

Listed X, γ and $\gamma^\pm$ radiations	7.68E−05
Listed radiations	7.68E−05

U-235 daughter is radioactive.



93-Np-231

α: 11-MAY-92
EC, β^+: 10-FEB-94

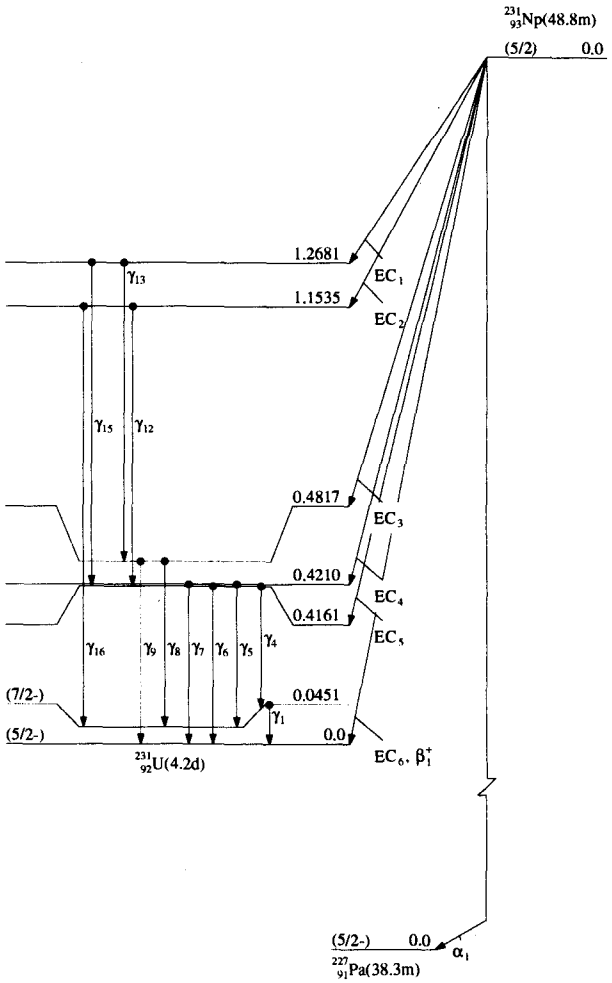
Half-life = 48.8 m
Decay mode(s): α, EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	2.00E−02	6.260E+00	1.25E−01
α recoil	2.00E−02	1.104E−01	2.21E−03
β^+ 1	1.66E−03	3.816E−01*	6.35E−04
$\gamma^\pm$	3.33E−03	5.110E−01	1.70E−03
ce-L$_1$, γ 1	5.80E−02	2.304E−02	1.34E−03
ce-L$_2$, γ 1	6.69E−03	2.385E−02	1.60E−04
ce-M, γ 1	1.57E−02	4.050E−02*	6.37E−04
ce-N$^+$, γ 1	5.80E−03	4.480E−02*	2.60E−04
γ 2	1.71E−02	2.638E−01	4.50E−03
ce-K, γ 2	1.65E−03	1.482E−01	2.45E−04
ce-L$_1$, γ 2	3.53E−04	2.420E−01	8.55E−05
ce-L$_2$, γ 2	1.44E−03	2.429E−01	3.51E−04
ce-L$_3$, γ 2	5.98E−04	2.466E−01	1.48E−04
ce-M, γ 2	6.51E−04	2.595E−01*	1.69E−04
ce-N$^+$, γ 2	2.41E−04	2.638E−01*	6.35E−05
γ 3	2.18E−02	3.484E−01	7.58E−03
ce-K, γ 3	1.25E−03	2.328E−01	2.91E−04
ce-L$_1$, γ 3	2.44E−04	3.266E−01	7.98E−05
ce-L$_2$, γ 3	5.95E−04	3.275E−01	1.95E−04
ce-L$_3$, γ 3	2.08E−04	3.312E−01	6.90E−05
ce-M, γ 3	2.81E−04	3.441E−01*	9.69E−05
ce-N$^+$, γ 3	1.04E−04	3.484E−01*	3.61E−05
γ 4	5.88E−02	3.709E−01	2.18E−02
ce-K, γ 4	1.64E−02	2.553E−01	4.18E−03
ce-L$_1$, γ 4	2.80E−03	3.491E−01	9.78E−04
ce-L$_2$, γ 4	3.48E−04	3.500E−01	1.22E−04
ce-M, γ 4	7.63E−04	3.666E−01*	2.80E−04
ce-N$^+$, γ 4	2.78E−04	3.709E−01*	1.03E−04
γ 5	3.82E−03	3.763E−01	1.44E−03
ce-K, γ 5	1.90E−04	2.607E−01	4.95E−05
ce-L$_2$, γ 5	7.70E−05	3.554E−01	2.74E−05
γ 6	1.71E−03	4.163E−01	7.10E−04
γ 7	6.29E−03	4.207E−01	2.65E−03
ce-K, γ 7	2.53E−04	3.051E−01	7.73E−05
ce-L$_2$, γ 7	8.20E−05	3.998E−01	3.28E−05
γ 8	1.71E−03	4.369E−01	7.45E−04
γ 9	3.65E−03	4.816E−01	1.76E−03
ce-K, γ 9	1.14E−04	3.660E−01	4.18E−05
γ 10	9.76E−03	4.847E−01	4.73E−03
ce-K, γ 10	3.02E−04	3.691E−01	1.12E−04
ce-L$_1$, γ 10	5.49E−05	4.629E−01	2.54E−05
ce-L$_2$, γ 10	7.42E−05	4.638E−01	3.44E−05
γ 11	1.47E−03	7.155E−01	1.05E−03
γ 12	7.41E−03	7.378E−01	5.47E−03
ce-K, γ 12	1.07E−04	6.222E−01	6.67E−05
γ 13	1.12E−03	7.866E−01	8.79E−04
γ 14	2.41E−03	8.373E−01	2.02E−03
γ 15	4.17E−03	8.516E−01	3.56E−03
ce-K, γ 15	4.70E−05	7.360E−01	3.46E−05
γ 16	3.23E−03	1.108E+00	3.58E−03
K$_{\alpha_1}$ X-ray	3.57E−01	9.844E−02	3.51E−02
K$_{\alpha_2}$ X-ray	2.21E−01	9.466E−02	2.09E−02
K$_{\beta_1}$ X-ray	8.35E−02	1.113E−01	9.29E−03
K$_{\beta_2}$ X-ray	4.39E−02	1.147E−01	5.03E−03
K$_{\beta_3}$ X-ray	4.40E−02	1.104E−01	4.86E−03
K$_{\beta_5}$ X-ray	3.09E−03	1.120E−01	3.46E−04
L$_\alpha$ X-ray	1.89E−01	1.360E−02*	2.57E−03
L$_\beta$ X-ray	2.00E−01	1.697E−02*	3.39E−03
L$_\gamma$ X-ray	4.55E−02	2.038E−02*	9.27E−04
Auger-KLL	1.10E−02	7.469E−02*	8.24E−04
Auger-KLX	6.39E−03	9.145E−02*	5.84E−04
Auger-KXY	1.09E−03	1.069E−01*	1.16E−04
Auger-LMM	2.22E−01	1.030E−02*	2.28E−03
Auger-LMX	1.55E−01	1.388E−02*	2.15E−03
Auger-LXY	2.63E−02	1.669E−02*	4.38E−04
Auger-MXY	1.14E+00	4.211E−03*	4.81E−03
ΔE	3.05E−01	8.671E−04*	2.64E−04

Listed X, γ and $\gamma^\pm$ radiations	1.47E−01
Omitted X, γ and $\gamma^\pm$ radiations**	3.00E−04
Listed β, ce and Auger radiations	2.25E−02
Omitted β, ce and Auger radiations**	4.06E−04
Listed α and α recoil radiations	1.27E−01
Listed radiations	2.96E−01
Omitted radiations**	7.06E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pa-227 daughter, yield 2.0E−02, is radioactive.
U-231 daughter, yield 9.80E−01, is radioactive.



93-Np-241

16-AUG-94

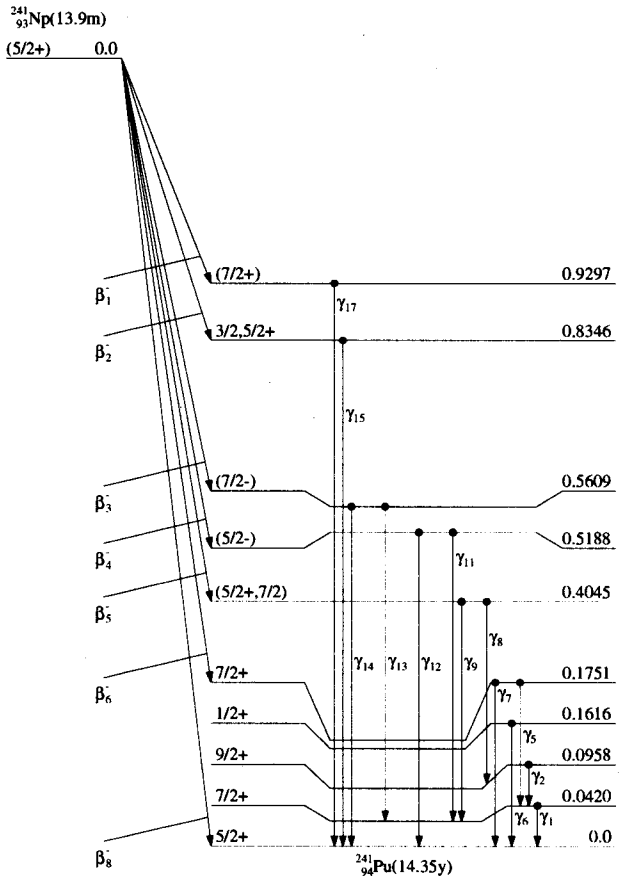
Half-life = 13.9 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 4	4.89E−03	2.413E−01*	1.18E−03
β^- 5	3.52E−03	2.820E−01*	9.94E−04
β^- 6	3.23E−01	3.661E−01*	1.18E−01
β^- 8	6.66E−01	4.321E−01*	2.88E−01
γ 1	1.00E−03	4.200E−02	4.20E−05
ce-L_1, γ 1	5.01E−02	1.890E−02	9.48E−04
ce-M, γ 1	1.93E−02	3.744E−02*	7.24E−04
γ 5	8.60E−03	1.331E−01	1.14E−03
ce-K, γ 5	8.52E−02	1.128E−02	9.62E−04
ce-L_1, γ 5	1.52E−02	1.100E−01	1.67E−03
ce-M, γ 5	4.18E−03	1.285E−01*	5.37E−04
γ 6	7.00E−04	1.616E−01	1.13E−04
γ 7	3.10E−02	1.751E−01	5.43E−03
ce-K, γ 7	1.41E−01	5.328E−02	7.50E−03
ce-L_1, γ 7	2.50E−02	1.520E−01	3.80E−03
ce-L_2, γ 7	3.17E−03	1.528E−01	4.84E−04
ce-M, γ 7	6.88E−03	1.705E−01*	1.17E−03
ce-N^+, γ 7	2.57E−03	1.751E−01*	4.50E−04
γ 8	8.35E−04	3.088E−01	2.58E−04
γ 9	1.48E−03	3.624E−01	5.35E−04
γ 11	1.00E−03	4.766E−01	4.77E−04
γ 12	4.00E−03	5.188E−01	2.08E−03
γ 13	4.00E−04	5.188E−01	2.08E−04
γ 14	8.00E−04	5.611E−01	4.49E−04
γ 15	1.10E−03	8.346E−01	9.18E−04
γ 17	8.00E−04	9.297E−01	7.44E−04
K_{α_1} X-ray	1.05E−01	1.038E−01	1.09E−02
K_{α_2} X-ray	6.55E−02	9.955E−02	6.52E−03
K_{β_1} X-ray	2.45E−02	1.173E−01	2.88E−03
K_{β_2} X-ray	1.31E−02	1.208E−01	1.58E−03
K_{β_3} X-ray	1.30E−02	1.163E−01	1.51E−03
K_{β_5} X-ray	9.67E−04	1.179E−01	1.14E−04
L_α X-ray	7.47E−02	1.426E−02*	1.07E−03
L_β X-ray	7.73E−02	1.795E−02*	1.39E−03
L_γ X-ray	1.81E−02	2.165E−02*	3.91E−04
L_ℓ X-ray	3.83E−03	1.212E−02	4.64E−05
Auger-LMM	7.48E−02	1.079E−02*	8.07E−04
Auger-LMX	5.30E−02	1.457E−02*	7.73E−04
Auger-MXY	4.10E−01	4.440E−03*	1.82E−03

Listed X, γ and $\gamma^\pm$ radiations	3.88E−02
Omitted X, γ and $\gamma^\pm$ radiations**	9.27E−05
Listed β, ce and Auger radiations	4.30E−01
Omitted β, ce and Auger radiations**	3.84E−03
Listed radiations	4.68E−01
Omitted radiations**	3.93E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Pu-241 daughter is radioactive.



94-Pu-232

α: 24-APR-97
EC: 07-AUG-91

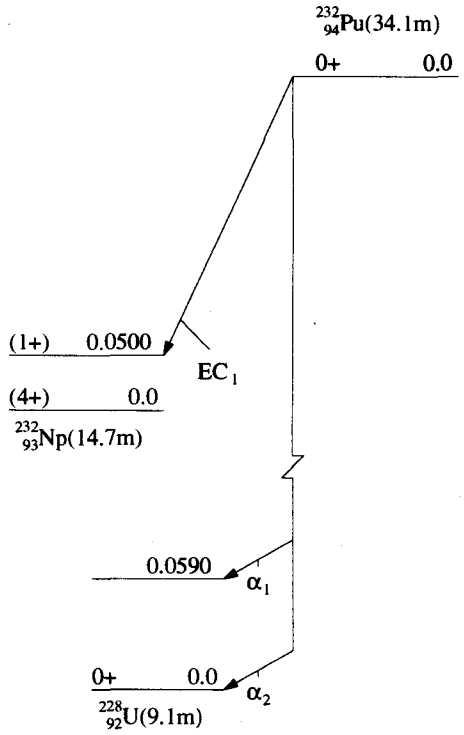
Half-life = 34.1 m
Decay mode(s): α, EC

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	7.60E−02	6.542E+00	4.97E−01
α recoil	7.60E−02	1.148E−01	8.73E−03
α 2	1.24E−01	6.600E+00	8.18E−01
α recoil	1.24E−01	1.159E−01	1.44E−02
K_{α_1} X-ray	2.75E−01	1.011E−01	2.78E−02
K_{α_2} X-ray	1.71E−01	9.708E−02	1.66E−02
K_{β_1} X-ray	6.43E−02	1.142E−01	7.35E−03
K_{β_2} X-ray	3.41E−02	1.177E−01	4.01E−03
K_{β_3} X-ray	3.39E−02	1.133E−01	3.85E−03
K_{β_5} X-ray	2.46E−03	1.149E−01	2.82E−04
L_α X-ray	1.43E−01	1.393E−02*	1.99E−03
L_β X-ray	1.46E−01	1.746E−02*	2.55E−03
L_γ X-ray	3.28E−02	2.099E−02*	6.88E−04
L_ℓ X-ray	7.18E−03	1.189E−02	8.54E−05
Auger-KLL	8.51E−03	7.646E−02*	6.51E−04
Auger-KLX	4.94E−03	9.382E−02*	4.63E−04
Auger-KXY	8.46E−04	1.097E−01*	9.28E−05
Auger-LMM	1.59E−01	1.047E−02*	1.66E−03
Auger-LMX	1.12E−01	1.415E−02*	1.58E−03
Auger-LXY	1.89E−02	1.705E−02*	3.22E−04
Auger-MXY	8.31E−01	4.368E−03*	3.63E−03
ΔE	2.20E−01	8.976E−04*	1.98E−04

Listed X, γ and $\gamma^{\pm}$ radiations	6.52E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	9.89E−05
Listed β, ce and Auger radiations	8.60E−03
Listed α and α recoil radiations	1.34E+00
Listed radiations	1.41E+00
Omitted radiations**	9.89E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

U-228 daughter, yield 2.00E−01, is radioactive.
Np-232 daughter, yield 8.00E−01, is radioactive.

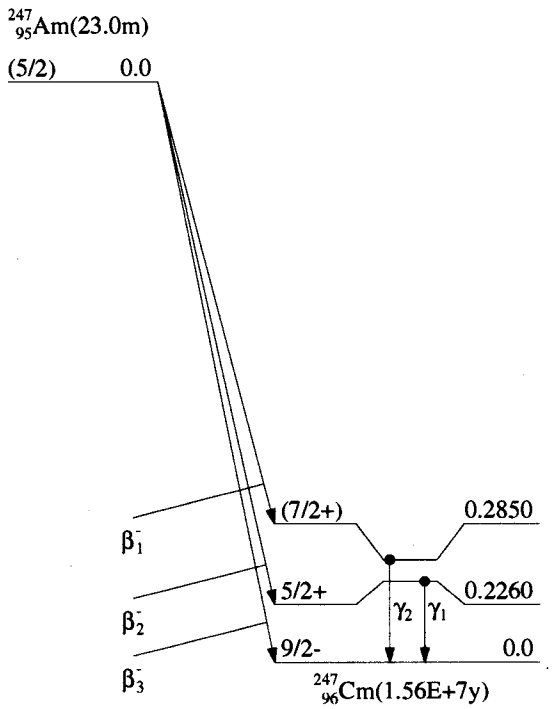


95-Am-247

13-OCT-93

Half-life = 23 m
Decay mode(s): β^-

Radiation	y(i) $(\text{Bq s})^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	2.43E−01	4.429E−01*	1.07E−01
β^- 2	6.99E−01	4.653E−01*	3.25E−01
β^- 3	5.83E−02	5.224E−01*	3.04E−02
γ 1	5.71E−02	2.260E−01	1.29E−02
ce-K, γ 1	4.59E−01	9.778E−02	4.49E−02
ce-L_1, γ 1	1.40E−01	2.015E−01	2.81E−02
ce-L_2, γ 1	2.12E−02	2.022E−01	4.30E−03
ce-L_3, γ 1	1.66E−02	2.071E−01	3.45E−03
ce-M, γ 1	4.74E−02	2.212E−01*	1.05E−02
ce-N^+, γ 1	1.85E−02	2.260E−01*	4.19E−03
γ 2	2.29E−01	2.850E−01	6.52E−02
ce-K, γ 2	8.79E−03	1.568E−01	1.38E−03
K_{α_1} X-ray	2.15E−01	1.093E−01	2.35E−02
K_{α_2} X-ray	1.36E−01	1.044E−01	1.42E−02
K_{β_1} X-ray	5.03E−02	1.234E−01	6.21E−03
K_{β_2} X-ray	2.75E−02	1.272E−01	3.50E−03
K_{β_3} X-ray	2.66E−02	1.223E−01	3.25E−03
K_{β_5} X-ray	2.03E−03	1.241E−01	2.52E−04
L_α X-ray	1.40E−01	1.493E−02*	2.09E−03
L_β X-ray	1.35E−01	1.901E−02*	2.57E−03
L_γ X-ray	3.09E−02	2.305E−02*	7.13E−04
Auger-LMM	1.26E−01	1.130E−02*	1.42E−03
Auger-LMX	9.02E−02	1.531E−02*	1.38E−03
Auger-MXY	7.14E−01	4.742E−03*	3.38E−03
Listed X, γ and $\gamma^\pm$ radiations			1.34E−01
Omitted X, γ and $\gamma^\pm$ radiations**			2.01E−04
Listed β, ce and Auger radiations			5.66E−01
Omitted β, ce and Auger radiations**			2.06E−03
Listed radiations			7.01E−01
Omitted radiations**			2.26E−03



* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cm-247 daughter is radioactive.

