



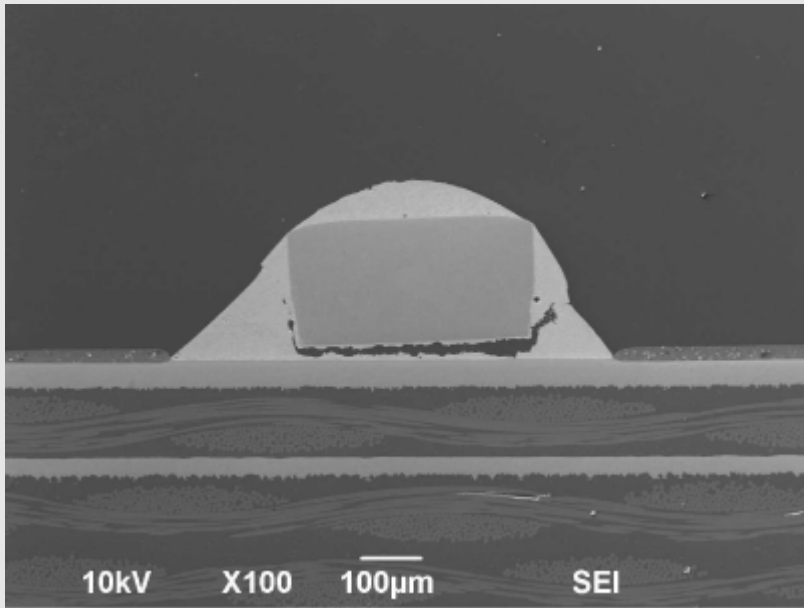
Cascade Engineering Services, Inc.

SEM/EDX/Optical Microscope Applications

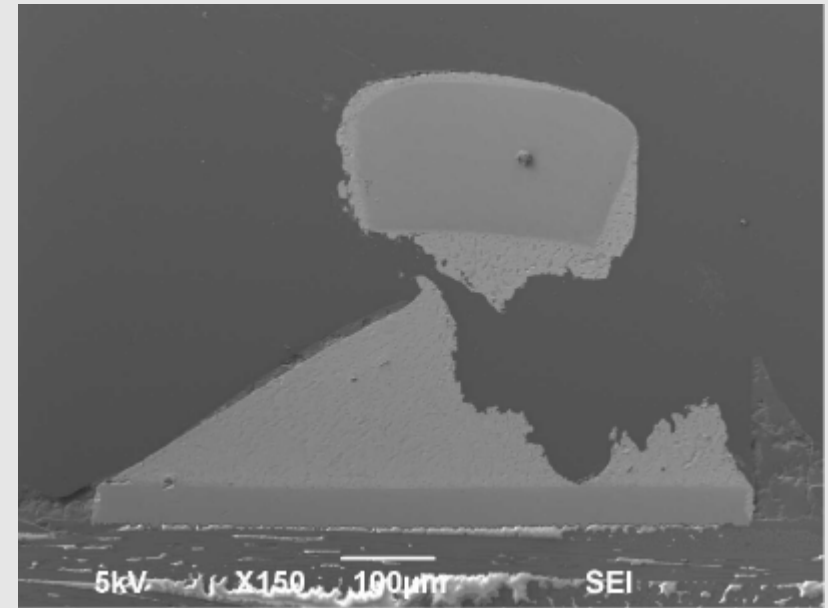
Reliability Engineering Group
Cascade Engineering Services, Inc.
6640 185th Ave NE Redmond WA 98052
(425) 895-8617 x 564

