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High Density Chip Interconnect Technology Using High Density Glass Interposers

Cooperative Research and Development Agreement Final Report

CRADA Number: FRA-2017-0047

Fermilab Technical Contact: Farah Fahim

Summary Report
30 July 2019

NOTICE

In accordance with Requirements set forth in Article X of the CRADA document, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

CRADA number: FRA-2017-0047

CRADA Title: High Density Chip Interconnect Technology Using High Density Glass Interposers

Parties to the Agreement: Collier Ventures, Inc. and Fermi Research Alliance, LLC

Abstract of CRADA work:

Modern particle physics experiments require “intelligent detectors” with dense interconnects and distributed intelligence in very large area detector systems. Available packaging and interconnect technologies directly limit the performance and capabilities of these systems. Interposers are interconnected elements that use through-silicon or through-glass via to replace the PC board technology currently used for connecting chips and can improve the interconnect density by more than two orders of magnitude. The goal of this project is to fabricate a thru glass via interposer that will allow top to bottom side interconnects in the tens of microns. Having a thru glass interposer with interconnects in the tens of microns will benefit the electrons industry which focuses on 3D packaging. In addition to commercial, medical applications such as the CAT scan, which have resolutions in the micron or larger range, will now be able to use these interposers to diagnose in the tens of microns.

Summary of Research Results:

CVI had to develop a process outside the original scope of the SBIR. While we can fabricate the holes as required, filling those holes hermetically is a challenge with available resources and at the temperatures required for post processing and reflow. As such, we are amending and looking towards both the 300um deep and 400um deep holes –YET- filled with ink and with polymer dielectrics we developed that can be cured at 175C to prevent damage to the filled vias.

Related Reports, Publications, and Presentations:

NONE

Subject Inventions listing:

NONE

Report Date: 9/24/2019

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This document contains NO confidential, protectable or proprietary information.