96-Cm-239

27-AUG-92

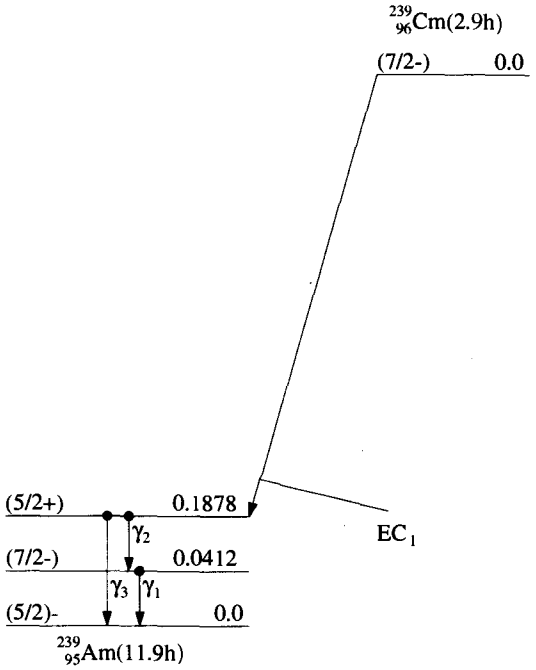
Half-life = 2.9 h
Decay mode(s): EC

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-L_1, γ 1	1.32E−01	1.723E−02	2.27E−03
ce-L_2, γ 1	1.58E−02	1.806E−02	2.85E−04
ce-M, γ 1	3.60E−02	3.633E−02*	1.31E−03
ce-N^+, γ 1	1.38E−02	4.100E−02*	5.67E−04
γ 2	1.64E−01	1.464E−01	2.40E−02
ce-K, γ 2	2.73E−02	2.137E−02	5.84E−04
ce-L_1, γ 2	3.41E−03	1.226E−01	4.18E−04
ce-L_2, γ 2	1.71E−03	1.235E−01	2.11E−04
ce-L_3, γ 2	1.26E−03	1.279E−01	1.62E−04
ce-M, γ 2	1.56E−03	1.417E−01*	2.22E−04
ce-N^+, γ 2	5.73E−04	1.464E−01*	8.39E−05
γ 3	7.13E−01	1.880E−01	1.34E−01
ce-K, γ 3	6.73E−02	6.297E−02	4.24E−03
ce-L_1, γ 3	8.70E−03	1.642E−01	1.43E−03
ce-L_2, γ 3	3.64E−03	1.651E−01	6.01E−04
ce-L_3, γ 3	2.50E−03	1.695E−01	4.23E−04
ce-M, γ 3	3.62E−03	1.833E−01*	6.64E−04
ce-N^+, γ 3	1.32E−03	1.880E−01*	2.49E−04
K_{α_1} X-ray	3.91E−01	1.065E−01	4.17E−02
K_{α_2} X-ray	2.46E−01	1.021E−01	2.51E−02
K_{β_1} X-ray	9.16E−02	1.204E−01	1.10E−02
K_{β_2} X-ray	4.95E−02	1.240E−01	6.14E−03
K_{β_3} X-ray	4.84E−02	1.193E−01	5.78E−03
K_{β_5} X-ray	3.61E−03	1.210E−01	4.37E−04
L_α X-ray	2.52E−01	1.460E−02*	3.68E−03
L_β X-ray	2.52E−01	1.845E−02*	4.65E−03
L_γ X-ray	5.87E−02	2.230E−02*	1.31E−03
Auger-KLL	1.11E−02	8.007E−02*	8.89E−04
Auger-KLX	6.49E−03	9.876E−02*	6.41E−04
Auger-KXY	1.11E−03	1.156E−01*	1.28E−04
Auger-LMM	2.39E−01	1.107E−02*	2.65E−03
Auger-LMX	1.71E−01	1.492E−02*	2.55E−03
Auger-LXY	2.87E−02	1.800E−02*	5.17E−04
Auger-MXY	1.33E+00	4.600E−03*	6.13E−03
ΔE	3.68E−01	9.686E−04*	3.57E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.58E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.28E−04
Listed β, ce and Auger radiations	2.76E−02
Omitted β, ce and Auger radiations**	1.53E−05
Listed radiations	2.85E−01
Omitted radiations**	4.43E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Am-239 daughter is radioactive.



96-Cm-251

24-AUG-90

Half-life = 16.8 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.70E−02	1.266E−01*	2.15E−03
β^- 2	3.30E−02	2.666E−01*	8.79E−03
β^- 3	1.40E−01	2.736E−01*	3.83E−02
β^- 4	2.00E−02	3.110E−01*	6.22E−03
β^- 5	3.50E−02	3.167E−01*	1.11E−02
β^- 6	5.50E−03	3.570E−01*	1.96E−03
β^- 7	2.00E−02	3.552E−01*	7.10E−03
β^- 8	7.30E−01	4.738E−01*	3.46E−01
γ 3	4.47E−03	2.336E−01	1.04E−03
ce-K, γ 3	1.18E−02	1.020E−01	1.21E−03
γ 4	5.23E−03	3.117E−01	1.63E−03
γ 5	1.28E−02	3.897E−01	4.97E−03
ce-K, γ 5	8.20E−03	2.581E−01	2.12E−03
ce-L_1, γ 5	1.48E−03	3.644E−01	5.40E−04
γ 6	1.63E−03	4.159E−01	6.80E−04
γ 7	7.19E−03	4.223E−01	3.04E−03
ce-K, γ 7	3.72E−03	2.907E−01	1.08E−03
γ 8	1.53E−03	4.358E−01	6.65E−04
γ 9	1.24E−02	4.382E−01	5.45E−03
ce-K, γ 9	5.81E−03	3.066E−01	1.78E−03
γ 10	1.62E−02	5.300E−01	8.61E−03
ce-K, γ 10	4.54E−03	3.984E−01	1.81E−03
γ 11	1.09E−01	5.427E−01	5.92E−02
ce-K, γ 11	2.86E−02	4.111E−01	1.17E−02
ce-L_1, γ 11	5.15E−03	5.174E−01	2.66E−03
ce-M, γ 11	1.44E−03	5.377E−01*	7.74E−04
γ 12	1.02E−02	5.625E−01	5.76E−03
ce-K, γ 12	2.44E−03	4.309E−01	1.05E−03
γ 13	1.53E−03	9.459E−01	1.44E−03
γ 14	1.00E−02	9.782E−01	9.81E−03
ce-K, γ 14	5.46E−04	8.466E−01	4.62E−04
K_{α_1} X-ray	3.08E−02	1.121E−01	3.46E−03
K_{α_2} X-ray	1.96E−02	1.072E−01	2.11E−03
K_{β_1} X-ray	7.28E−03	1.266E−01	9.21E−04
K_{β_2} X-ray	4.01E−03	1.305E−01	5.23E−04
K_{β_3} X-ray	3.86E−03	1.254E−01	4.84E−04
L_α X-ray	2.80E−02	1.530E−02*	4.28E−04
L_β X-ray	2.86E−02	1.947E−02*	5.57E−04
L_γ X-ray	7.18E−03	2.373E−02*	1.70E−04
Auger-MXY	1.51E−01	4.843E−03*	7.34E−04

Listed X, γ and $\gamma^\pm$ radiations	1.11E−01
Omitted X, γ and $\gamma^\pm$ radiations**	8.16E−05
Listed β, ce and Auger radiations	4.47E−01
Omitted β, ce and Auger radiations**	6.47E−03
Listed radiations	5.58E−01
Omitted radiations**	6.56E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Bk-251 daughter is radioactive.

97-Bk-248m

07-FEB-90

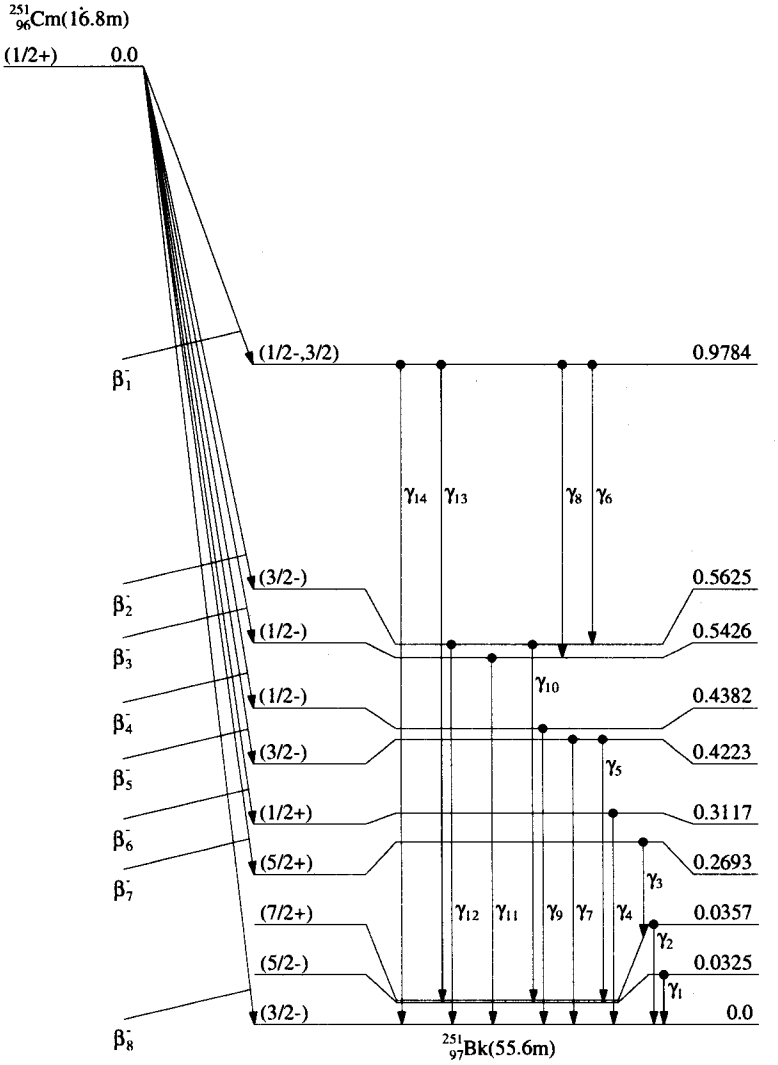
Half-life = 23.7 h
Decay mode(s): EC, β^-

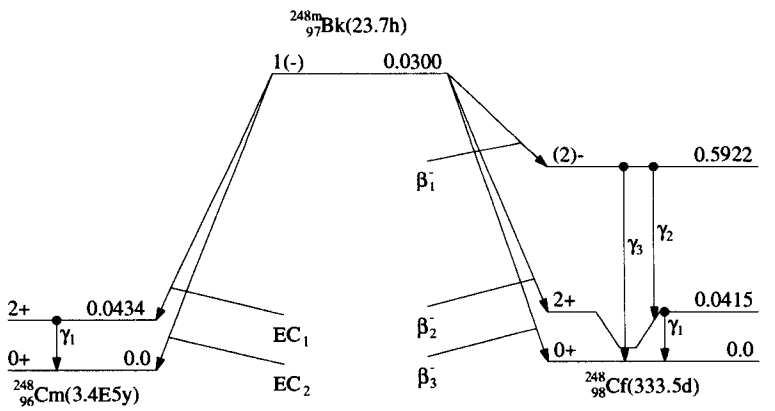
Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
ce-L_2, γ 1	2.69E−02	1.962E−02	5.28E−04
ce-L_3, γ 1	2.23E−02	2.447E−02	5.45E−04
ce-M, γ 1	1.41E−02	3.860E−02*	5.44E−04
ce-N^+, γ 1	5.56E−03	4.340E−02*	2.41E−04
K_{α_1} X-ray	9.80E−02	1.093E−01	1.07E−02
K_{α_2} X-ray	6.19E−02	1.044E−01	6.47E−03
K_{β_1} X-ray	2.29E−02	1.234E−01	2.83E−03
K_{β_2} X-ray	1.25E−02	1.272E−01	1.60E−03
K_{β_3} X-ray	1.21E−02	1.223E−01	1.48E−03
K_{β_5} X-ray	9.24E−04	1.241E−01	1.15E−04
L_α X-ray	6.95E−02	1.493E−02*	1.04E−03
L_β X-ray	7.24E−02	1.906E−02*	1.38E−03
L_γ X-ray	1.66E−02	2.304E−02*	3.83E−04
Auger-KLL	2.78E−03	8.190E−02*	2.28E−04
Auger-LMM	6.44E−02	1.139E−02*	7.34E−04
Auger-LMX	4.61E−02	1.540E−02*	7.10E−04
Auger-MXY	3.69E−01	4.697E−03*	1.73E−03
β^- 1	5.00E−02	7.620E−02*	3.81E−03
β^- 2	2.00E−01	2.558E−01*	5.12E−02
β^- 3	4.50E−01	2.704E−01*	1.22E−01
ce-L_2, γ 1	9.59E−02	1.625E−02	1.56E−03
ce-L_3, γ 1	7.81E−02	2.157E−02	1.68E−03
ce-M, γ 1	5.04E−02	3.639E−02*	1.84E−03
ce-N^+, γ 1	2.03E−02	4.150E−02*	8.41E−04
γ 2	4.97E−02	5.507E−01	2.74E−02
ce-K, γ 2	5.42E−04	4.147E−01	2.25E−04
γ 3	1.49E−04	5.922E−01	8.83E−05
L_α X-ray	3.81E−02	1.565E−02*	5.97E−04
L_β X-ray	4.91E−02	2.033E−02*	9.98E−04
L_γ X-ray	1.15E−02	2.442E−02*	2.80E−04
Auger-LMM	4.15E−02	1.231E−02*	5.11E−04
Auger-LMX	2.99E−02	1.653E−02*	4.94E−04
Auger-MXY	2.42E−01	4.684E−03*	1.13E−03

Listed X, γ and $\gamma^\pm$ radiations	5.53E−02
Omitted X, γ and $\gamma^\pm$ radiations**	2.28E−04
Listed β, ce and Auger radiations	1.90E−01
Omitted β, ce and Auger radiations**	8.30E−04
Listed radiations	2.46E−01
Omitted radiations**	1.06E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cm-248 daughter, yield 3.00E−01, is radioactive.
Cf-248 daughter, yield 7.00E−01, is radioactive.


251 96 Cm(16.8m)
(1/2+) 0.0
(1/2-,3/2) 0.9784
(3/2-) 0.5625
(1/2-) 0.5426
(1/2-) 0.4382
(3/2-) 0.4223
(1/2+) 0.3117
(5/2+) 0.2693
(7/2+) 0.0357
(5/2-) 0.0325
(3/2-) 0.0
β1-
β2-
β3-
β4-
β5-
β6-
β7-
β8-
γ14 γ13 γ8 γ6
γ10
γ5
γ3
γ12 γ11 γ9 γ7 γ4
γ2
γ1
251 97 Bk(55.6m)


248m 97 Bk(23.7h)
1(-) 0.0300
(2)- 0.5922
2+ 0.0415
0+ 0.0
2+ 0.0434
0+ 0.0
γ1
γ3 γ2
γ1
EC1
EC2
β1-
β2-
β3-
248 96 Cm(3.4E5y)
248 98 Cf(333.5d)

97-Bk-251

24-AUG-90

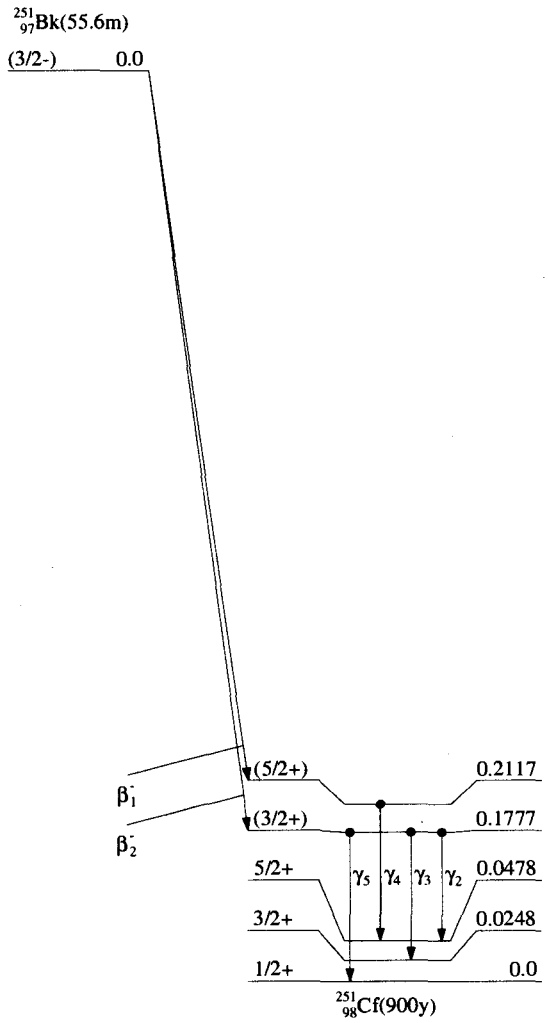
Half-life = 55.6 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	4.21E−02	2.744E−01*	1.16E−02
β^- 2	9.58E−01	2.864E−01*	2.74E−01
γ 2	3.36E−02	1.299E−01	4.37E−03
ce-L_1, γ 2	9.60E−02	1.038E−01	9.97E−03
ce-L_2, γ 2	1.28E−02	1.046E−01	1.34E−03
ce-M, γ 2	2.69E−02	1.248E−01*	3.35E−03
ce-N^+, γ 2	1.04E−02	1.299E−01*	1.36E−03
γ 3	2.23E−02	1.528E−01	3.41E−03
ce-K, γ 3	2.14E−01	1.684E−02	3.61E−03
ce-L_1, γ 3	3.99E−02	1.267E−01	5.06E−03
ce-L_2, γ 3	5.41E−03	1.276E−01	6.90E−04
ce-M, γ 3	1.12E−02	1.477E−01*	1.66E−03
ce-N^+, γ 3	4.34E−03	1.528E−01*	6.63E−04
γ 4	3.48E−03	1.638E−01	5.70E−04
ce-K, γ 4	2.74E−02	2.784E−02	7.61E−04
ce-L_1, γ 4	5.09E−03	1.377E−01	7.01E−04
γ 5	5.80E−02	1.777E−01	1.03E−02
ce-K, γ 5	3.62E−01	4.174E−02	1.51E−02
ce-L_1, γ 5	6.72E−02	1.516E−01	1.02E−02
ce-L_2, γ 5	9.23E−03	1.524E−01	1.41E−03
ce-M, γ 5	1.90E−02	1.726E−01*	3.28E−03
ce-N^+, γ 5	7.31E−03	1.777E−01*	1.30E−03
K_{α_1} X-ray	2.75E−01	1.160E−01	3.19E−02
K_{α_2} X-ray	1.76E−01	1.107E−01	1.95E−02
K_{α_3} X-ray	1.07E−03	1.098E−01	1.18E−04
K_{β_1} X-ray	6.54E−02	1.309E−01	8.55E−03
K_{β_2} X-ray	3.62E−02	1.348E−01	4.89E−03
K_{β_3} X-ray	3.47E−02	1.296E−01	4.50E−03
K_{β_5} X-ray	2.69E−03	1.316E−01	3.54E−04
L_α X-ray	1.68E−01	1.565E−02*	2.63E−03
L_β X-ray	1.74E−01	2.013E−02*	3.49E−03
L_γ X-ray	4.17E−02	2.450E−02*	1.02E−03
L_ℓ X-ray	9.24E−03	1.318E−02	1.22E−04
Auger-KLL	7.50E−03	8.559E−02*	6.42E−04
Auger-KLX	4.41E−03	1.072E−01*	4.73E−04
Auger-LMM	1.70E−01	1.212E−02*	2.05E−03
Auger-LMX	1.23E−01	1.637E−02*	2.02E−03
Auger-LXY	2.07E−02	1.975E−02*	4.08E−04
Auger-MXY	9.29E−01	5.083E−03*	4.72E−03

Listed X, γ and $\gamma^\pm$ radiations	9.57E−02
Omitted X, γ and $\gamma^\pm$ radiations**	4.32E−05
Listed β, ce and Auger radiations	3.57E−01
Omitted β, ce and Auger radiations**	9.04E−04
Listed radiations	4.52E−01
Omitted radiations**	9.47E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i)\times E(i)$ in its category.