www.cascade-eng.com

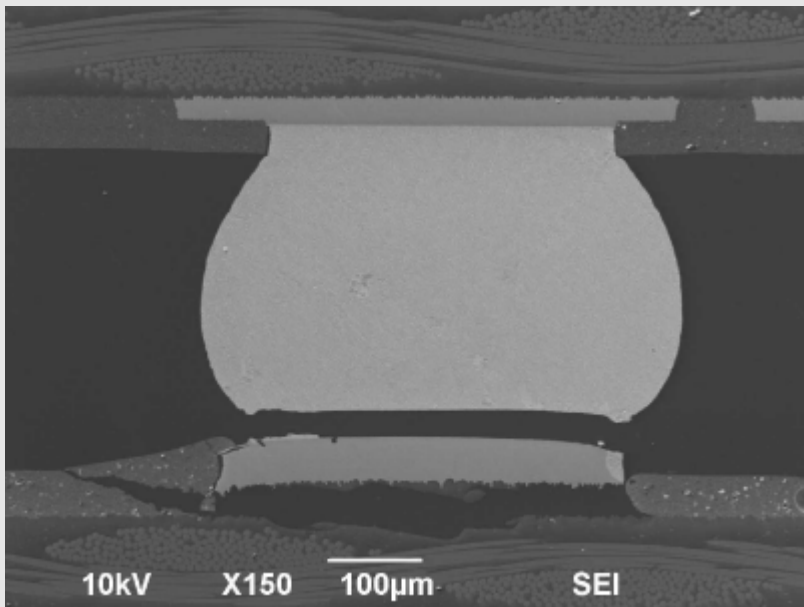
Example Defects Captured from SEM Imaging



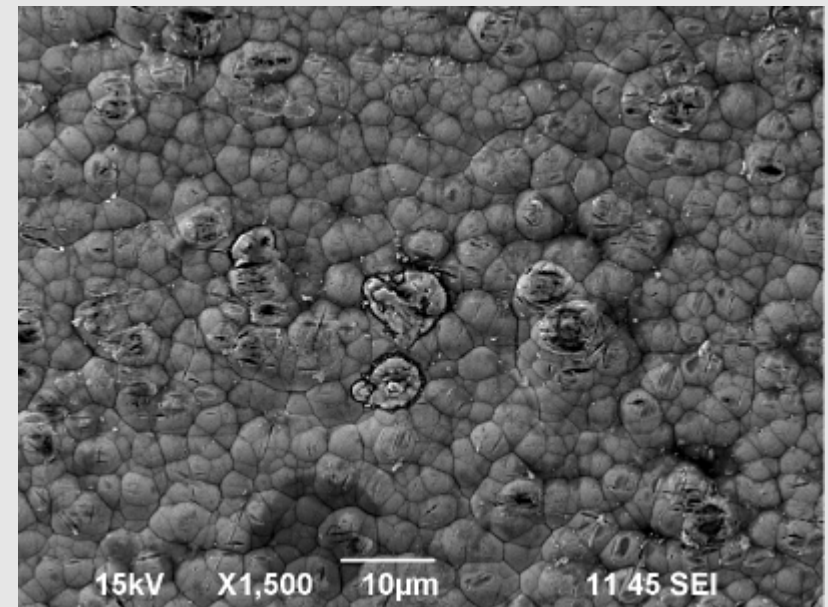
Connector Pin Cracking from Mechanical Overstress Tests



