Course subject:

Reliability High Reliability Soldering in Semiconductor Packaging

Course leader: Dr. Ning-Cheng Lee—ShinePure Hi-Tech

Speech Description/Objective:

Semiconductor soldering is much more delicate and is very critical for reliability of devices. This course covers the critical parameters governing the reliability for soldering in semiconductor packaging. The reliability discussed includes parameters affecting the intermetallic compounds (IMC), voiding, electromigration, low temperature soldering, high temperature soldering, and electrochemical migration under a variety of material combinations. The failure modes are discussed in details, with preferred choices of materials and designs recommended.

Course Content:

- IMC
  - Effect of Cu Pad Grain Size on IMC
  - Interaction of Cu and Ni
  - Effect of Base Metal Co-P on IMC
- Voiding
  - Effect of Solder Form on Voiding
  - Effect of Joint Height, Temperature, Electrical, Mechanical on Shear Strength, IMC, Kirkendall Voiding
  - Effect of Cu Structure on Kirkendall Voids
- Electrochemical Migration (ECM)
- EM
  - Effect of EM vs TC on Crack Formation
  - Effect of Back Stress on EM
  - Effect of Grain Orientation on EM
  - Effect of RDL Design on EM
  - Electromigration of Low Temperature Sn-57Bi-1Ag
  - Electromigration of LTS - Alloy Effect
  - Electromigration of LTS - Surface Finish Effect
- LTS
  - Bi-Rich Whisker Growth
  - TCT Reliability of LTS
  - Collapse of LTS
  - Deposition, Hot Tear, Bi Stratification of LTS
  - Hot Tear of Homogeneous LTS BiSn - Effect of Profile & Surface Finish
  - Drop Test of LTS

- HTS - TLPB (Transient Liquid Phase Bonding)

Who Should Attend:

Anyone who care about achieving high reliability solder joints for semiconductor packaging and like to know how to achieve it should take this course.

Introduction of Speaker：

Ning-Cheng Lee is founder of ShinePure Hi-Tech. Prior to that, he was the Vice President of Technology of Indium Corporation. He has been with Indium from 1986 to 2021. Prior to joining Indium, he was with Morton Chemical and SCM. He has more than 30 years of experience in the development of fluxes and solder materials for SMT industries. He received his PhD in polymer science from University of Akron in 1981, and BS in chemistry from National Taiwan University in 1973. Ning-Cheng is the author of “Reflow Soldering Processes and Troubleshooting: SMT, BGA, CSP, and Flip Chip Technologies” by Newnes, and co-author of 5 other books. He received 1991 award from SMT Magazine and 1993 and 2001 awards for best proceedings papers of SMI or SMTA International Conferences, 2003 Lead Free Co-Operation Award from Soldertec, 2008 and 2014 awards from IPC for Honorable Mention Paper – USA Award of APEX conference, and 2010 Best Paper Award of SMTA China South Conference. He was honored as 2002 Member of Distinction from SMTA, 2006 Exceptional Technical Achievement Award from CPMT, 2007 Distinguished Lecturer from CPMT, 2009 Distinguished Author from SMTA, 2010 Electronics Manufacturing Technology Award from CPMT, 2015 Founder’s Award from SMTA, and 2017 IEEE Fellow.