Cf-251 daughter is radioactive.



98-Cf-247

13-OCT-93

Half-life = 3.11 h
Decay mode(s): α, EC

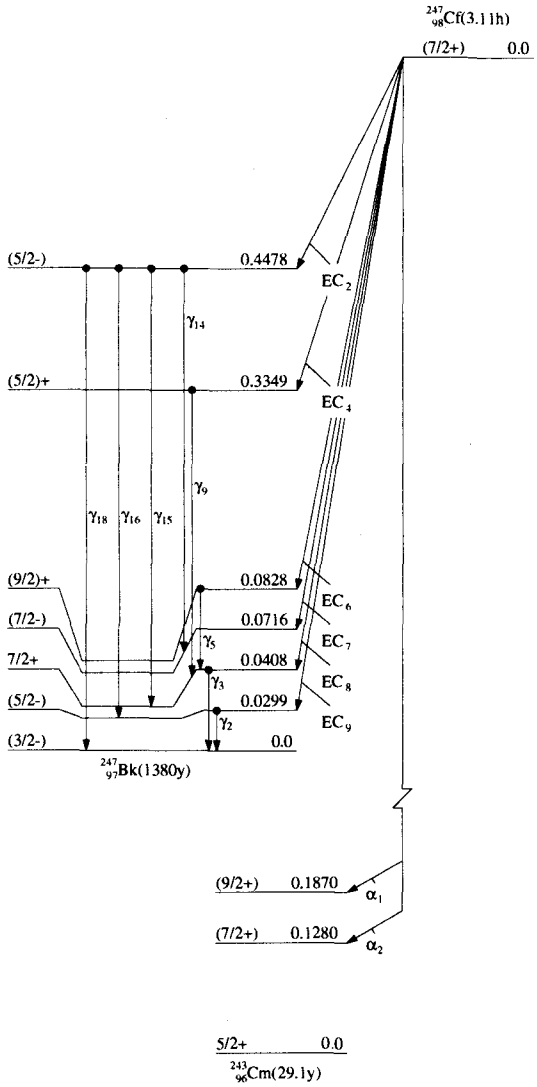
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	1.75E−05	6.237E+00	1.09E−04
α recoil	1.75E−05	1.027E−01	1.80E−06
α 2	3.32E−04	6.295E+00	2.09E−03
α recoil	3.32E−04	1.037E−01	3.45E−05
ce-L_1, γ 2	5.78E−01	4.625E−03	2.67E−03
ce-L_2, γ 2	7.10E−02	5.515E−03	3.91E−04
ce-M, γ 2	1.60E−01	2.492E−02*	4.00E−03
ce-N^+, γ 2	6.44E−02	2.990E−02*	1.93E−03
ce-L_1, γ 3	5.51E−02	1.553E−02	8.55E−04
ce-L_2, γ 3	3.14E−03	1.641E−02	5.15E−05
ce-L_3, γ 3	2.62E−02	2.135E−02	5.60E−04
ce-M, γ 3	2.51E−02	3.582E−02*	8.99E−04
ce-N^+, γ 3	1.04E−02	4.080E−02*	4.24E−04
ce-L_1, γ 5	1.29E−01	1.672E−02	2.17E−03
ce-L_2, γ 5	1.60E−02	1.761E−02	2.83E−04
ce-M, γ 5	3.60E−02	3.702E−02*	1.33E−03
ce-N^+, γ 5	1.39E−02	4.200E−02*	5.83E−04
γ 9	9.79E−03	2.941E−01	2.88E−03
ce-K, γ 9	1.37E−02	1.625E−01	2.23E−03
ce-L_1, γ 9	2.48E−03	2.688E−01	6.68E−04
ce-L_2, γ 9	3.44E−04	2.697E−01	9.27E−05
ce-M, γ 9	6.96E−04	2.891E−01*	2.01E−04
ce-N^+, γ 9	2.64E−04	2.941E−01*	7.75E−05
γ 14	7.23E−04	3.762E−01	2.72E−04
ce-K, γ 14	2.95E−04	2.446E−01	7.21E−05
γ 15	1.85E−03	4.070E−01	7.55E−04
γ 16	3.41E−03	4.179E−01	1.42E−03
ce-K, γ 16	1.29E−03	2.863E−01	3.69E−04
ce-L_1, γ 16	2.35E−04	3.926E−01	9.22E−05
γ 18	5.52E−03	4.478E−01	2.47E−03
ce-K, γ 18	1.33E−03	3.162E−01	4.21E−04
ce-L_1, γ 18	2.44E−04	4.225E−01	1.03E−04
K_{α_1} X-ray	3.18E−01	1.121E−01	3.56E−02
K_{α_2} X-ray	2.02E−01	1.072E−01	2.17E−02
K_{α_3} X-ray	1.15E−03	1.063E−01	1.22E−04
K_{β_1} X-ray	7.50E−02	1.266E−01	9.50E−03
K_{β_2} X-ray	4.13E−02	1.305E−01	5.39E−03
K_{β_3} X-ray	3.98E−02	1.254E−01	4.99E−03
K_{β_5} X-ray	3.06E−03	1.273E−01	3.90E−04
L_α X-ray	3.86E−01	1.530E−02*	5.91E−03
L_β X-ray	4.26E−01	1.947E−02*	8.29E−03
L_γ X-ray	1.14E−01	2.375E−02*	2.71E−03
L_ℓ X-ray	2.08E−02	1.290E−02	2.69E−04
Auger-KLL	8.65E−03	8.374E−02*	7.24E−04
Auger-KLX	5.07E−03	1.037E−01*	5.26E−04
Auger-KXY	8.81E−04	1.215E−01*	1.07E−04
Auger-LMM	3.87E−01	1.191E−02*	4.61E−03
Auger-LMX	2.81E−01	1.608E−02*	4.51E−03
Auger-LXY	4.74E−02	1.937E−02*	9.18E−04
Auger-MXY	2.18E+00	4.797E−03*	1.05E−02
ΔE	6.76E−01	1.095E−03*	7.40E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.03E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.71E−04
Listed β, ce and Auger radiations	4.31E−02
Omitted β, ce and Auger radiations**	2.90E−04
Listed α and α recoil radiations	2.24E−03
Listed radiations	1.48E−01
Omitted radiations**	7.61E−04

* Average energy (MeV)
** Each omitted transition contributes

<0.100 % to $\sum y(i) \times E(i)$ in its category.

Cm-243 daughter, yield 3.5E−04, is radioactive.
Bk-247 daughter, yield 9.9965E−01, is radioactive.



98-Cf-255

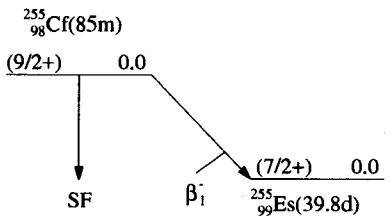
SF: 30-OCT-98
β^-: 24-AUG-90

Half-life = 85 m
Decay mode(s): SF, β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
SF n	3.80E−05	2.174E+00*	8.26E−05
SF f	2.00E−05	9.473E+01*	1.89E−03
SF p γ	8.64E−05	8.847E−01*	7.64E−05
SF d γ	1.15E−04	9.578E−01*	1.10E−04
SF β	7.39E−05	1.520E+00*	1.12E−04
β^- 1	1.00E+00	2.178E−01*	2.18E−01
Listed β, ce and Auger radiations			2.18E−01
Listed radiations			2.20E−01

* Average energy (MeV)

SF yield is 1.00E−05.
Es-255 daughter is radioactive.



98-Cf-256

30-OCT-98

Half-life = 12.3 m
Decay mode(s): SF

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
SF n	3.80E+00	2.174E+00*	8.26E+00
SF f	2.00E+00	9.459E+01*	1.89E+02
SF p γ	8.64E+00	8.847E−01*	7.64E+00
SF d γ	1.27E+01	9.578E−01*	1.22E+01
SF β	7.78E+00	1.600E+00*	1.24E+01
Listed radiations			2.17E+02

* Average energy (MeV)

SF yield is 1.00E+00.

99-Es-249

α: 13-OCT-93
EC, β^+: 24-AUG-90

Half-life = 102.2 m
Decay mode(s): α, EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	3.99E−04	6.715E+00	2.68E−03
α recoil	3.99E−04	1.097E−01	4.38E−05
α 2	5.30E−03	6.775E+00	3.59E−02
α recoil	5.30E−03	1.107E−01	5.87E−04
ce-L_1, γ 1	2.37E−02	1.689E−02	4.00E−04
ce-L_2, γ 1	2.98E−03	1.775E−02	5.30E−05
ce-M, γ 1	6.60E−03	3.789E−02*	2.50E−04
ce-N^+, γ 1	2.57E−03	4.300E−02*	1.11E−04
ce-L_1, γ 2	1.10E−02	2.903E−02	3.21E−04
ce-M, γ 2	3.08E−03	5.003E−02*	1.54E−04
ce-N^+, γ 2	1.19E−03	5.514E−02*	6.57E−05
ce-L_1, γ 3	1.07E−02	3.190E−02	3.42E−04
ce-L_2, γ 3	1.28E−02	3.276E−02	4.19E−04
ce-L_3, γ 3	8.59E−03	3.808E−02	3.27E−04
ce-M, γ 3	8.70E−03	5.290E−02*	4.60E−04
ce-N^+, γ 3	3.42E−03	5.801E−02*	1.99E−04
ce-L_1, γ 4	2.84E−02	3.636E−02	1.03E−03
ce-L_2, γ 4	1.19E−02	3.722E−02	4.43E−04
ce-L_3, γ 4	6.14E−03	4.254E−02	2.61E−04
ce-M, γ 4	1.20E−02	5.736E−02*	6.89E−04
ce-N^+, γ 4	4.68E−03	6.247E−02*	2.93E−04
ce-L_1, γ 5	1.13E−02	3.734E−02	4.22E−04
ce-L_2, γ 5	2.69E−03	3.820E−02	1.03E−04
ce-M, γ 5	3.77E−03	5.834E−02*	2.20E−04
ce-N^+, γ 5	1.46E−03	6.345E−02*	9.29E−05
ce-L_1, γ 6	1.60E−02	3.734E−02	5.97E−04
ce-L_2, γ 6	2.04E−03	3.820E−02	7.81E−05
ce-M, γ 6	4.46E−03	5.834E−02*	2.60E−04
ce-N^+, γ 6	1.72E−03	6.345E−02*	1.09E−04
ce-L_1, γ 8	1.60E−03	1.103E−01	1.77E−04
ce-M, γ 8	4.49E−04	1.313E−01*	5.90E−05
ce-L_2, γ 9	1.96E−03	1.111E−01	2.18E−04
ce-L_3, γ 9	1.03E−03	1.164E−01	1.20E−04
ce-M, γ 9	8.96E−04	1.313E−01*	1.18E−04
ce-N^+, γ 9	3.58E−04	1.364E−01*	4.88E−05
ce-K, γ 10	5.98E−02	9.030E−03	5.40E−04
ce-L_1, γ 10	2.55E−02	1.189E−01	3.03E−03
ce-L_2, γ 10	1.15E−02	1.197E−01	1.38E−03
ce-L_3, γ 10	8.15E−03	1.251E−01	1.02E−03
ce-M, γ 10	1.29E−02	1.399E−01*	1.81E−03
ce-N^+, γ 10	5.28E−03	1.450E−01*	7.66E−04
γ 11	3.98E−03	1.916E−01	7.62E−04
ce-K, γ 11	1.59E−02	5.564E−02	8.87E−04
ce-L_1, γ 11	2.99E−03	1.655E−01	4.94E−04
ce-L_2, γ 11	8.85E−04	1.664E−01	1.47E−04
ce-M, γ 11	1.04E−03	1.865E−01*	1.94E−04
ce-N^+, γ 11	4.02E−04	1.916E−01*	7.71E−05
γ 12	3.98E−03	1.916E−01	7.62E−04
ce-K, γ 12	2.01E−02	5.564E−02	1.12E−03
ce-L_1, γ 12	3.72E−03	1.655E−01	6.15E−04
ce-L_2, γ 12	5.13E−04	1.664E−01	8.54E−05
ce-M, γ 12	1.05E−03	1.865E−01*	1.96E−04
ce-N^+, γ 12	4.04E−04	1.916E−01*	7.74E−05
γ 13	2.59E−03	2.346E−01	6.06E−04
ce-L_2, γ 13	6.25E−04	2.094E−01	1.31E−04
ce-L_3, γ 13	2.41E−04	2.147E−01	5.17E−05
ce-M, γ 13	2.76E−04	2.295E−01*	6.34E−05
ce-K, γ 14	2.47E−03	1.190E−01	2.95E−04
ce-L_1, γ 14	4.59E−04	2.289E−01	1.05E−04
γ 15	5.57E−03	2.980E−01	1.66E−03
ce-K, γ 15	7.11E−03	1.620E−01	1.15E−03

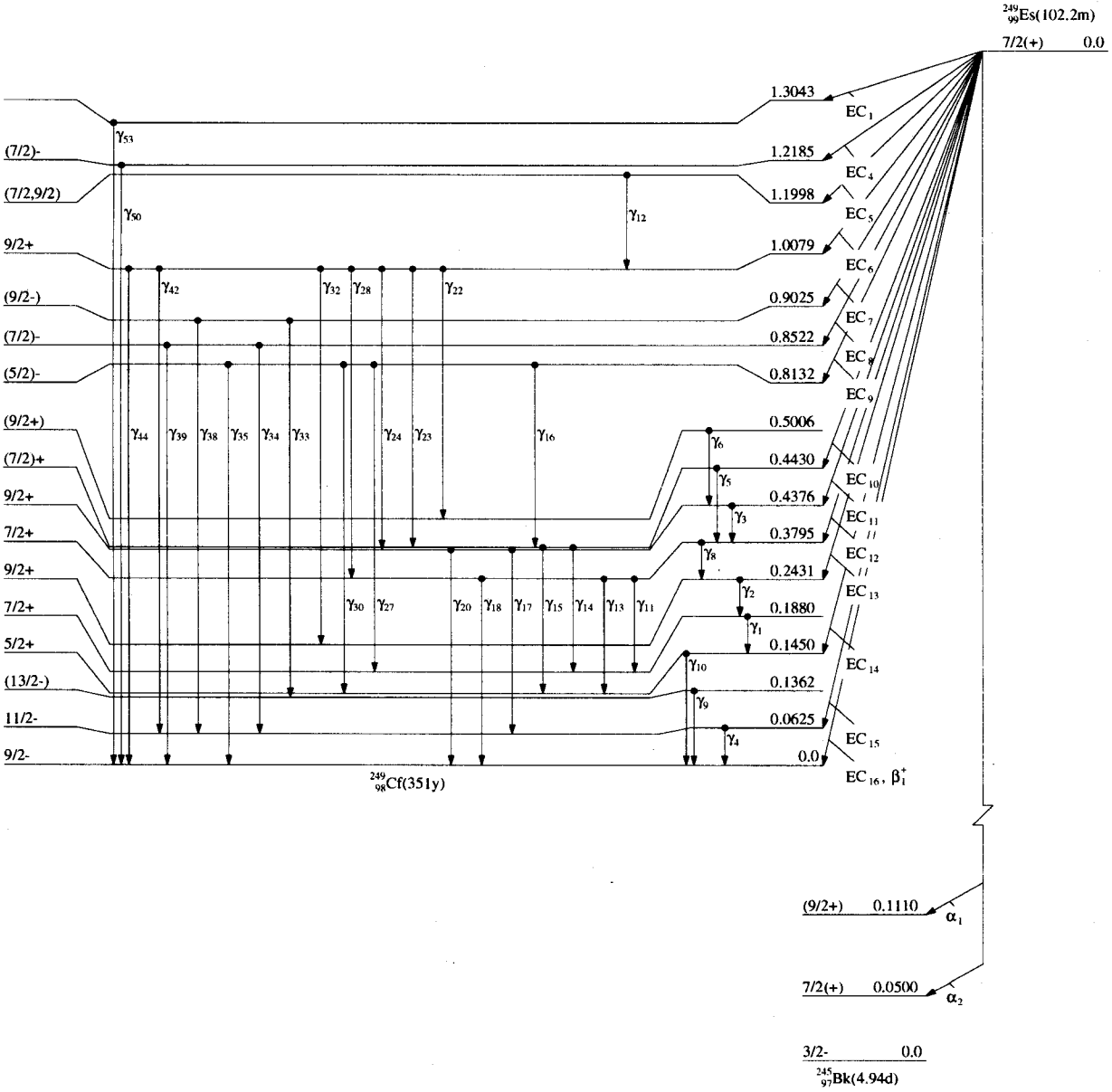
ce-L_1, γ 15	1.32E−03	2.719E−01	3.59E−04
ce-L_2, γ 15	2.54E−04	2.727E−01	6.92E−05
ce-M, γ 15	3.97E−04	2.929E−01*	1.16E−04
γ 16	1.39E−03	3.701E−01	5.15E−04
γ 17	3.28E−02	3.751E−01	1.23E−02
ce-K, γ 17	7.47E−04	2.391E−01	1.79E−04
γ 18	4.04E−01	3.795E−01	1.53E−01
ce-K, γ 18	8.98E−03	2.435E−01	2.19E−03
ce-L_1, γ 18	1.28E−03	3.534E−01	4.51E−04
ce-L_2, γ 18	3.71E−04	3.543E−01	1.31E−04
ce-L_3, γ 18	1.87E−04	3.596E−01	6.74E−05
ce-M, γ 18	4.47E−04	3.744E−01*	1.67E−04
ce-N^+, γ 18	1.66E−04	3.795E−01*	6.31E−05
γ 20	7.46E−03	4.376E−01	3.26E−03
ce-K, γ 22	1.37E−04	3.713E−01	5.07E−05
γ 23	2.09E−03	5.650E−01	1.18E−03
ce-K, γ 23	5.36E−04	4.290E−01	2.30E−04
ce-L_1, γ 23	9.74E−05	5.389E−01	5.25E−05
ce-K, γ 24	1.35E−04	4.343E−01	5.84E−05
γ 27	1.29E−03	6.253E−01	8.08E−04
γ 28	2.09E−03	6.285E−01	1.31E−03
ce-K, γ 28	2.66E−04	4.925E−01	1.31E−04
γ 30	2.39E−03	6.683E−01	1.59E−03
γ 32	9.94E−04	7.663E−01	7.62E−04
ce-K, γ 32	1.13E−04	6.303E−01	7.12E−05
γ 33	9.94E−04	7.663E−01	7.62E−04
γ 34	1.14E−02	7.897E−01	9.03E−03
ce-K, γ 34	1.93E−04	6.537E−01	1.26E−04
γ 35	9.15E−02	8.132E−01	7.44E−02
ce-K, γ 35	1.47E−03	6.772E−01	9.93E−04
ce-L_1, γ 35	2.77E−04	7.871E−01	2.18E−04
ce-L_2, γ 35	1.98E−04	7.879E−01	1.56E−04
ce-M, γ 35	1.32E−04	8.081E−01*	1.07E−04
γ 38	9.64E−04	8.400E−01	8.10E−04
ce-K, γ 38	8.57E−05	7.040E−01	6.03E−05
γ 39	8.75E−03	8.522E−01	7.46E−03
ce-K, γ 39	1.30E−04	7.162E−01	9.28E−05
γ 42	2.39E−03	9.454E−01	2.26E−03
γ 44	7.26E−03	1.008E+00	7.32E−03
γ 50	1.50E−02	1.219E+00	1.83E−02
ce-K, γ 50	3.49E−04	1.083E+00	3.77E−04
ce-L_1, γ 50	6.26E−05	1.192E+00	7.46E−05
γ 53	3.78E−04	1.304E+00	4.93E−04
K_{α_1} X-ray	3.83E−01	1.160E−01	4.45E−02
K_{α_2} X-ray	2.46E−01	1.107E−01	2.72E−02
K_{β_1} X-ray	9.12E−02	1.309E−01	1.19E−02
K_{β_2} X-ray	5.06E−02	1.348E−01	6.82E−03
K_{β_3} X-ray	4.85E−02	1.296E−01	6.28E−03
K_{β_5} X-ray	3.76E−03	1.316E−01	4.95E−04
L_α X-ray	2.54E−01	1.565E−02*	3.97E−03
L_β X-ray	2.68E−01	2.014E−02*	5.39E−03
L_γ X-ray	6.49E−02	2.450E−02*	1.59E−03
Auger-KLL	1.05E−02	8.559E−02*	8.96E−04
Auger-KLX	6.16E−03	1.072E−01*	6.60E−04
Auger-KXY	1.07E−03	1.256E−01*	1.35E−04
Auger-LMM	2.58E−01	1.215E−02*	3.14E−03
Auger-LMX	1.87E−01	1.641E−02*	3.07E−03
Auger-LXY	3.14E−02	1.979E−02*	6.22E−04
Auger-MXY	1.42E+00	5.053E−03*	7.20E−03
ΔE	4.06E−01	1.097E−03*	4.45E−04

Listed X, γ and $\gamma^{\pm}$ radiations	4.08E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.97E−03
Listed β, ce and Auger radiations	4.54E−02
Omitted β, ce and Auger radiations**	1.20E−03
Listed α and α recoil radiations	3.92E−02
Listed radiations	4.92E−01
Omitted radiations**	6.16E−03

* Average energy (MeV)
** Each omitted transition contributes

<0.100 % to $\sum y(i) \times E(i)$ in its category.

