

3. FUNDAMENTALS OF GLASS TECHNOLOGY AND APPLICATIONS FOR ADVANCED SEMICONDUCTOR PACKAGING

Course Leaders: Aric Shorey and Dr. Jingshi Wu – Corning, Inc.

Course Objective:

This course is intended to guide technologists toward a deeper understanding of how to leverage engineered glass as a material for advanced IC packaging applications. Following a review of the fundamental principles of glass structure, composition, and properties, we will discuss the unique attributes that make glass an enabling material: including strength and reliability, chemical durability, thermal behavior, associated thermal relaxation behavior, and electrical properties. In addition, we will review the “glass toolkit” as a platform alternative for semiconductor packaging development: including various manufacturing (glass melting and forming) approaches, the diversity of compositional options, and a survey of glass processing approaches that can be adapted from adjacent glass technology spaces to advanced semiconductor packaging. Finally, a series of case studies will illustrate how glass is contributing to emerging technologies in the microelectronics space and explore current and potential applications in advanced semiconductor packaging and the internet of things (IoT). The focus will be on the role of glass as a carrier for: temporary bonding, integrated wafer for optical sensors and virtual/augmented reality, key components in RF communications, as well as, glass interposers for 2.5D and 3D packaging. The ability to leverage glass solutions for improved cost-effectiveness will also be discussed as an alternative to other materials for carriers and interposers.

Course Outline:

1. Fundamentals of Glass
 - What is Glass?
 - Overview of Glass Attributes
2. Versatility of Glass
 - Glass Composition Review
 - Melting and Forming Process
 - Overview of Major Forming Processes
 - Secondary Processes
 - Options for Enhanced Properties
3. Major Applications and Markets
 - Electronics
 - Carrier Wafers
 - Case Studies
 - RF Applications
 - Case Studies
 - Interposers/Packaging

Who Should Attend:

Engineers, technical managers, scientists, buyers, and managers involved in materials, research and development as well as 3D IC packaging should attend. We welcome individuals or companies with little or no experience in using glass.

Bio 1:

Aric Shorey, PhD, is a Sr. Technical Manager in Corning Incorporated’s Precision Glass Solutions business, which offers industry-leading wafer and panel solutions for semiconductor, consumer electronics, and Internet of Things (IoT) applications. He has BS/MS in Mechanical

Engineering and a PhD in Materials Science – all from the University of Rochester. He has spent the majority of his career in material finishing and characterization for the telecommunications, precision optics and semiconductor industries.

Bio 2:

Dr. Jingshi Wu joined Corning Incorporated in 2015. Her research revolves around a fundamental understanding of the atomic structure of glass and how such structure correlates with physical properties, as well as an understanding of laser damage to glass, and the composition development for high performance display glass and through glass via applications.

Prior to joining Corning, Dr. Wu worked as a postdoctoral scholar in the Geological and Environmental Science Department at Stanford University from 2011 to 2014.

Dr. Wu holds a Bachelor of Science in Geology from China University of Geoscience in Wuhan and a Master of Science in Geology from the University of Western Ontario. She also holds a Master of Science in Material Science and Engineering and a doctorate in Geological and Environmental Science from Stanford University.