Solder Joint Overstress Fracture from Mechanical Bend Tests

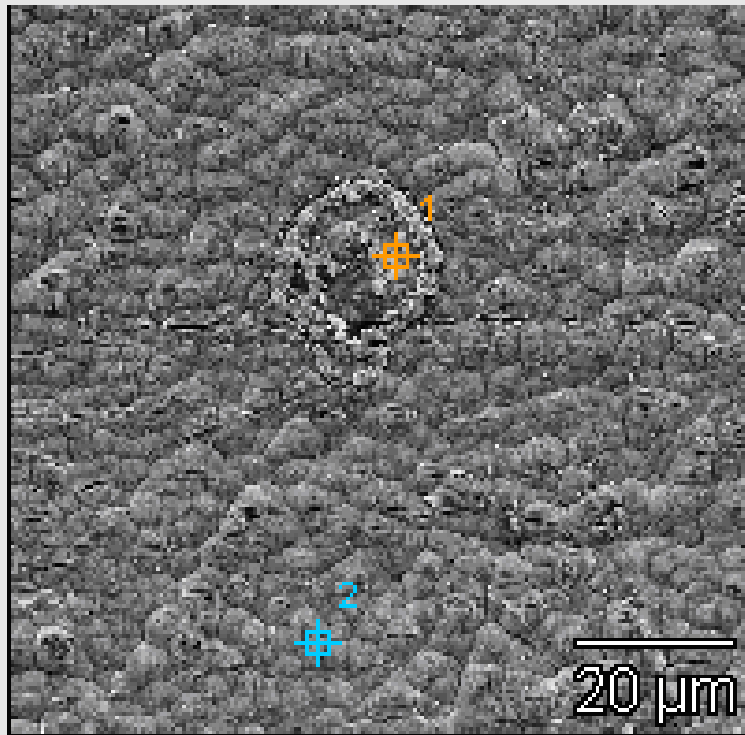


BGA Lead Free Solder