Bk-245 daughter, yield 5.7E−03, is radioactive.
Cf-249 daughter, yield 9.943E−01, is radioactive.


249 99 Es(102.2m)
7/2(+) 0.0
1.3043
1.2185
1.1998
1.0079
0.9025
0.8522
0.8132
0.5006
0.4430
0.4376
0.3795
0.2431
0.1880
0.1450
0.1362
0.0625
0.0
(7/2)-
(7/2,9/2)
9/2+
(9/2-)
(7/2)-
(5/2)-
(9/2+)
(7/2)+
9/2+
7/2+
9/2+
7/2+
5/2+
(13/2-)
11/2-
9/2-
EC1
EC4
EC5
EC6
EC7
EC8
EC9
EC10
EC11
EC12
EC13
EC14
EC15
EC16, β1+
249 98 Cf(351y)
(9/2+) 0.1110
α1
7/2(+) 0.0500
α2
3/2- 0.0
245 97 Bk(4.94d)

99-Es-252

07-FEB-90

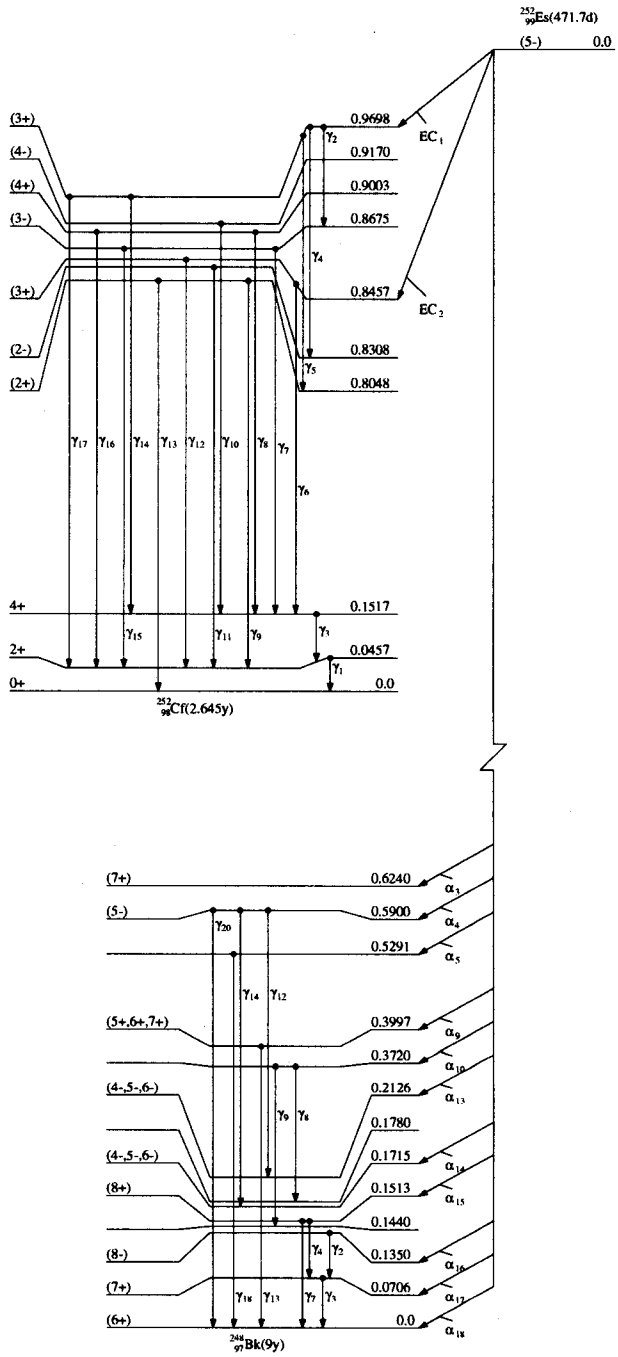
Half-life = 471.7 d
Decay mode(s): α, EC

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 3	9.12E−04	6.068E+00	5.53E−03
α recoil	9.12E−04	9.794E−02	8.93E−05
α 4	7.75E−03	6.102E+00	4.73E−02
α recoil	7.75E−03	9.848E−02	7.63E−04
α 5	9.12E−04	6.161E+00	5.62E−03
α recoil	9.12E−04	9.944E−02	9.07E−05
α 9	4.33E−03	6.289E+00	2.72E−02
α recoil	4.33E−03	1.015E−01	4.40E−04
α 10	5.70E−03	6.316E+00	3.60E−02
α recoil	5.70E−03	1.019E−01	5.81E−04
α 13	3.42E−03	6.473E+00	2.21E−02
α recoil	3.42E−03	1.045E−01	3.57E−04
α 14	1.90E−03	6.513E+00	1.24E−02
α recoil	1.90E−03	1.051E−01	2.00E−04
α 15	1.66E−02	6.533E+00	1.09E−01
α recoil	1.66E−02	1.054E−01	1.75E−03
α 16	2.36E−03	6.549E+00	1.54E−02
α recoil	2.36E−03	1.057E−01	2.49E−04
α 17	1.03E−01	6.613E+00	6.83E−01
α recoil	1.03E−01	1.067E−01	1.10E−02
α 18	6.10E−01	6.682E+00	4.07E+00
α recoil	6.10E−01	1.078E−01	6.57E−02
γ 1	5.47E−03	5.233E−02	2.86E−04
ce-L_3, γ 1	1.13E−03	3.288E−02	3.72E−05
ce-M, γ 1	8.11E−04	4.735E−02*	3.84E−05
ce-L_1, γ 3	2.44E−03	4.538E−02	1.11E−04
ce-L_2, γ 3	5.33E−02	4.627E−02	2.47E−03
ce-L_3, γ 3	3.76E−02	5.120E−02	1.93E−03
ce-M, γ 3	2.65E−02	6.567E−02*	1.74E−03
ce-N^+, γ 3	1.04E−02	7.065E−02*	7.33E−04
ce-L_2, γ 4	7.60E−03	5.632E−02	4.28E−04
ce-L_3, γ 4	5.11E−03	6.125E−02	3.13E−04
ce-M, γ 4	3.71E−03	7.572E−02*	2.81E−04
ce-N^+, γ 4	1.45E−03	8.070E−02*	1.17E−04
ce-L_2, γ 6	3.01E−04	1.247E−01	3.75E−05
ce-L_2, γ 7	1.04E−03	1.269E−01	1.32E−04
ce-L_3, γ 7	5.29E−04	1.318E−01	6.97E−05
ce-M, γ 7	4.72E−04	1.463E−01*	6.90E−05
ce-K, γ 8	2.32E−03	6.191E−02	1.44E−04
ce-L_1, γ 8	4.27E−04	1.682E−01	7.19E−05
ce-K, γ 9	7.76E−04	9.641E−02	7.48E−05
γ 12	1.22E−03	3.774E−01	4.59E−04
ce-K, γ 12	8.54E−04	2.458E−01	2.10E−04
ce-L_1, γ 12	1.54E−04	3.521E−01	5.43E−05
γ 13	1.22E−03	3.997E−01	4.86E−04
ce-K, γ 13	7.30E−04	2.681E−01	1.96E−04
ce-L_1, γ 13	1.32E−04	3.744E−01	4.93E−05
γ 14	2.20E−03	4.185E−01	9.22E−04
ce-K, γ 14	1.17E−03	2.869E−01	3.35E−04
ce-L_1, γ 14	2.10E−04	3.932E−01	8.27E−05
γ 18	5.32E−04	5.291E−01	2.81E−04
γ 20	8.36E−04	5.900E−01	4.93E−04
K_{α_1} X-ray	2.79E−03	1.121E−01	3.12E−04
L_α X-ray	2.45E−02	1.530E−02*	3.75E−04
L_β X-ray	3.45E−02	1.970E−02*	6.80E−04
Auger-LMM	2.70E−02	1.208E−02*	3.26E−04
Auger-LMX	1.93E−02	1.619E−02*	3.13E−04
Auger-LXY	3.23E−03	1.943E−02*	6.27E−05
Auger-MXY	1.60E−01	4.575E−03*	7.31E−04
ΔE	5.12E−02	1.057E−03*	5.41E−05
ce-L_1, γ 1	3.81E−03	1.961E−02	7.47E−05
ce-L_2, γ 1	9.63E−02	2.047E−02	1.97E−03
ce-L_3, γ 1	7.66E−02	2.579E−02	1.98E−03
ce-M, γ 1	5.02E−02	4.061E−02*	2.04E−03
ce-N^+, γ 1	2.01E−02	4.572E−02*	9.17E−04
γ 2	1.88E−02	1.023E−01	1.93E−03
ce-L_1, γ 2	8.72E−04	7.622E−02	6.65E−05
ce-L_2, γ 2	6.25E−04	7.708E−02	4.82E−05
ce-L_3, γ 2	4.97E−04	8.240E−02	4.10E−05
ce-M, γ 2	4.95E−04	9.722E−02*	4.82E−05
ce-L_1, γ 3	6.45E−04	7.991E−02	5.15E−05
ce-L_2, γ 3	1.05E−02	8.077E−02	8.45E−04
ce-L_3, γ 3	6.18E−03	8.609E−02	5.32E−04
ce-M, γ 3	4.93E−03	1.009E−01*	4.97E−04
ce-N^+, γ 3	1.97E−03	1.060E−01*	2.09E−04
γ 4	1.39E−01	1.390E−01	1.93E−02
ce-K, γ 4	2.60E−02	3.070E−03	7.98E−05
ce-L_1, γ 4	3.38E−03	1.129E−01	3.82E−04
ce-L_2, γ 4	1.95E−03	1.138E−01	2.22E−04
ce-L_3, γ 4	1.40E−03	1.191E−01	1.66E−04
ce-M, γ 4	1.66E−03	1.339E−01*	2.23E−04
ce-N^+, γ 4	6.19E−04	1.390E−01*	8.61E−05
ce-K, γ 5	1.11E−02	2.904E−02	3.22E−04
ce-L_1, γ 5	2.06E−03	1.389E−01	2.86E−04
ce-L_2, γ 5	2.81E−04	1.398E−01	3.93E−05
ce-M, γ 5	5.81E−04	1.599E−01*	9.29E−05
ce-N^+, γ 5	2.24E−04	1.650E−01*	3.70E−05
γ 6	4.60E−03	6.940E−01	3.20E−03
ce-K, γ 6	6.82E−04	5.580E−01	3.81E−04
ce-L_1, γ 6	1.23E−04	6.679E−01	8.24E−05
γ 7	8.63E−03	7.158E−01	6.18E−03
γ 8	7.59E−04	7.486E−01	5.68E−04
ce-K, γ 8	9.17E−05	6.126E−01	5.62E−05
γ 9	5.13E−03	7.591E−01	3.89E−03
ce-K, γ 9	5.97E−04	6.231E−01	3.72E−04
ce-L_1, γ 9	1.08E−04	7.330E−01	7.92E−05
γ 10	1.83E−03	7.653E−01	1.40E−03
γ 11	1.83E−01	7.851E−01	1.44E−01
ce-K, γ 11	1.06E−03	6.491E−01	6.90E−04
ce-L_1, γ 11	1.58E−04	7.590E−01	1.20E−04
ce-M, γ 11	4.89E−05	7.800E−01*	3.81E−05
γ 12	1.49E−02	8.000E−01	1.19E−02
ce-K, γ 12	1.51E−03	6.640E−01	1.00E−03
ce-L_1, γ 12	2.73E−04	7.739E−01	2.11E−04
ce-M, γ 12	7.68E−05	7.949E−01*	6.10E−05
γ 13	3.92E−03	8.048E−01	3.16E−03
ce-K, γ 13	6.40E−05	6.688E−01	4.28E−05
γ 14	7.46E−03	8.181E−01	6.10E−03
ce-K, γ 14	7.11E−04	6.821E−01	4.85E−04
ce-L_1, γ 14	1.28E−04	7.920E−01	1.02E−04
γ 15	3.48E−03	8.218E−01	2.86E−03
γ 16	3.40E−04	8.545E−01	2.91E−04
γ 17	2.41E−02	9.241E−01	2.22E−02
ce-K, γ 17	1.66E−03	7.881E−01	1.31E−03
ce-L_1, γ 17	2.99E−04	8.980E−01	2.69E−04
ce-L_2, γ 17	4.23E−05	8.989E−01	3.81E−05
ce-M, γ 17	8.08E−05	9.190E−01*	7.43E−05
K_{α_1} X-ray	4.43E−02	1.160E−01	5.14E−03
K_{α_2} X-ray	2.85E−02	1.107E−01	3.15E−03
K_{β_1} X-ray	1.06E−02	1.309E−01	1.38E−03
K_{β_2} X-ray	5.85E−03	1.348E−01	7.89E−04
K_{β_3} X-ray	5.60E−03	1.296E−01	7.26E−04
L_α X-ray	9.28E−02	1.565E−02*	1.45E−03
L_β X-ray	1.06E−01	2.020E−02*	2.14E−03
L_γ X-ray	2.58E−02	2.448E−02*	6.31E−04
Auger-KLL	1.21E−03	8.559E−02*	1.04E−04
Auger-KLX	7.12E−04	1.072E−01*	7.63E−05
Auger-LMM	9.72E−02	1.225E−02*	1.19E−03
Auger-LMX	7.05E−02	1.649E−02*	1.16E−03
Auger-LXY	1.18E−02	1.986E−02*	2.35E−04
Auger-MXY	5.60E−01	4.821E−03*	2.70E−03
ΔE	1.75E−01	1.113E−03*	1.95E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.46E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	2.17E−03
Listed β, ce and Auger radiations	3.35E−02
Omitted β, ce and Auger radiations**	9.54E−04
Listed α and α recoil radiations	5.12E+00
Omitted α and α recoil radiations	2.02E−02
Listed radiations	5.40E+00
Omitted radiations**	2.33E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Bk-248 daughter, yield 7.60E−01, is radioactive.
Cf-252 daughter, yield 2.40E−01, is radioactive.



99-Es-255

SF: 30-OCT-98
α, β^-: 24-AUG-90

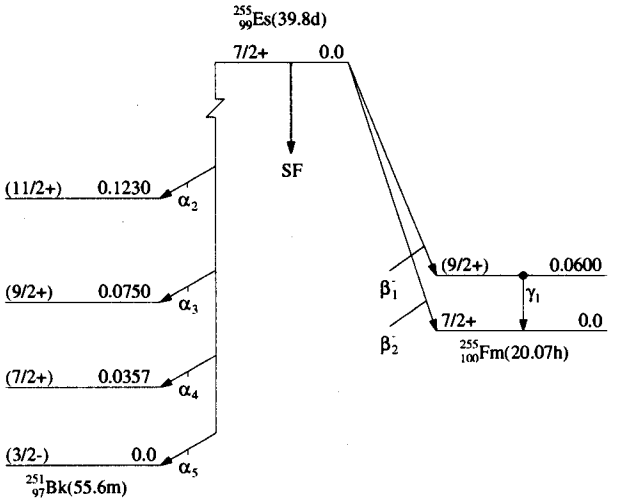
Half-life = 39.8 d
Decay mode(s): SF, α, β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
SF n	1.60E−04	2.189E+00*	3.50E−04
SF f	8.20E−05	9.689E+01*	7.95E−03
SF p γ	3.54E−04	8.847E−01*	3.13E−04
SF d γ	3.52E−04	9.578E−01*	3.37E−04
SF β	2.62E−04	1.314E+00*	3.44E−04
α 2	2.00E−03	6.213E+00	1.24E−02
α recoil	2.00E−03	9.908E−02	1.98E−04
α 3	7.83E−03	6.261E+00	4.90E−02
α recoil	7.83E−03	9.984E−02	7.82E−04
α 4	7.01E−02	6.299E+00	4.42E−01
α recoil	7.01E−02	1.005E−01	7.04E−03
β^- 1	1.10E−01	6.210E−02*	6.86E−03
β^- 2	8.10E−01	7.966E−02*	6.45E−02
γ 1	2.12E−03	6.000E−02	1.27E−04
ce-L_1, γ 1	7.09E−02	3.230E−02	2.29E−03
ce-L_2, γ 1	9.36E−03	3.319E−02	3.11E−04
ce-M, γ 1	1.99E−02	5.460E−02*	1.09E−03
ce-N^+, γ 1	7.76E−03	6.000E−02*	4.66E−04
L_α X-ray	1.50E−02	1.638E−02*	2.46E−04
L_β X-ray	2.25E−02	2.125E−02*	4.78E−04
L_γ X-ray	7.17E−03	2.608E−02*	1.87E−04
L_η X-ray	1.20E−04	1.960E−02	2.35E−06
L_ℓ X-ray	8.53E−04	1.369E−02	1.17E−05
Auger-LMM	1.87E−02	1.336E−02*	2.50E−04
Auger-LMX	1.39E−02	1.789E−02*	2.48E−04
Auger-MXY	1.05E−01	5.123E−03*	5.37E−04

Listed X, γ and $\gamma^\pm$ radiations	1.05E−03
Listed β, ce and Auger radiations	7.65E−02
Omitted β, ce and Auger radiations**	1.07E−04
Listed α and α recoil radiations	5.11E−01
Omitted α and α recoil radiations	4.93E−04
Listed radiations	5.98E−01
Omitted radiations**	6.00E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

SF yield is 4.10E−05.
Bk-251 daughter, yield 8.0E−02, is radioactive.
Fm-255 daughter, yield 9.20E−01, is radioactive.



99-Es-256

08-FEB-90

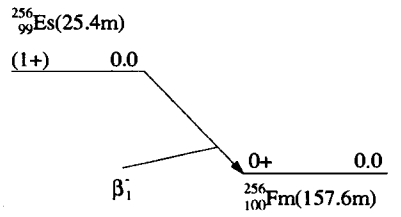
Half-life = 25.4 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	1.00E+00	5.754E−01*	5.75E−01

Listed β, ce and Auger radiations	5.75E−01
Listed radiations	5.75E−01

* Average energy (MeV)

Fm-256 daughter is radioactive.



