

## **The surface characteristics of under bump metallurgy (UBM) in electroless nickel immersion gold (ENIG) deposition**

### **Abstract**

This paper discusses on the surface characteristics of each of the seven set-up process steps prior completion of under bump metallurgy (UBM) deposition. The Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM) techniques were used to obtain the surface roughness and morphology of each deposition process. The elemental analysis using Energy Disperse X-Ray (EDX) and precision micro-cross-section using Focus Ion Beam (FIB) was also used in this study. The first zincation process has high surface roughness but preserved surface morphology of initial thin-film surface. The second zincation provides the improved surface roughness due to the replacement aluminum layer with ion zinc in the solution. Smooth surfaces leads to better shear strength. However, second zincation will affect the Al thickness, hence excessive attacks on Al layer may cause reliability problem.