Joint Delamination from Mechanical Bend Test

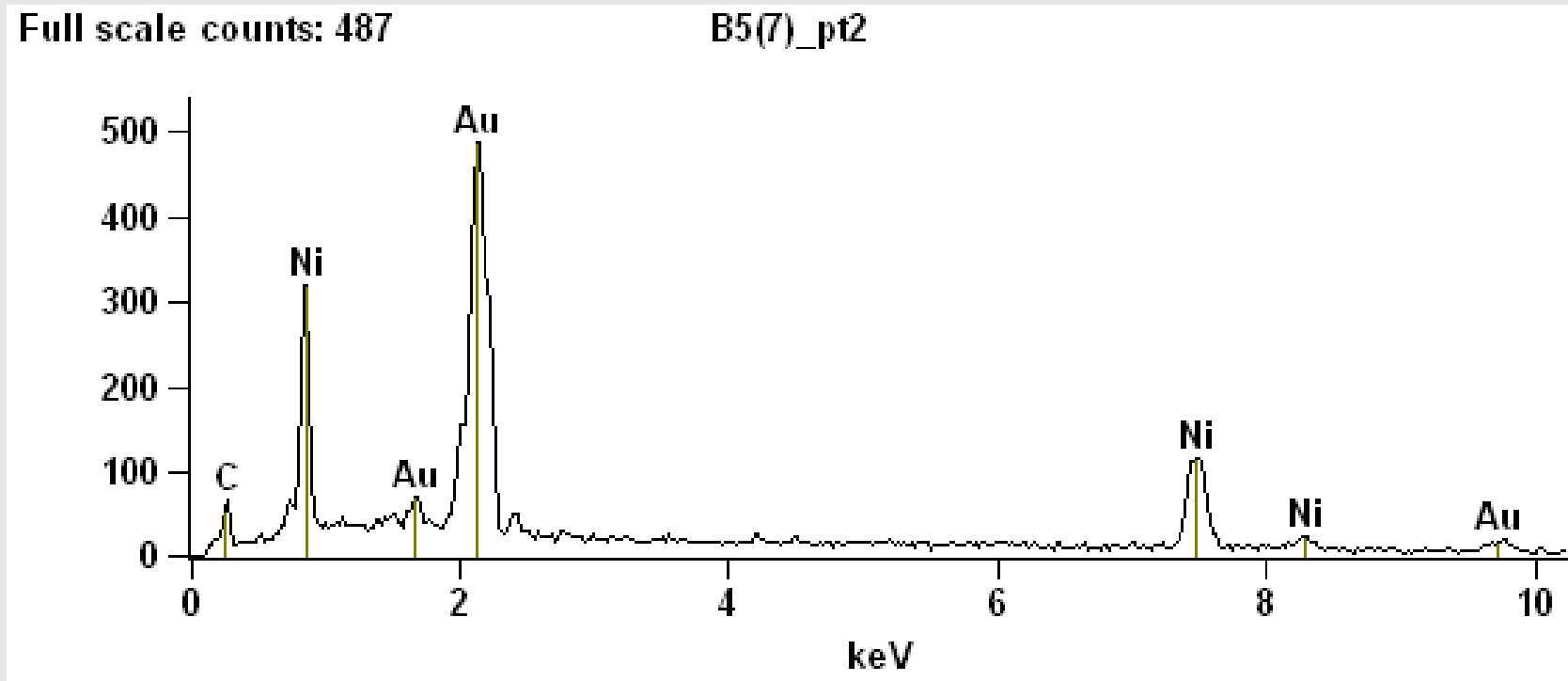
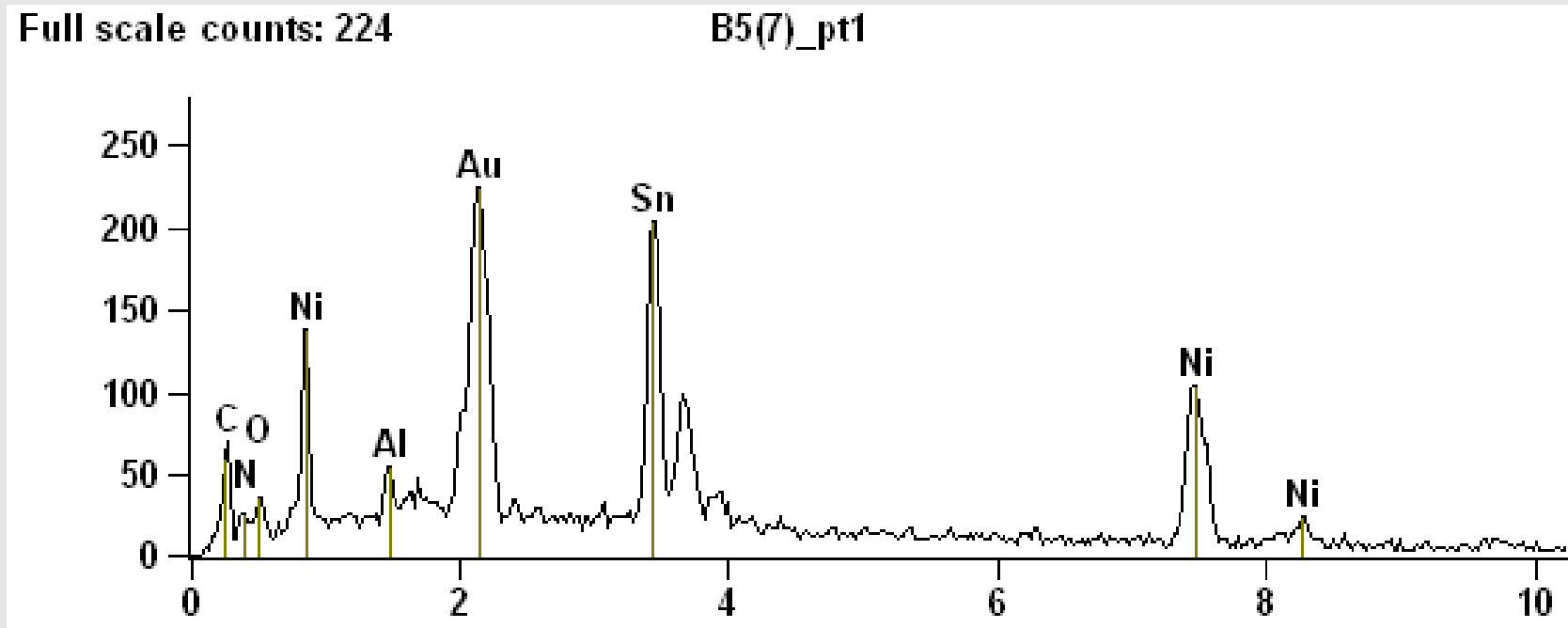