100-Fm-251

α: 13-OCT-93
EC, β^+: 24-AUG-90

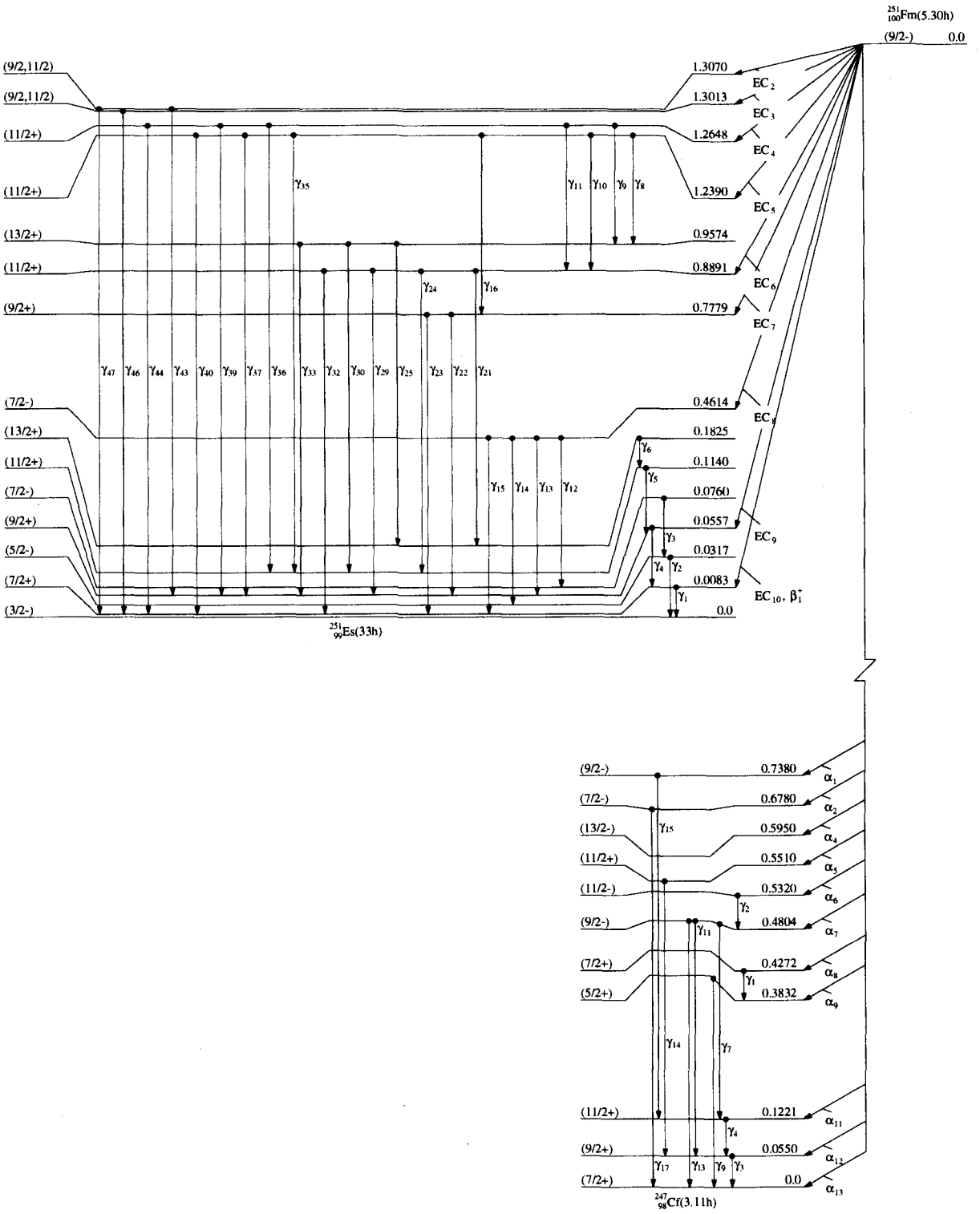
Half-life = 5.3 h
Decay mode(s): α, EC, β^+

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
α 1	4.69E−05	6.580E+00	3.09E−04
α recoil	4.69E−05	1.066E−01	5.00E−06
α 2	1.01E−04	6.640E+00	6.71E−04
α recoil	1.01E−04	1.076E−01	1.09E−05
α 4	7.94E−05	6.721E+00	5.33E−04
α recoil	7.94E−05	1.089E−01	8.65E−06
α 5	6.86E−05	6.764E+00	4.64E−04
α recoil	6.86E−05	1.096E−01	7.51E−06
α 6	8.66E−04	6.783E+00	5.87E−03
α recoil	8.66E−04	1.099E−01	9.52E−05
α 7	1.57E−02	6.834E+00	1.07E−01
α recoil	1.57E−02	1.107E−01	1.74E−03
α 8	3.07E−04	6.886E+00	2.11E−03
α recoil	3.07E−04	1.116E−01	3.42E−05
α 9	3.25E−04	6.930E+00	2.25E−03
α recoil	3.25E−04	1.123E−01	3.65E−05
α 11	5.23E−05	7.187E+00	3.76E−04
α recoil	5.23E−05	1.165E−01	6.09E−06
α 12	1.68E−04	7.253E+00	1.22E−03
α recoil	1.68E−04	1.175E−01	1.97E−05
α 13	2.71E−04	7.307E+00	1.98E−03
α recoil	2.71E−04	1.184E−01	3.20E−05
ce-L_1, γ 3	3.03E−03	2.889E−02	8.74E−05
ce-L_2, γ 3	3.66E−03	2.975E−02	1.09E−04
ce-L_3, γ 3	2.51E−03	3.507E−02	8.80E−05
ce-M, γ 3	2.49E−03	4.989E−02*	1.24E−04
ce-N^+, γ 3	9.82E−04	5.500E−02*	5.40E−05
ce-L_1, γ 4	8.28E−04	4.099E−02	3.39E−05
γ 7	3.14E−03	3.583E−01	1.13E−03
ce-K, γ 9	1.45E−04	2.472E−01	3.57E−05
γ 11	9.51E−03	4.254E−01	4.04E−03
ce-K, γ 11	1.69E−04	2.894E−01	4.89E−05
γ 13	3.93E−03	4.804E−01	1.89E−03
Auger-LMM	2.90E−03	1.257E−02*	3.64E−05
Auger-LMX	2.11E−03	1.682E−02*	3.55E−05
Auger-MXY	1.66E−02	4.754E−03*	7.88E−05
ce-M, γ 1	5.53E−01	3.048E−03*	1.68E−03
ce-N^+, γ 1	4.29E−01	8.300E−03*	3.56E−03
ce-L_1, γ 4	6.88E−02	2.058E−02	1.42E−03
ce-L_2, γ 4	2.12E−02	2.146E−02	4.55E−04
ce-L_3, γ 4	9.91E−03	2.707E−02	2.68E−04
ce-M, γ 4	2.56E−02	4.223E−02*	1.08E−03
ce-N^+, γ 4	1.00E−02	4.748E−02*	4.77E−04
ce-L_1, γ 5	1.90E−03	3.130E−02	5.93E−05
γ 8	7.07E−04	2.814E−01	1.99E−04
ce-K, γ 8	1.18E−03	1.419E−01	1.67E−04
ce-L_1, γ 8	2.21E−04	2.545E−01	5.63E−05
ce-K, γ 9	4.22E−04	1.679E−01	7.09E−05
γ 10	8.25E−03	3.499E−01	2.89E−03
ce-K, γ 10	8.35E−03	2.104E−01	1.76E−03
ce-L_1, γ 10	1.55E−03	3.230E−01	5.00E−04
ce-L_2, γ 10	2.35E−04	3.239E−01	7.62E−05
ce-M, γ 10	4.43E−04	3.446E−01*	1.53E−04
ce-N^+, γ 10	1.71E−04	3.499E−01*	5.97E−05
γ 11	3.63E−03	3.758E−01	1.37E−03
ce-K, γ 11	3.09E−03	2.363E−01	7.29E−04
ce-L_1, γ 11	5.72E−04	3.489E−01	2.00E−04
ce-M, γ 11	1.62E−04	3.705E−01*	6.01E−05
ce-K, γ 12	2.08E−04	2.458E−01	5.11E−05
γ 13	9.92E−03	4.056E−01	4.02E−03
ce-K, γ 13	1.99E−04	2.661E−01	5.29E−05
γ 14	8.25E−04	4.297E−01	3.54E−04
ce-K, γ 14	4.44E−04	2.902E−01	1.29E−04
γ 15	1.45E−02	4.531E−01	6.59E−03
ce-K, γ 15	2.35E−04	3.136E−01	7.37E−05
γ 16	9.03E−04	4.610E−01	4.16E−04
ce-K, γ 16	3.67E−04	3.215E−01	1.18E−04
γ 21	2.46E−04	7.063E−01	1.73E−04
γ 22	8.05E−04	7.221E−01	5.81E−04
ce-K, γ 22	9.01E−05	5.826E−01	5.25E−05
γ 23	3.93E−03	7.696E−01	3.02E−03
ce-K, γ 23	4.46E−04	6.301E−01	2.81E−04
ce-L_1, γ 23	8.16E−05	7.427E−01	6.06E−05
γ 24	8.64E−04	7.750E−01	6.70E−04
ce-K, γ 24	6.07E−05	6.355E−01	3.85E−05
γ 25	4.12E−04	7.750E−01	3.20E−04
γ 29	6.28E−03	8.333E−01	5.24E−03
ce-K, γ 29	2.06E−04	6.938E−01	1.43E−04
γ 30	1.18E−03	8.434E−01	9.94E−04
ce-K, γ 30	7.44E−05	7.039E−01	5.24E−05
γ 32	2.19E−02	8.808E−01	1.93E−02
ce-K, γ 32	3.24E−04	7.413E−01	2.40E−04
ce-L_1, γ 32	6.11E−05	8.539E−01	5.22E−05
ce-L_2, γ 32	4.02E−05	8.548E−01	3.44E−05
γ 33	1.28E−03	9.016E−01	1.15E−03
γ 35	2.75E−04	1.125E+00	3.09E−04
γ 36	1.47E−04	1.151E+00	1.70E−04
γ 37	7.27E−04	1.183E+00	8.60E−04
γ 39	3.44E−04	1.209E+00	4.16E−04
γ 40	1.37E−03	1.231E+00	1.69E−03
γ 43	1.87E−04	1.251E+00	2.33E−04
γ 44	6.38E−04	1.257E+00	8.02E−04
γ 46	3.73E−04	1.293E+00	4.82E−04
γ 47	4.12E−04	1.299E+00	5.36E−04
K_{α_1} X-ray	3.29E−01	1.191E−01	3.92E−02
K_{α_2} X-ray	2.12E−01	1.135E−01	2.41E−02
K_{β_1} X-ray	7.86E−02	1.342E−01	1.06E−02
K_{β_2} X-ray	4.39E−02	1.383E−01	6.08E−03
K_{β_3} X-ray	4.19E−02	1.329E−01	5.56E−03
K_{β_5} X-ray	3.29E−03	1.350E−01	4.44E−04
L_α X-ray	2.00E−01	1.601E−02*	3.20E−03
L_β X-ray	2.17E−01	2.072E−02*	4.49E−03
L_γ X-ray	5.33E−02	2.524E−02*	1.35E−03
Auger-KLL	8.57E−03	8.746E−02*	7.49E−04
Auger-KLX	5.05E−03	1.100E−01*	5.55E−04
Auger-KXY	8.82E−04	1.289E−01*	1.14E−04
Auger-LMM	2.11E−01	1.242E−02*	2.63E−03
Auger-LMX	1.54E−01	1.679E−02*	2.59E−03
Auger-LXY	2.58E−02	2.027E−02*	5.23E−04
Auger-MXY	1.71E+00	5.236E−03*	8.94E−03
ΔE	7.56E−01	1.241E−03*	9.38E−04

Listed X, γ and $\gamma^\pm$ radiations	1.55E−01
Omitted X, γ and $\gamma^\pm$ radiations**	2.43E−03
Listed β, ce and Auger radiations	3.20E−02
Omitted β, ce and Auger radiations**	1.23E−03
Listed α and α recoil radiations	1.25E−01
Omitted α and α recoil radiations	1.51E−04
Listed radiations	3.12E−01
Omitted radiations**	3.81E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cf-247 daughter, yield 1.8E−02, is radioactive.
Es-251 daughter, yield 9.82E−01, is radioactive.


$^{251}_{100}$Fm(5.30h)
(9/2-) 0.0
(9/2,11/2) 1.3070
(9/2,11/2) 1.3013
(11/2+) 1.2648
(11/2+) 1.2390
(13/2+) 0.9574
(11/2+) 0.8891
(9/2+) 0.7779
(7/2-) 0.4614
(13/2+) 0.1825
(11/2+) 0.1140
(7/2-) 0.0760
(9/2+) 0.0557
(5/2-) 0.0317
(7/2+) 0.0083
(3/2-) 0.0
EC2
EC3
EC4
EC5
EC6
EC7
EC8
EC9
EC10, β1+
γ47 γ46 γ44 γ43 γ40 γ39 γ37 γ36 γ35 γ33 γ32 γ30 γ29 γ25 γ24 γ23 γ22 γ21 γ16
γ15 γ14 γ13 γ12 γ11 γ10 γ9 γ8 γ6 γ5 γ4 γ3 γ2 γ1
$^{251}_{99}$Es(33h)
(9/2-) 0.7380 α1
(7/2-) 0.6780 α2
(13/2-) 0.5950 α4
(11/2+) 0.5510 α5
(11/2-) 0.5320 α6
(9/2-) 0.4804 α7
(7/2+) 0.4272 α8
(5/2+) 0.3832 α9
(11/2+) 0.1221 α11
(9/2+) 0.0550 α12
(7/2+) 0.0 α13
γ15 γ14 γ13 γ11 γ9 γ7 γ4 γ3 γ2 γ1 γ17
$^{247}_{98}$Cf(3.11h)

100-Fm-256

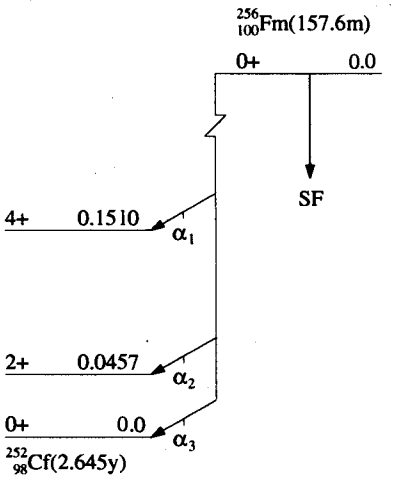
SF: 30-OCT-98
α: 07-FEB-90

Half-life = 157.6 m
Decay mode(s): SF, α

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
SF n	3.40E+00	2.159E+00*	7.34E+00
SF f	1.84E+00	9.894E+01*	1.82E+02
SF p γ	7.94E+00	8.847E−01*	7.02E+00
SF d γ	6.45E+00	9.578E−01*	6.17E+00
SF β	5.31E+00	1.189E+00*	6.31E+00
α 1	8.10E−04	6.768E+00	5.48E−03
α recoil	8.10E−04	1.075E−01	8.71E−05
α 2	1.13E−02	6.872E+00	7.79E−02
α recoil	1.13E−02	1.092E−01	1.24E−03
α 3	6.89E−02	6.917E+00	4.76E−01
α recoil	6.89E−02	1.099E−01	7.56E−03
Listed α and α recoil radiations			5.69E−01
Listed radiations			2.03E+02

* Average energy (MeV)

SF yield is 9.19E−01.
Cf-252 daughter, yield 8.1E−02, is radioactive.



7-N-16

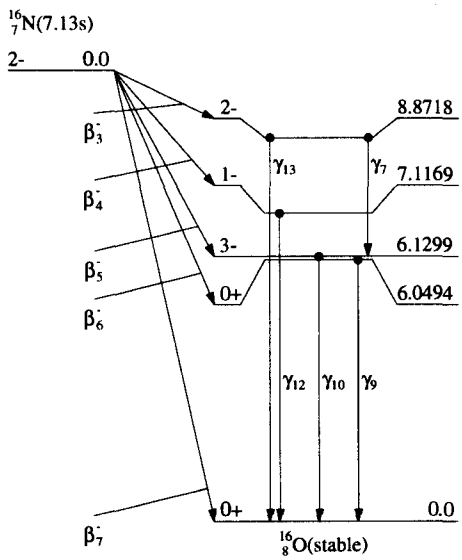
06-OCT-94

Half-life = 7.13 s
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 3	1.06E−02	6.312E−01*	6.69E−03
β^- 4	4.80E−02	1.463E+00*	7.02E−02
β^- 5	6.62E−01	1.943E+00*	1.29E+00
β^- 7	2.80E−01	4.980E+00*	1.39E+00
γ 7	8.20E−03	2.741E+00	2.25E−02
ce-K, γ 9	1.34E−03	6.048E+00	8.11E−03
γ 10	6.70E−01	6.129E+00	4.11E+00
γ 12	4.90E−02	7.115E+00	3.49E−01
γ 13	7.60E−04	8.869E+00	6.74E−03
Listed X, γ and $\gamma^{\pm}$ radiations			4.48E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**			9.20E−03
Listed β, ce and Auger radiations			2.76E+00
Omitted β, ce and Auger radiations**			6.06E−04
Listed radiations			7.25E+00
Omitted radiations**			9.80E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

O-16 daughter is stable.



16-S-37

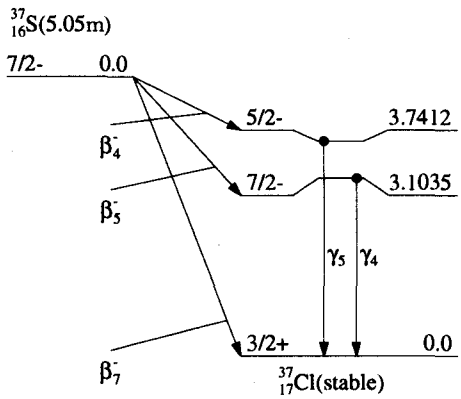
24-JUN-93

Half-life = 5.05 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 4	2.67E−03	4.287E−01*	1.14E−03
β^- 5	9.39E−01	7.170E−01*	6.74E−01
β^- 7	5.60E−02	2.221E+00*	1.24E−01
γ 4	9.40E−01	3.103E+00	2.92E+00
γ 5	2.63E−03	3.741E+00	9.85E−03
Listed X, γ and $\gamma^{\pm}$ radiations			2.93E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**			4.05E−03
Listed β, ce and Auger radiations			7.99E−01
Omitted β, ce and Auger radiations**			7.17E−04
Listed radiations			3.73E+00
Omitted radiations**			4.77E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cl-37 daughter is stable.



17-Cl-40

24-JUN-93

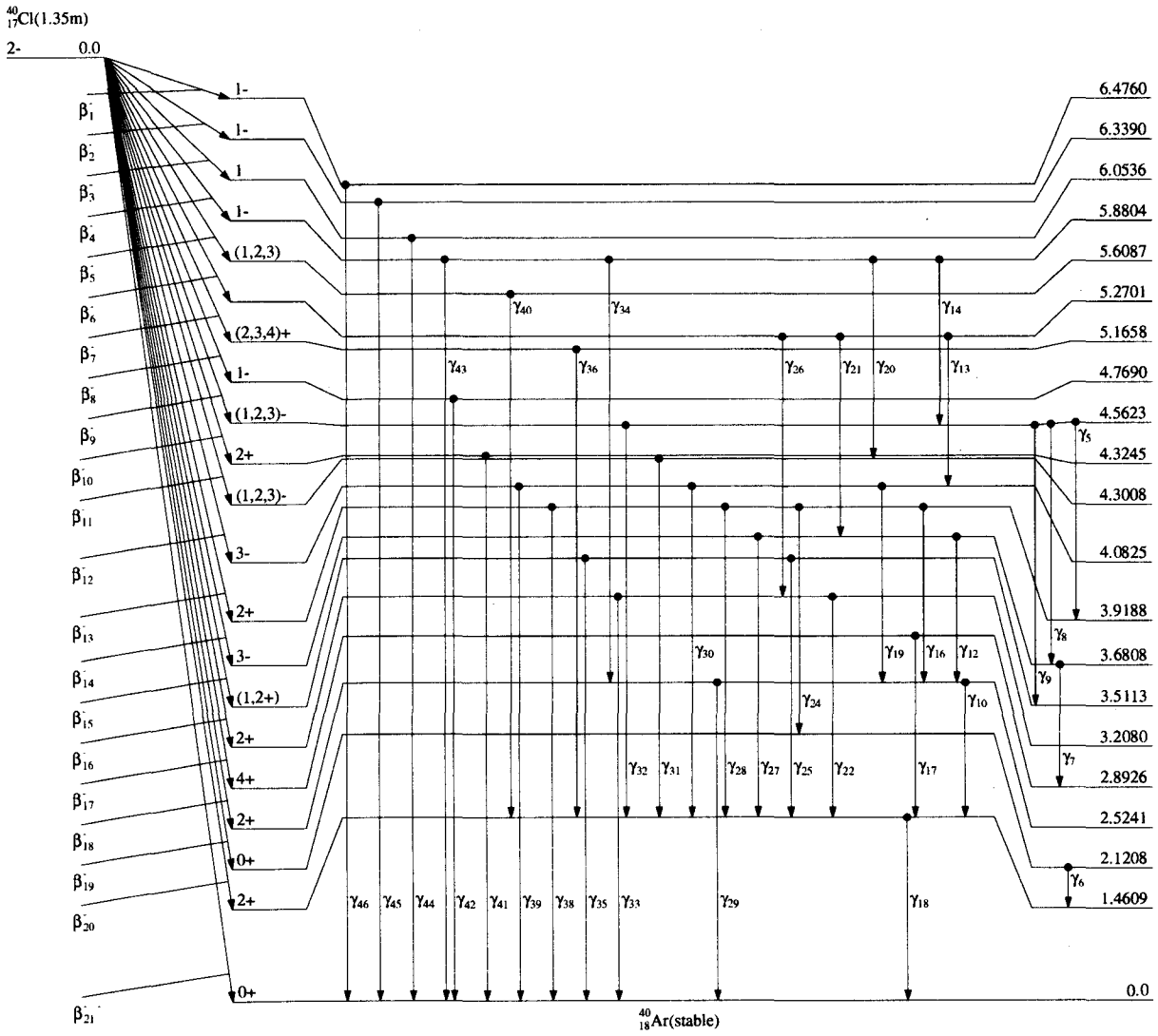
Half-life = 1.35 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 3	2.90E−03	5.623E−01*	1.63E−03
β^- 4	4.55E−02	6.411E−01*	2.92E−02
β^- 5	7.74E−03	7.664E−01*	5.94E−03
β^- 6	1.84E−02	9.250E−01*	1.70E−02
β^- 7	7.74E−03	9.742E−01*	7.54E−03
β^- 8	3.87E−03	1.163E+00*	4.50E−03
β^- 9	1.94E−01	1.262E+00*	2.44E−01
β^- 10	1.45E−03	1.376E+00*	2.00E−03
β^- 11	2.81E−01	1.388E+00*	3.90E−01
β^- 12	1.36E−01	1.493E+00*	2.02E−01
β^- 13	6.20E−02	1.572E+00*	9.74E−02
β^- 14	4.65E−02	1.688E+00*	7.84E−02
β^- 15	1.26E−02	1.770E+00*	2.23E−02
β^- 16	2.03E−02	1.918E+00*	3.90E−02
β^- 17	4.84E−03	2.084E+00*	1.01E−02
β^- 18	1.74E−02	2.252E+00*	3.92E−02
β^- 19	9.68E−03	2.460E+00*	2.38E−02
β^- 20	3.87E−02	2.773E+00*	1.07E−01
β^- 21	8.71E−02	3.499E+00*	3.05E−01
γ 5	6.30E−02	6.435E−01	4.06E−02
γ 6	2.44E−02	6.599E−01	1.61E−02
γ 7	7.88E−03	7.882E−01	6.21E−03
γ 8	2.60E−02	8.815E−01	2.29E−02
γ 9	4.73E−03	1.051E+00	4.97E−03
γ 10	2.36E−02	1.063E+00	2.51E−02
γ 12	4.73E−03	1.157E+00	5.47E−03
γ 13	7.09E−03	1.188E+00	8.42E−03
γ 14	3.94E−03	1.318E+00	5.19E−03
γ 16	1.18E−02	1.395E+00	1.65E−02
γ 17	1.50E−02	1.432E+00	2.14E−02
γ 18	7.88E−01	1.461E+00	1.15E+00
γ 19	4.73E−03	1.558E+00	7.37E−03
γ 20	3.15E−03	1.580E+00	4.98E−03
γ 21	9.46E−03	1.589E+00	1.50E−02
γ 22	2.76E−02	1.747E+00	4.82E−02
γ 24	2.60E−02	1.798E+00	4.68E−02
γ 25	1.02E−02	2.050E+00	2.10E−02
γ 26	3.94E−03	2.062E+00	8.12E−03
γ 27	7.49E−02	2.220E+00	1.66E−01
γ 28	5.20E−02	2.458E+00	1.28E−01
γ 29	2.13E−02	2.524E+00	5.37E−02
γ 30	1.54E−01	2.622E+00	4.05E−01
γ 31	3.04E−01	2.840E+00	8.64E−01
γ 32	1.10E−01	3.101E+00	3.42E−01
γ 33	4.73E−03	3.208E+00	1.52E−02
γ 34	3.15E−03	3.356E+00	1.06E−02
γ 35	1.58E−03	3.511E+00	5.53E−03
γ 36	7.88E−03	3.705E+00	2.92E−02
γ 38	4.02E−02	3.919E+00	1.57E−01
γ 39	2.36E−03	4.082E+00	9.65E−03
γ 40	8.67E−03	4.148E+00	3.60E−02
γ 41	1.58E−03	4.324E+00	6.81E−03
γ 42	4.73E−03	4.769E+00	2.25E−02
γ 43	3.86E−02	5.880E+00	2.27E−01
γ 44	3.15E−03	6.053E+00	1.91E−02
γ 45	2.36E−03	6.339E+00	1.50E−02
γ 46	1.58E−03	6.475E+00	1.02E−02

Listed X, γ and $\gamma^{\pm}$ radiations	4.00E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.45E−02
Listed β, ce and Auger radiations	1.63E+00
Omitted β, ce and Auger radiations**	1.45E−03
Listed radiations	5.62E+00
Omitted radiations**	1.59E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

Ar-40 daughter is stable.


$^{40}_{17}$Cl(1.35m)
2- 0.0
1-
1-
1
1-
(1,2,3)
(2,3,4)+
1-
(1,2,3)-
2+
(1,2,3)-
3-
2+
3-
(1,2+)
2+
4+
2+
0+
2+
0+
6.4760
6.3390
6.0536
5.8804
5.6087
5.2701
5.1658
4.7690
4.5623
4.3245
4.3008
4.0825
3.9188
3.6808
3.5113
3.2080
2.8926
2.5241
2.1208
1.4609
0.0
β^-_1 β^-_2 β^-_3 β^-_4 β^-_5 β^-_6 β^-_7 β^-_8 β^-_9 β^-_{10} β^-_{11} β^-_{12} β^-_{13} β^-_{14} β^-_{15} β^-_{16} β^-_{17} β^-_{18} β^-_{19} β^-_{20} β^-_{21}
γ_{40} γ_{34} γ_{14} γ_{43} γ_{36} γ_{26} γ_{21} γ_{20} γ_{13} γ_5 γ_{30} γ_{19} γ_{16} γ_{12} γ_8 γ_9 γ_{24} γ_{10} γ_{32} γ_{31} γ_{28} γ_{27} γ_{25} γ_{22} γ_{17} γ_7 γ_6
γ_{46} γ_{45} γ_{44} γ_{42} γ_{41} γ_{39} γ_{38} γ_{35} γ_{33} γ_{29} γ_{18}
$^{40}_{18}$Ar(stable)

23-V-52

11-JUL-94

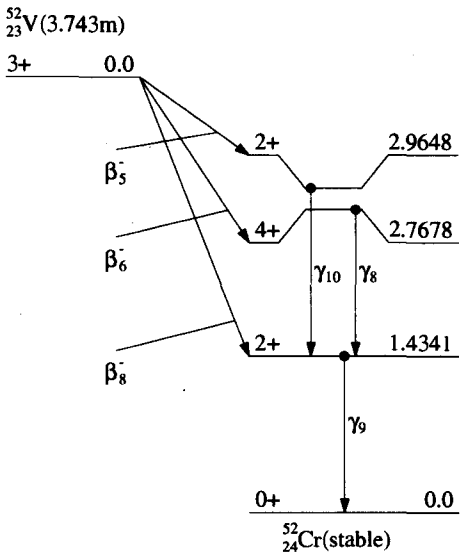
Half-life = 3.743 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 6	5.70E−03	4.579E−01*	2.61E−03
β^- 8	9.92E−01	1.073E+00*	1.06E+00
γ 8	5.88E−03	1.334E+00	7.84E−03
γ 9	1.00E+00	1.434E+00	1.43E+00
γ 10	1.16E−03	1.531E+00	1.78E−03

Listed X, γ and $\gamma^{\pm}$ radiations	1.44E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.21E−03
Listed β, ce and Auger radiations	1.07E+00
Omitted β, ce and Auger radiations**	9.46E−04
Listed radiations	2.51E+00
Omitted radiations**	2.16E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cr-52 daughter is stable.



23-V-53

13-DEC-90

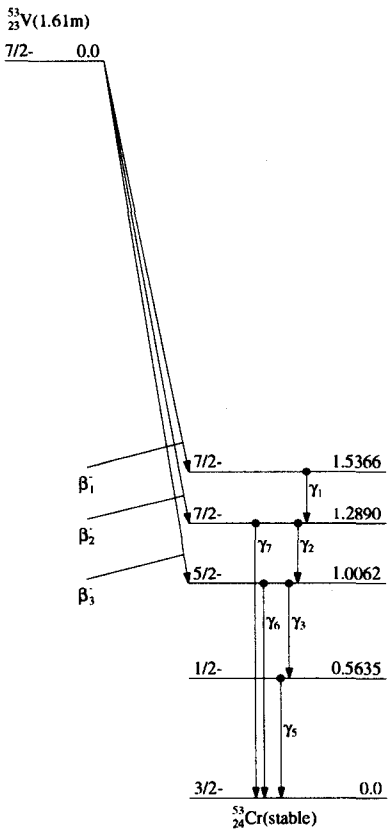
Half-life = 1.61 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 1	3.98E−03	7.715E−01*	3.07E−03
β^- 2	1.10E−01	8.870E−01*	9.72E−02
β^- 3	8.86E−01	1.020E+00*	9.04E−01
γ 2	7.62E−03	2.827E−01	2.15E−03
γ 3	3.85E−03	4.427E−01	1.71E−03
γ 5	3.85E−03	5.636E−01	2.17E−03
γ 6	8.96E−01	1.006E+00	9.01E−01
γ 7	1.00E−01	1.289E+00	1.29E−01

Listed X, γ and $\gamma^{\pm}$ radiations	1.04E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.39E−03
Listed β, ce and Auger radiations	1.00E+00
Omitted β, ce and Auger radiations**	1.27E−04
Listed radiations	2.04E+00
Omitted radiations**	1.52E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cr-53 daughter is stable.



24-Cr-55

09-NOV-95

Half-life = 3.497 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 5	1.00E+00	1.101E+00*	1.10E+00
γ 1	1.74E−05	1.260E−01	2.19E−06
γ 2	1.33E−05	1.402E+00	1.87E−05
γ 3	3.70E−04	1.528E+00	5.65E−04
γ 4	4.07E−06	2.241E+00	9.12E−06
γ 5	3.14E−05	2.253E+00	7.08E−05
γ 6	1.11E−06	2.268E+00	2.52E−06
γ 7	1.81E−06	2.368E+00	4.29E−06

Listed X, γ and $\gamma^{\pm}$ radiations	6.73E−04
Omitted X, γ and $\gamma^{\pm}$ radiations**	5.31E−10
Listed β, ce and Auger radiations	1.10E+00
Omitted β, ce and Auger radiations**	1.56E−04
Listed radiations	1.10E+00
Omitted radiations**	1.56E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Mn-55 daughter is stable.

25-Mn-57

25-JAN-93

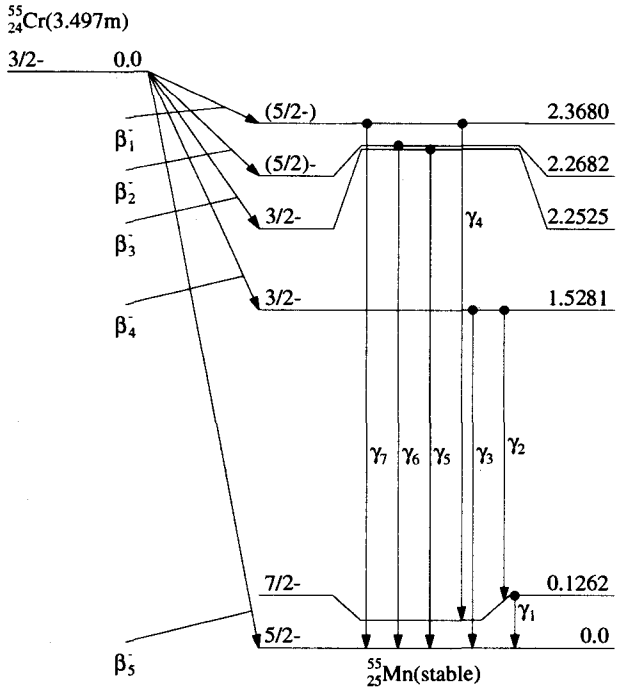
Half-life = 85.4 s
Decay mode(s): β^-

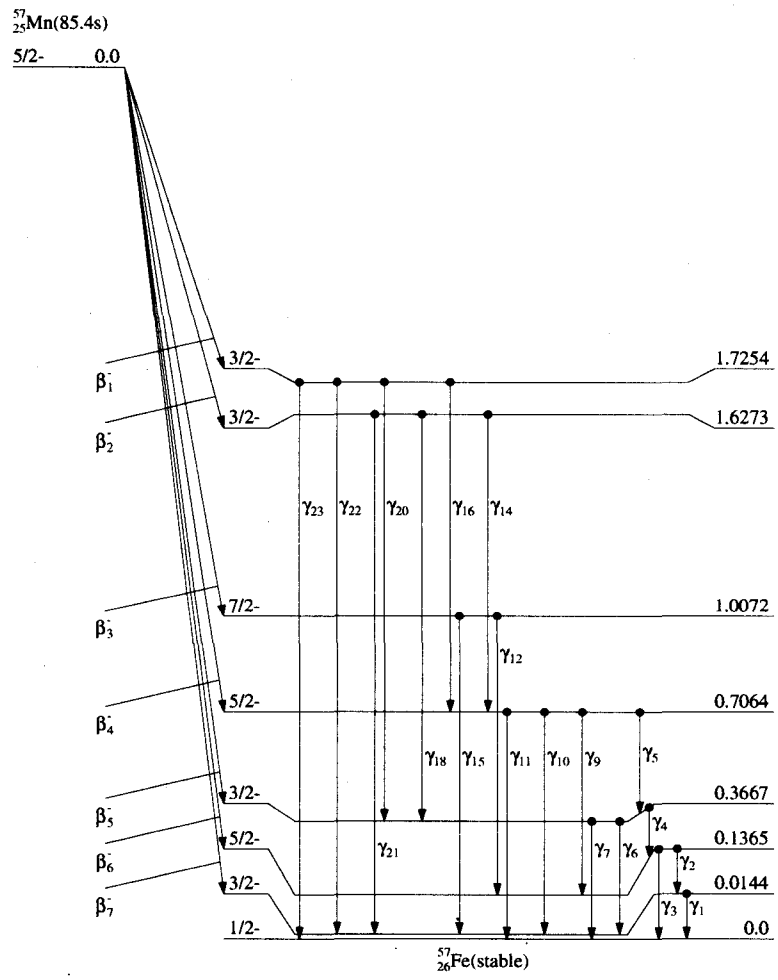
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 2	1.10E−02	3.930E−01*	4.31E−03
β^- 3	3.99E−03	6.696E−01*	2.67E−03
β^- 4	6.28E−02	8.085E−01*	5.08E−02
β^- 5	2.19E−02	9.676E−01*	2.12E−02
β^- 6	1.50E−01	1.076E+00*	1.61E−01
β^- 7	7.48E−01	1.134E+00*	8.49E−01
γ 1	1.01E−01	1.441E−02	1.46E−03
ce-K, γ 1	7.87E−01	7.301E−03	5.75E−03
γ 2	1.39E−01	1.221E−01	1.70E−02
γ 3	1.92E−02	1.365E−01	2.63E−03
γ 4	2.20E−03	2.303E−01	5.07E−04
γ 5	1.70E−03	3.396E−01	5.79E−04
γ 6	2.09E−02	3.523E−01	7.36E−03
γ 7	3.96E−03	3.667E−01	1.45E−03
γ 9	5.17E−03	5.699E−01	2.95E−03
γ 10	5.50E−02	6.920E−01	3.81E−02
γ 11	2.36E−03	7.064E−01	1.67E−03
γ 12	2.59E−03	8.707E−01	2.25E−03
γ 14	9.35E−04	9.210E−01	8.61E−04
γ 15	1.43E−03	9.927E−01	1.42E−03
γ 16	4.40E−04	1.019E+00	4.48E−04
γ 18	3.24E−03	1.261E+00	4.09E−03
γ 20	2.36E−04	1.359E+00	3.21E−04
γ 21	7.32E−03	1.613E+00	1.18E−02
γ 22	6.60E−05	1.710E+00	1.13E−04
γ 23	1.65E−03	1.725E+00	2.85E−03
K_{α_1} X-ray	1.61E−01	6.404E−03	1.03E−03
K_{α_2} X-ray	8.14E−02	6.391E−03	5.20E−04
K_{β_1} X-ray	2.17E−02	7.058E−03	1.53E−04
Auger-KLL	4.11E−01	5.574E−03*	2.29E−03

Listed X, γ and $\gamma^{\pm}$ radiations	9.95E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	9.04E−05
Listed β, ce and Auger radiations	1.10E+00
Omitted β, ce and Auger radiations**	4.31E−03
Listed radiations	1.20E+00
Omitted radiations**	4.40E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Fe-57 daughter is stable.