Surface contamination in gold plated PCB board

EDX Analysis of Ni / Au Plated PCBA



Connector Pin Cracking from Mechanical Overstress Tests



Dye and Pry Analysis of CPU from a Motherboard

Equipment Used

- Optical Microscope with EFI (3D Stitching) Capability

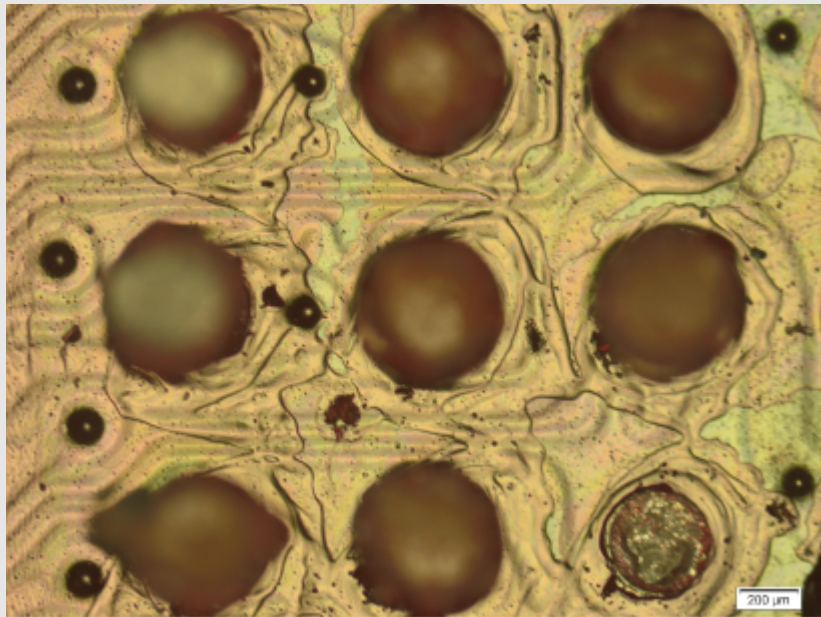


Image Focus: bottom edge i.e PCBA

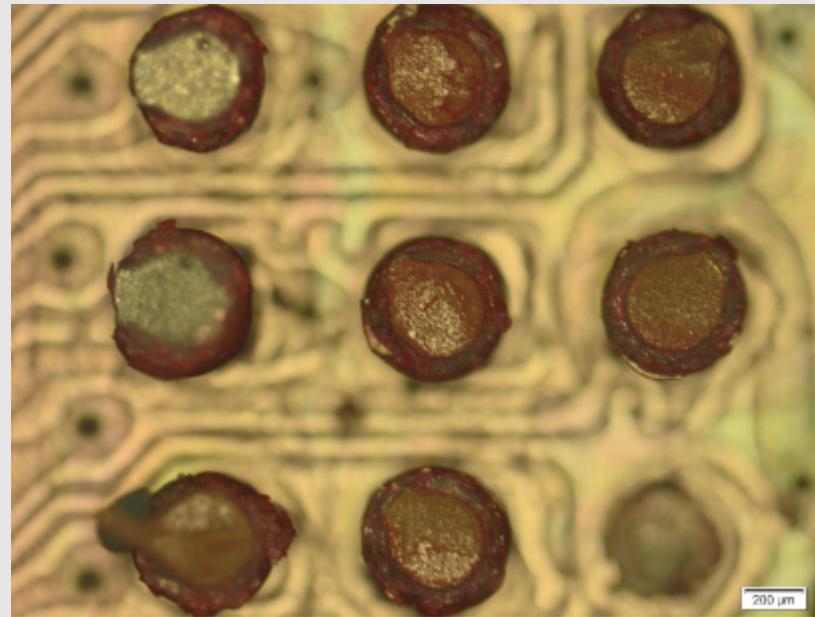
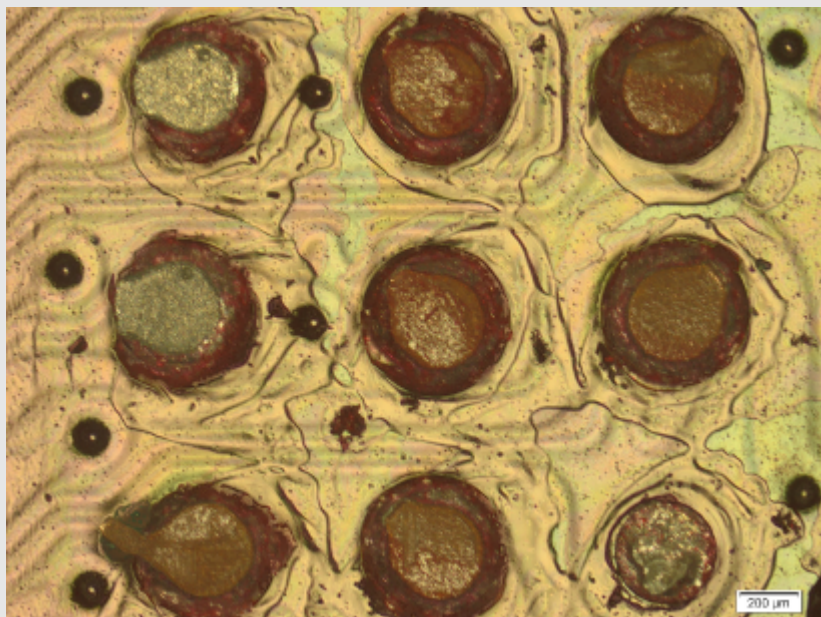


Image Focus: top edge i.e fractured joint top



Composite Extended Focal Image; Good Focus for both top and bottom edges enabling better failure analysis