$^{55}_{24}$Cr(3.497m)
3/2- 0.0
(5/2-) 2.3680
(5/2)- 2.2682
3/2- 2.2525
3/2- 1.5281
7/2- 0.1262
5/2- 0.0
β_1^-
β_2^-
β_3^-
β_4^-
β_5^-
γ_7 γ_6 γ_5 γ_4 γ_3 γ_2 γ_1
$^{55}_{25}$Mn(stable)


$^{57}_{25}$Mn(85.4s)
5/2- 0.0
3/2- 1.7254
3/2- 1.6273
7/2- 1.0072
5/2- 0.7064
3/2- 0.3667
5/2- 0.1365
3/2- 0.0144
1/2- 0.0
β_1^-
β_2^-
β_3^-
β_4^-
β_5^-
β_6^-
β_7^-
γ_{23} γ_{22} γ_{20} γ_{16} γ_{14} γ_{12} γ_{18} γ_{15} γ_{11} γ_{10} γ_9 γ_5 γ_{21} γ_7 γ_6 γ_4 γ_2 γ_3 γ_1
$^{57}_{26}$Fe(stable)

27-Co-62

05-SEP-90

Half-life = 1.5 m
Decay mode(s): β^-

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 2	1.39E−02	7.186E−01*	1.00E−02
β^- 3	3.78E−03	7.876E−01*	2.98E−03
β^- 4	1.20E−02	8.338E−01*	1.00E−02
β^- 5	3.28E−03	8.404E−01*	2.76E−03
β^- 6	2.39E−02	8.862E−01*	2.12E−02
β^- 7	3.98E−03	9.325E−01*	3.71E−03
β^- 8	2.57E−01	1.292E+00*	3.31E−01
β^- 9	6.74E−01	1.836E+00*	1.24E+00
β^- 10	4.97E−03	2.409E+00*	1.20E−02
γ 1	1.11E−01	1.129E+00	1.25E−01
γ 2	8.35E−01	1.173E+00	9.79E−01
γ 3	4.17E−03	1.886E+00	7.88E−03
γ 4	1.59E−02	1.985E+00	3.15E−02
γ 5	3.34E−03	2.083E+00	6.96E−03
γ 6	9.18E−03	2.097E+00	1.93E−02
γ 7	1.47E−01	2.302E+00	3.38E−01
γ 8	1.34E−02	2.346E+00	3.13E−02
γ 9	8.35E−03	3.158E+00	2.64E−02
γ 10	2.92E−03	3.271E+00	9.56E−03
γ 11	3.76E−03	3.369E+00	1.27E−02
γ 12	8.35E−04	3.519E+00	2.94E−03
γ 13	3.34E−03	4.063E+00	1.36E−02

Listed X, γ and $\gamma^{\pm}$ radiations	1.61E+00
Omitted X, γ and $\gamma^{\pm}$ radiations**	4.69E−07
Listed β, ce and Auger radiations	1.63E+00
Omitted β, ce and Auger radiations**	1.75E−03
Listed radiations	3.24E+00
Omitted radiations**	1.75E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Ni-62 daughter is stable.

41-Nb-94m

β^-: 29-JUL-97
IT: 13-MAY-92

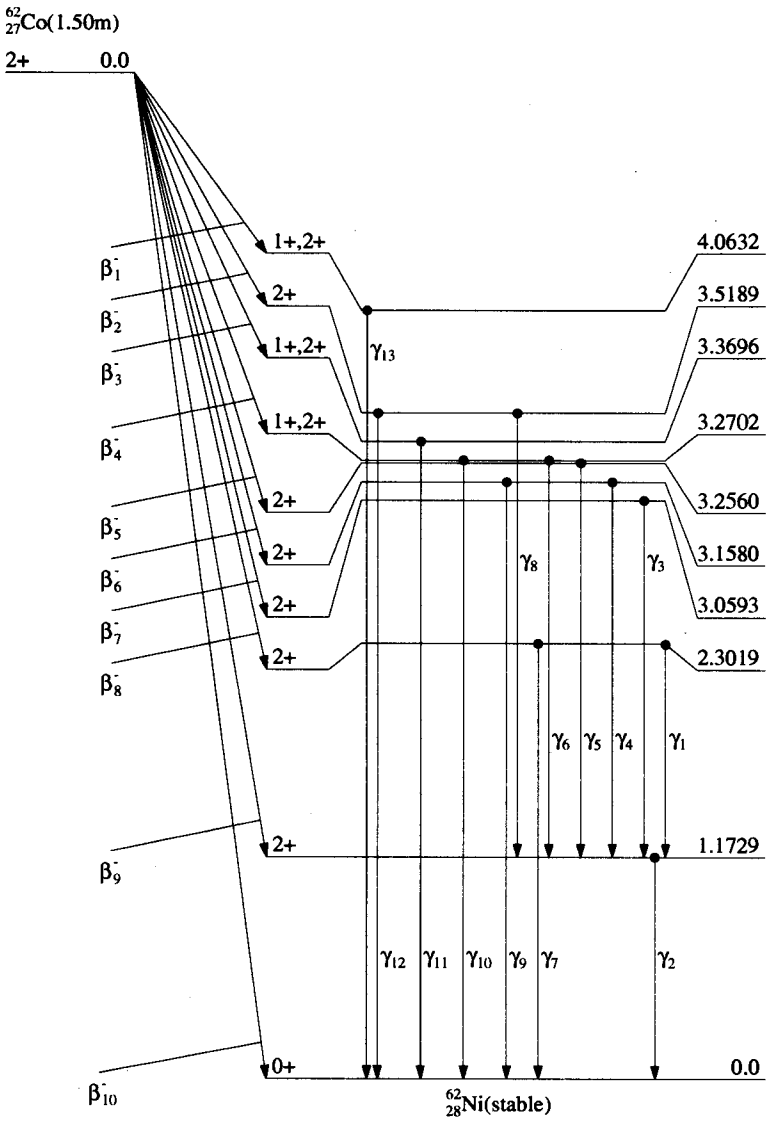
Half-life = 6.26 m
Decay mode(s): β^-, IT

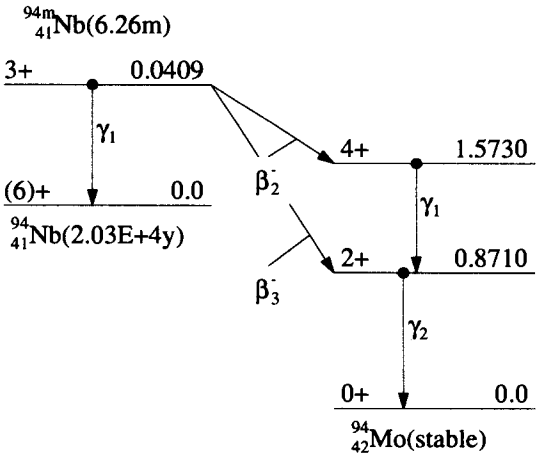
Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 3	4.96E−03	4.440E−01*	2.20E−03
γ 1	3.15E−05	7.020E−01	2.21E−05
γ 2	5.00E−03	8.710E−01	4.35E−03
γ 1	7.38E−04	4.094E−02	3.02E−05
ce-K, γ 1	5.76E−01	2.195E−02	1.27E−02
ce-L_1, γ 1	1.50E−01	3.824E−02	5.75E−03
ce-L_2, γ 1	2.33E−02	3.848E−02	8.98E−04
ce-L_3, γ 1	1.66E−01	3.857E−02	6.40E−03
ce-M, γ 1	6.61E−02	4.058E−02*	2.68E−03
ce-N^+, γ 1	1.22E−02	4.094E−02*	5.01E−04
K_{α_1} X-ray	2.37E−01	1.662E−02	3.94E−03
K_{α_2} X-ray	1.24E−01	1.652E−02	2.05E−03
K_{β_1} X-ray	3.96E−02	1.862E−02	7.37E−04
K_{β_2} X-ray	9.24E−03	1.895E−02	1.75E−04
K_{β_3} X-ray	2.11E−02	1.861E−02	3.93E−04
L_α X-ray	1.51E−02	2.166E−03*	3.28E−05
L_β X-ray	8.79E−03	2.270E−03*	2.00E−05
Auger-KLL	1.02E−01	1.395E−02*	1.42E−03
Auger-KLX	3.89E−02	1.610E−02*	6.27E−04
Auger-KXY	4.63E−03	1.824E−02*	8.44E−05
Auger-LMM	6.23E−01	1.851E−03*	1.15E−03
Auger-LMX	2.63E−01	2.203E−03*	5.80E−04
Auger-LXY	3.08E−02	2.404E−03*	7.40E−05
Auger-MXY	1.71E+00	2.773E−04*	4.74E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.17E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	1.42E−05
Listed β, ce and Auger radiations	3.55E−02
Omitted β, ce and Auger radiations**	1.13E−05
Listed radiations	4.72E−02
Omitted radiations**	2.55E−05

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Mo-94 daughter, yield 5E−03, is stable.
Nb-94 daughter, yield 9.95E−01, is radioactive.


62 27 Co(1.50m)
2+ 0.0
1+,2+
2+
1+,2+
1+,2+
2+
2+
2+
2+
2+
0+
4.0632
3.5189
3.3696
3.2702
3.2560
3.1580
3.0593
2.3019
1.1729
0.0
β1-
β2-
β3-
β4-
β5-
β6-
β7-
β8-
β9-
β10-
γ13
γ8
γ3
γ6 γ5 γ4 γ1
γ12 γ11 γ10 γ9 γ7 γ2
62 28 Ni(stable)


94m 41 Nb(6.26m)
3+ 0.0409
γ1
(6)+ 0.0
94 41 Nb(2.03E+4y)
β2-
β3-
4+ 1.5730
γ1
2+ 0.8710
γ2
0+ 0.0
94 42 Mo(stable)

54-Xe-125m

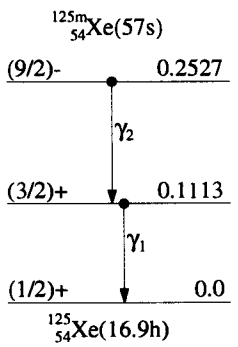
10-FEB-94

Half-life = 57 s
Decay mode(s): IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	6.02E−01	1.113E−01	6.70E−02
ce-K, γ 1	3.30E−01	7.674E−02	2.54E−02
ce-L_1, γ 1	3.90E−02	1.058E−01	4.13E−03
ce-L_2, γ 1	6.85E−03	1.062E−01	7.27E−04
ce-L_3, γ 1	5.41E−03	1.065E−01	5.76E−04
ce-M, γ 1	1.05E−02	1.104E−01*	1.16E−03
ce-N^+, γ 1	2.61E−03	1.113E−01*	2.90E−04
γ 2	1.91E−01	1.414E−01	2.71E−02
ce-K, γ 2	3.67E−01	1.068E−01	3.92E−02
ce-L_1, γ 2	3.24E−02	1.359E−01	4.41E−03
ce-L_2, γ 2	1.50E−01	1.363E−01	2.04E−02
ce-L_3, γ 2	1.37E−01	1.366E−01	1.87E−02
ce-M, γ 2	7.00E−02	1.405E−01*	9.83E−03
ce-N^+, γ 2	1.70E−02	1.414E−01*	2.40E−03
K_{α_1} X-ray	3.27E−01	2.978E−02	9.73E−03
K_{α_2} X-ray	1.76E−01	2.946E−02	5.19E−03
K_{β_1} X-ray	6.28E−02	3.362E−02	2.11E−03
K_{β_2} X-ray	2.09E−02	3.443E−02	7.20E−04
K_{β_3} X-ray	3.23E−02	3.356E−02	1.08E−03
L_α X-ray	4.00E−02	4.109E−03*	1.64E−04
L_β X-ray	4.03E−02	4.481E−03*	1.80E−04
Auger-KLL	5.07E−02	2.432E−02*	1.23E−03
Auger-KLX	2.35E−02	2.850E−02*	6.69E−04
Auger-LMM	5.60E−01	3.313E−03*	1.86E−03
Auger-LMX	3.04E−01	4.168E−03*	1.27E−03
Auger-LXY	4.63E−02	4.779E−03*	2.21E−04
Auger-MXY	1.71E+00	8.059E−04*	1.37E−03
Listed X, γ and $\gamma^\pm$ radiations			1.13E−01
Omitted X, γ and $\gamma^\pm$ radiations**			5.82E−05
Listed β, ce and Auger radiations			1.34E−01
Omitted β, ce and Auger radiations**			1.38E−04
Listed radiations			2.47E−01
Omitted radiations**			1.97E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i)\times E(i)$ in its category.

Xe-125 daughter is radioactive.



54-Xe-127m

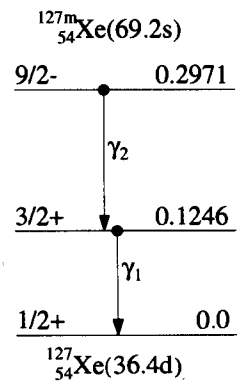
29-JAN-96

Half-life = 69.2 s
Decay mode(s): IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	6.90E−01	1.246E−01	8.60E−02
ce-K, γ 1	2.66E−01	9.004E−02	2.40E−02
ce-L_1, γ 1	3.21E−02	1.191E−01	3.82E−03
ce-L_2, γ 1	2.79E−03	1.195E−01	3.33E−04
ce-L_3, γ 1	1.17E−03	1.198E−01	1.40E−04
ce-M, γ 1	7.30E−03	1.237E−01*	9.02E−04
ce-N^+, γ 1	1.84E−03	1.246E−01*	2.29E−04
γ 2	3.80E−01	1.725E−01	6.55E−02
ce-K, γ 2	3.48E−01	1.379E−01	4.80E−02
ce-L_1, γ 2	3.25E−02	1.670E−01	5.43E−03
ce-L_2, γ 2	9.95E−02	1.674E−01	1.67E−02
ce-L_3, γ 2	8.35E−02	1.677E−01	1.40E−02
ce-M, γ 2	4.71E−02	1.716E−01*	8.07E−03
ce-N^+, γ 2	1.14E−02	1.725E−01*	1.97E−03
K_{α_1} X-ray	2.88E−01	2.978E−02	8.57E−03
K_{α_2} X-ray	1.55E−01	2.946E−02	4.57E−03
K_{β_1} X-ray	5.53E−02	3.362E−02	1.86E−03
K_{β_2} X-ray	1.84E−02	3.443E−02	6.34E−04
K_{β_3} X-ray	2.84E−02	3.356E−02	9.54E−04
Auger-KLL	4.47E−02	2.432E−02*	1.09E−03
Auger-KLX	2.07E−02	2.850E−02*	5.89E−04
Auger-LMM	4.51E−01	3.315E−03*	1.50E−03
Auger-LMX	2.46E−01	4.170E−03*	1.02E−03
Auger-LXY	3.74E−02	4.781E−03*	1.79E−04
Auger-MXY	1.37E+00	8.071E−04*	1.11E−03
Listed X, γ and $\gamma^\pm$ radiations			1.68E−01
Omitted X, γ and $\gamma^\pm$ radiations**			3.27E−04
Listed β, ce and Auger radiations			1.29E−01
Omitted β, ce and Auger radiations**			1.19E−04
Listed radiations			2.97E−01
Omitted radiations**			4.46E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i)\times E(i)$ in its category.

Xe-127 daughter is radioactive.



54-Xe-137

04-NOV-94

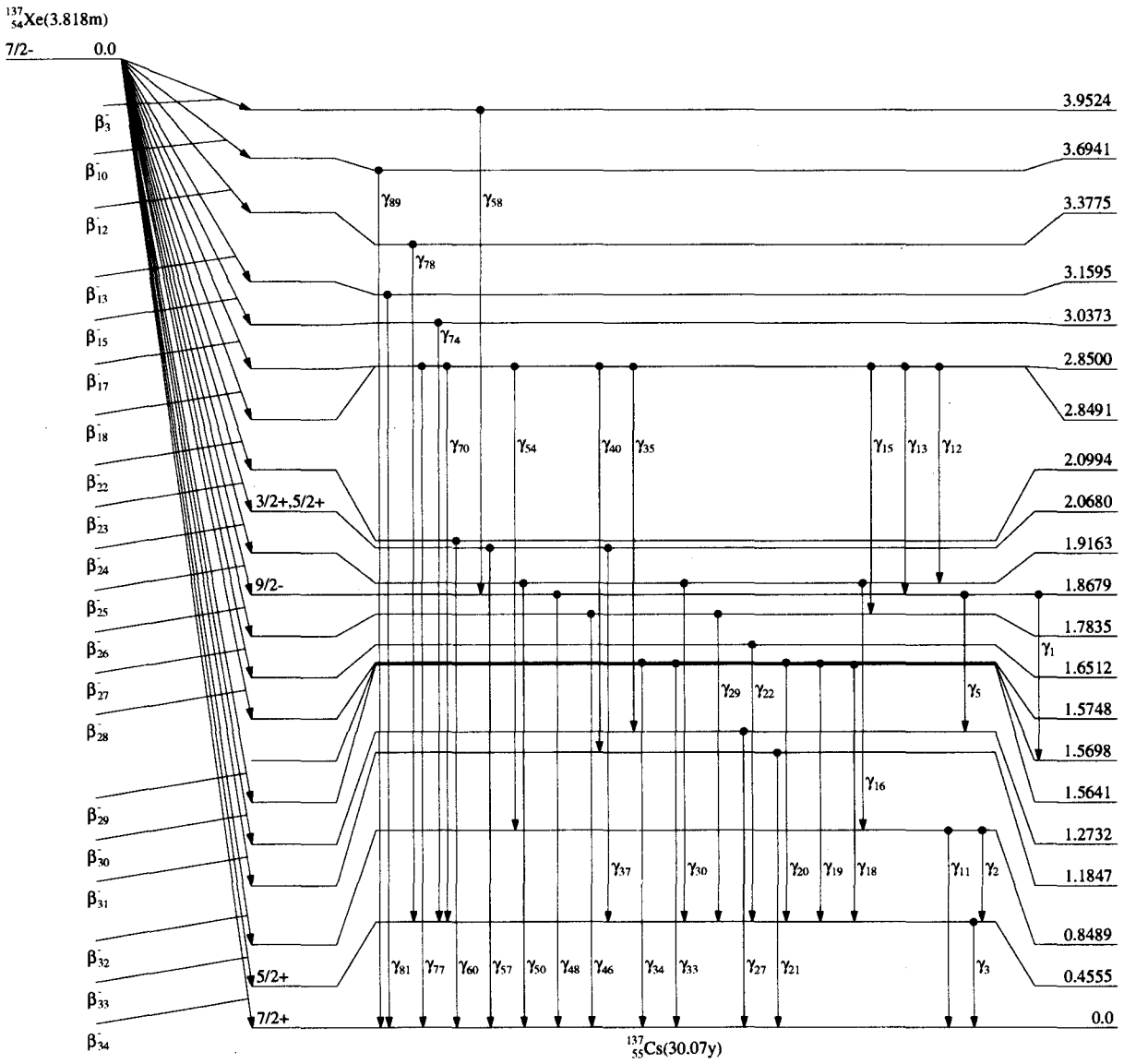
Half-life = 3.818 m
Decay mode(s): β^-

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
β^- 17	7.20E−03	4.787E−01*	3.45E−03
β^- 26	3.80E−03	9.529E−01*	3.62E−03
β^- 28	1.70E−03	1.048E+00*	1.78E−03
β^- 32	6.50E−03	1.385E+00*	9.00E−03
β^- 33	3.04E−01	1.568E+00*	4.77E−01
β^- 34	6.70E−01	1.781E+00*	1.19E+00
γ 1	1.19E−03	2.980E−01	3.53E−04
γ 2	1.40E−03	3.934E−01	5.52E−04
γ 3	3.12E−01	4.555E−01	1.42E−01
γ 5	8.42E−04	5.947E−01	5.01E−04
γ 11	6.24E−03	8.490E−01	5.30E−03
γ 12	8.42E−04	9.338E−01	7.87E−04
γ 13	2.09E−03	9.822E−01	2.05E−03
γ 15	5.43E−04	1.067E+00	5.79E−04
γ 16	4.90E−04	1.067E+00	5.23E−04
γ 18	5.12E−04	1.109E+00	5.67E−04
γ 19	9.24E−04	1.114E+00	1.03E−03
γ 20	1.07E−03	1.119E+00	1.20E−03
γ 21	8.42E−04	1.185E+00	9.98E−04
γ 22	4.80E−04	1.196E+00	5.75E−04
γ 27	2.28E−03	1.273E+00	2.90E−03
γ 29	2.93E−04	1.328E+00	3.89E−04
γ 30	1.72E−04	1.461E+00	2.51E−04
γ 33	8.55E−04	1.570E+00	1.34E−03
γ 34	7.18E−04	1.575E+00	1.13E−03
γ 35	1.03E−03	1.577E+00	1.62E−03
γ 37	1.25E−03	1.613E+00	2.01E−03
γ 40	5.30E−04	1.665E+00	8.83E−04
γ 46	4.15E−03	1.783E+00	7.40E−03
γ 48	1.62E−04	1.868E+00	3.03E−04
γ 50	9.67E−04	1.916E+00	1.85E−03
γ 54	1.78E−04	2.000E+00	3.56E−04
γ 57	1.03E−04	2.068E+00	2.13E−04
γ 58	1.37E−04	2.084E+00	2.86E−04
γ 60	1.34E−04	2.099E+00	2.82E−04
γ 70	8.11E−04	2.394E+00	1.94E−03
γ 74	2.34E−04	2.582E+00	6.04E−04
γ 77	1.84E−03	2.850E+00	5.25E−03
γ 78	1.78E−04	2.922E+00	5.20E−04
γ 81	1.19E−04	3.159E+00	3.75E−04
γ 89	6.24E−05	3.694E+00	2.31E−04

Listed X, γ and $\gamma^{\pm}$ radiations	1.87E−01
Omitted X, γ and $\gamma^{\pm}$ radiations**	3.50E−03
Listed β, ce and Auger radiations	1.69E+00
Omitted β, ce and Auger radiations**	6.69E−03
Listed radiations	1.88E+00
Omitted radiations**	1.02E−02

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

Cs-137 daughter is radioactive.


137 54 Xe(3.818m)
7/2- 0.0
β-3
β-10
β-12
β-13
β-15
β-17
β-18
β-22
β-23
β-24
β-25
β-26
β-27
β-28
β-29
β-30
β-31
β-32
β-33
β-34
3/2+,5/2+
9/2-
5/2+
7/2+
3.9524
3.6941
3.3775
3.1595
3.0373
2.8500
2.8491
2.0994
2.0680
1.9163
1.8679
1.7835
1.6512
1.5748
1.5698
1.5641
1.2732
1.1847
0.8489
0.4555
0.0
γ89 γ58 γ78 γ74 γ70 γ54 γ40 γ35 γ15 γ13 γ12 γ1 γ29 γ22 γ5 γ16 γ37 γ30 γ20 γ19 γ18 γ11 γ2 γ81 γ77 γ60 γ57 γ50 γ48 γ46 γ34 γ33 γ27 γ21 γ3
137 55 Cs(30.07y)

74-W-183m

10-JUL-91

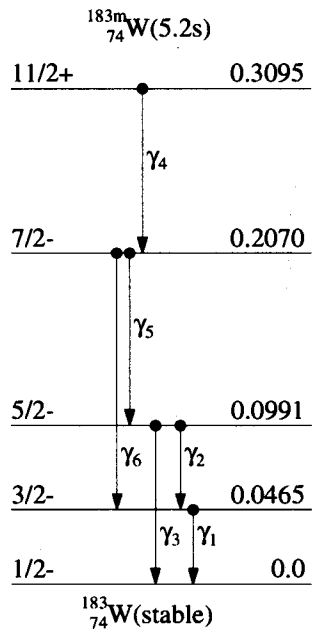
Half-life = 5.2 s
Decay mode(s): IT

Radiation	y(i) (Bq s)$^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 1	6.13E−02	4.648E−02	2.85E−03
ce-L_1, γ 1	3.33E−01	3.438E−02	1.15E−02
ce-L_2, γ 1	4.92E−02	3.494E−02	1.72E−03
ce-L_3, γ 1	2.29E−02	3.628E−02	8.30E−04
ce-M, γ 1	9.30E−02	4.420E−02*	4.11E−03
ce-N^+, γ 1	2.83E−02	4.648E−02*	1.31E−03
γ 2	6.76E−02	5.260E−02	3.56E−03
ce-L_1, γ 2	2.53E−01	4.050E−02	1.03E−02
ce-L_2, γ 2	4.87E−02	4.105E−02	2.00E−03
ce-L_3, γ 2	2.91E−02	4.239E−02	1.23E−03
ce-M, γ 2	7.65E−02	5.031E−02*	3.85E−03
ce-N^+, γ 2	2.30E−02	5.260E−02*	1.21E−03
γ 3	8.14E−02	9.908E−02	8.07E−03
ce-K, γ 3	7.40E−02	2.955E−02	2.19E−03
ce-L_1, γ 3	8.06E−03	8.698E−02	7.01E−04
ce-L_2, γ 3	9.99E−02	8.754E−02	8.74E−03
ce-L_3, γ 3	8.93E−02	8.887E−02	7.93E−03
ce-M, γ 3	4.95E−02	9.680E−02*	4.80E−03
ce-N^+, γ 3	1.45E−02	9.908E−02*	1.44E−03
γ 4	2.42E−02	1.025E−01	2.48E−03
ce-K, γ 4	6.80E−01	3.296E−02	2.24E−02
ce-L_1, γ 4	1.67E−01	9.038E−02	1.51E−02
ce-L_2, γ 4	1.97E−02	9.094E−02	1.79E−03
ce-L_3, γ 4	3.67E−02	9.227E−02	3.39E−03
ce-M, γ 4	5.50E−02	1.002E−01*	5.51E−03
ce-N^+, γ 4	1.71E−02	1.025E−01*	1.76E−03
γ 5	1.89E−01	1.079E−01	2.04E−02
ce-K, γ 5	5.75E−01	3.841E−02	2.21E−02
ce-L_1, γ 5	8.23E−02	9.583E−02	7.89E−03
ce-L_2, γ 5	2.13E−02	9.639E−02	2.05E−03
ce-L_3, γ 5	1.28E−02	9.773E−02	1.25E−03
ce-M, γ 5	2.70E−02	1.057E−01*	2.86E−03
ce-N^+, γ 5	8.19E−03	1.079E−01*	8.84E−04
γ 6	5.12E−02	1.605E−01	8.22E−03
ce-K, γ 6	1.56E−02	9.100E−02	1.42E−03
ce-L_1, γ 6	1.71E−03	1.484E−01	2.53E−04
ce-L_2, γ 6	7.01E−03	1.490E−01	1.04E−03
ce-L_3, γ 6	5.29E−03	1.503E−01	7.95E−04
ce-M, γ 6	3.50E−03	1.582E−01*	5.54E−04
K_{α_1} X-ray	6.45E−01	5.932E−02	3.83E−02
K_{α_2} X-ray	3.72E−01	5.798E−02	2.15E−02
K_{β_1} X-ray	1.39E−01	6.724E−02	9.37E−03
K_{β_2} X-ray	5.55E−02	6.913E−02	3.83E−03
K_{β_3} X-ray	7.22E−02	6.695E−02	4.84E−03
K_{β_5} X-ray	3.25E−03	6.769E−02	2.20E−04
L_α X-ray	2.58E−01	8.391E−03*	2.17E−03
L_β X-ray	3.14E−01	9.728E−03*	3.05E−03
L_γ X-ray	5.92E−02	1.144E−02*	6.78E−04
Auger-KLL	3.56E−02	4.682E−02*	1.67E−03
Auger-KLX	1.93E−02	5.599E−02*	1.08E−03
Auger-KXY	2.99E−03	6.490E−02*	1.94E−04
Auger-LMM	1.01E+00	6.822E−03*	6.89E−03
Auger-LMX	6.38E−01	8.847E−03*	5.64E−03
Auger-LXY	1.03E−01	1.039E−02*	1.07E−03
Auger-MXY	3.73E+00	2.079E−03*	7.75E−03
ΔE	9.49E−01	3.178E−04*	3.02E−04

Listed X, γ and $\gamma^\pm$ radiations	1.30E−01
Omitted X, γ and $\gamma^\pm$ radiations**	1.16E−04
Listed β, ce and Auger radiations	1.79E−01
Omitted β, ce and Auger radiations**	1.64E−04
Listed radiations	3.09E−01
Omitted radiations**	2.80E−04

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum$y(i)×E(i) in its category.

W-183 daughter is stable.



74-W-185m

22-MAR-95

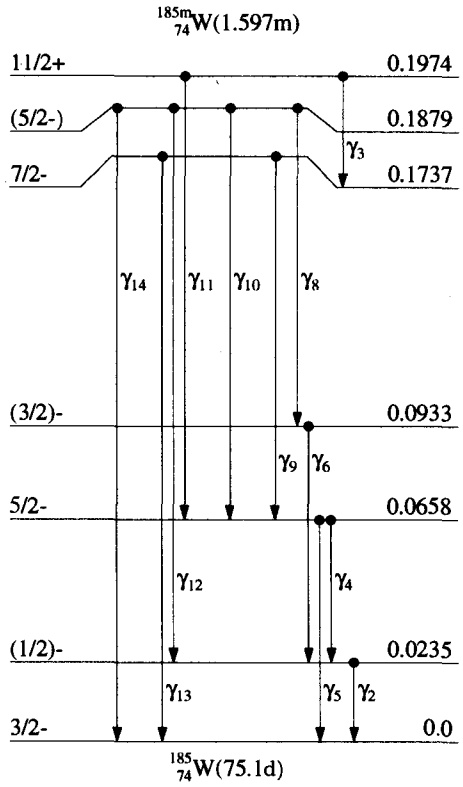
Half-life = 1.597 m
Decay mode(s): IT

Radiation	y(i) $(Bq\ s)^{-1}$	E(i) (MeV)	y(i)×E(i)
γ 2	1.69E−03	2.354E−02	3.98E−05
ce-L_1, γ 2	6.88E−02	1.144E−02	7.88E−04
ce-L_2, γ 2	2.64E−02	1.200E−02	3.16E−04
ce-L_3, γ 2	2.50E−02	1.333E−02	3.34E−04
ce-M, γ 2	2.82E−02	2.126E−02*	6.00E−04
ce-N^+, γ 2	1.03E−02	2.354E−02*	2.42E−04
ce-L_1, γ 3	3.04E−02	1.144E−02	3.48E−04
ce-L_3, γ 3	1.68E−02	1.333E−02	2.25E−04
ce-M, γ 3	1.29E−02	2.126E−02*	2.73E−04
γ 4	7.36E−04	4.229E−02	3.11E−05
ce-L_2, γ 4	5.01E−02	3.075E−02	1.54E−03
ce-L_3, γ 4	5.62E−02	3.208E−02	1.80E−03
ce-M, γ 4	2.67E−02	4.001E−02*	1.07E−03
ce-N^+, γ 4	7.96E−03	4.229E−02*	3.37E−04
γ 5	5.80E−02	6.586E−02	3.82E−03
ce-L_1, γ 5	5.88E−02	5.376E−02	3.16E−03
ce-L_2, γ 5	2.67E−01	5.432E−02	1.45E−02
ce-L_3, γ 5	2.64E−01	5.565E−02	1.47E−02
ce-M, γ 5	1.47E−01	6.358E−02*	9.36E−03
ce-N^+, γ 5	4.26E−02	6.586E−02*	2.81E−03
γ 8	1.05E−03	9.459E−02	9.95E−05
γ 9	4.07E−03	1.079E−01	4.39E−04
ce-K, γ 9	7.32E−03	3.833E−02	2.81E−04
ce-L_2, γ 9	2.07E−03	9.631E−02	1.99E−04
γ 10	1.02E−03	1.221E−01	1.24E−04
γ 11	4.33E−02	1.315E−01	5.70E−03
ce-K, γ 11	6.09E−02	6.203E−02	3.78E−03
ce-L_1, γ 11	1.40E−02	1.195E−01	1.67E−03
ce-L_2, γ 11	3.40E−01	1.200E−01	4.08E−02
ce-L_3, γ 11	2.37E−01	1.213E−01	2.88E−02
ce-M, γ 11	1.57E−01	1.293E−01*	2.02E−02
ce-N^+, γ 11	4.67E−02	1.315E−01*	6.15E−03
γ 12	5.89E−03	1.643E−01	9.68E−04
γ 13	3.26E−02	1.737E−01	5.67E−03
ce-K, γ 13	8.12E−03	1.042E−01	8.45E−04
ce-L_2, γ 13	3.15E−03	1.621E−01	5.11E−04
ce-L_3, γ 13	2.30E−03	1.635E−01	3.77E−04
ce-M, γ 13	1.58E−03	1.714E−01*	2.72E−04
γ 14	8.14E−03	1.879E−01	1.53E−03
ce-K, γ 14	4.05E−03	1.184E−01	4.80E−04
K_{α_1} X-ray	4.52E−02	5.932E−02	2.68E−03
K_{α_2} X-ray	2.60E−02	5.798E−02	1.51E−03
K_{β_1} X-ray	9.76E−03	6.724E−02	6.56E−04
K_{β_2} X-ray	3.88E−03	6.913E−02	2.69E−04
K_{β_3} X-ray	5.06E−03	6.695E−02	3.39E−04
L_α X-ray	1.66E−01	8.391E−03*	1.39E−03
L_β X-ray	2.19E−01	9.720E−03*	2.13E−03
L_γ X-ray	3.75E−02	1.134E−02*	4.25E−04
L_η X-ray	3.50E−03	8.724E−03	3.05E−05
L_ℓ X-ray	5.83E−03	7.387E−03	4.30E−05
Auger-LMM	6.50E−01	6.757E−03*	4.39E−03
Auger-LMX	4.03E−01	8.760E−03*	3.53E−03
Auger-LXY	6.50E−02	1.031E−02*	6.70E−04
Auger-MXY	2.47E+00	2.027E−03*	5.00E−03
ΔE	6.74E−01	3.264E−04*	2.20E−04

Listed X, γ and $\gamma^{\pm}$ radiations	2.79E−02
Omitted X, γ and $\gamma^{\pm}$ radiations**	6.51E−05
Listed β, ce and Auger radiations	1.71E−01
Omitted β, ce and Auger radiations**	2.37E−03
Listed radiations	1.98E−01
Omitted radiations**	2.43E−03

* Average energy (MeV)
** Each omitted transition contributes <0.100 % to $\sum y(i) \times E(i)$ in its category.

W-185 daughter is radioactive.



国際単位系（SI）と換算表

表1　SI基本単位および補助単位

量	名称	記号
長さ	メートル	m
質量	キログラム	kg
時間	秒	s
電流	アンペア	A
熱力学温度	ケルビン	K
物質量	モル	mol
光度	カンデラ	cd
平面角	ラジアン	rad
立体角	ステラジアン	sr

表2　SIと併用される単位

名称	記号
分，時，日	min，h，d
度，分，秒	°，′，″
リットル	l，L
トン	t
電子ボルト	eV
原子質量単位	u

1 eV=1.60218×10^{-19}J

1 u=1.66054×10^{-27}kg

表5　SI接頭語

倍数	接頭語	記号
10^{18}	エクサ	E
10^{15}	ペタ	P
10^{12}	テラ	T
10^{9}	ギガ	G
10^{6}	メガ	M
10^{3}	キロ	k
10^{2}	ヘクト	h
10^{1}	デカ	da
10^{-1}	デシ	d
10^{-2}	センチ	c
10^{-3}	ミリ	m
10^{-6}	マイクロ	μ
10^{-9}	ナノ	n
10^{-12}	ピコ	p
10^{-15}	フェムト	f
10^{-18}	アト	a

表3　固有の名称をもつSI組立単位

量	名称	記号	他のSI単位による表現
周波数	ヘルツ	Hz	s^{-1}
力	ニュートン	N	$m\cdot kg/s^2$
圧力，応力	パスカル	Pa	N/m^2
エネルギー,仕事,熱量	ジュール	J	N·m
工率，放射束	ワット	W	J/s
電気量，電荷	クーロン	C	A·s
電位，電圧，起電力	ボルト	V	W/A
静電容量	ファラド	F	C/V
電気抵抗	オーム	Ω	V/A
コンダクタンス	ジーメンス	S	A/V
磁束	ウェーバ	Wb	V·s
磁束密度	テスラ	T	Wb/m^2
インダクタンス	ヘンリー	H	Wb/A
セルシウス温度	セルシウス度	℃	
光束	ルーメン	lm	cd·sr
照度	ルクス	lx	lm/m^2
放射能	ベクレル	Bq	s^{-1}
吸収線量	グレイ	Gy	J/kg
線量等量	シーベルト	Sv	J/kg

表4　SIと共に暫定的に維持される単位

名称	記号
オングストローム	Å
バーン	b
バール	bar
ガル	Gal
キュリー	Ci
レントゲン	R
ラド	rad
レム	rem

1 Å=0.1nm=10^{-10}m

1 b=100fm^2=10^{-28}m^2

1 bar=0.1MPa=10^5Pa

1 Gal=1cm/s^2=10^{-2}m/s^2

1 Ci=3.7×10^{10}Bq

1 R=2.58×10^{-4}C/kg

1 rad=1cGy=10^{-2}Gy

1 rem=1cSv=10^{-2}Sv

(注)

1．表1－5は「国際単位系」第5版，国際度量衡局1985年刊行による。ただし，1 eVおよび1 uの値はCODATAの1986年推奨値によった。

2．表4には海里，ノット，アール，ヘクタールも含まれているが日常の単位なのでここでは省略した。

3．barは，JISでは流体の圧力を表わす場合に限り表2のカテゴリーに分類されている。

4．ECの閣僚理事会指令ではbar，barnおよび「血圧の単位」mmHgを表2のカテゴリーに入れている。

換算表

力	N(=10^5dyn)	kgf	lbf
	1	0.101972	0.224809
	9.80665	1	2.20462
	4.44822	0.453592	1

粘度　1 Pa·s(N·s/m^2)=10 P(ポアズ)(g/(cm·s))

動粘度　1m^2/s=10^4St(ストークス)(cm^2/s)

圧力	MPa(=10bar)	kgf/cm^2	atm	mmHg(Torr)	lbf/in^2(psi)
	1	10.1972	9.86923	7.50062×10^3	145.038
	0.0980665	1	0.967841	735.559	14.2233
	0.101325	1.03323	1	760	14.6959
	1.33322×10^{-4}	1.35951×10^{-3}	1.31579×10^{-3}	1	1.93368×10^{-2}
	6.89476×10^{-3}	7.03070×10^{-2}	6.80460×10^{-2}	51.7149	1

エネルギー・仕事・熱量	J(=10^7 erg)	kgf·m	kW·h	cal(計量法)	Btu	ft·lbf	eV
	1	0.101972	2.77778×10^{-7}	0.238889	9.47813×10^{-4}	0.737562	6.24150×10^{18}
	9.80665	1	2.72407×10^{-6}	2.34270	9.29487×10^{-3}	7.23301	6.12082×10^{19}
	3.6×10^6	3.67098×10^5	1	8.59999×10^5	3412.13	2.65522×10^6	2.24694×10^{25}
	4.18605	0.426858	1.16279×10^{-6}	1	3.96759×10^{-3}	3.08747	2.61272×10^{19}
	1055.06	107.586	2.93072×10^{-4}	252.042	1	778.172	6.58515×10^{21}
	1.35582	0.138255	3.76616×10^{-7}	0.323890	1.28506×10^{-3}	1	8.46233×10^{18}
	1.60218×10^{-19}	1.63377×10^{-20}	4.45050×10^{-26}	3.82743×10^{-20}	1.51857×10^{-22}	1.18171×10^{-19}	1

1 cal= 4.18605J（計量法）

= 4.184J（熱化学）

= 4.1855J（15℃）

= 4.1868J（国際蒸気表）

仕事率　1 PS(仏馬力)

= 75 kgf·m/s

= 735.499W

放射能	Bq	Ci
	1	2.70270×10^{-11}
	3.7×10^{10}	1

吸収線量	Gy	rad
	1	100
	0.01	1

照射線量	C/kg	R
	1	3876
	2.58×10^{-4}	1

線量当量	Sv	rem
	1	100
	0.01	1

（86年12月26日現在）