

The effects of Multiple Zincation process on Aluminum bond pad surface for electroless nickel immersion gold deposition

Abstract

This paper reports the effects of a multiple zincation process on the Al bond pad surface prior to electroless nickel immersion gold deposition. The study of multiple zincation comprises the surface topography and morphology of the appearance of the Al bond pad. In addition, by comprehension of the effects of the multiple zincation process, the study includes investigating the Al dissolution rate and adhesion strength between eutectic a 37 Pb/63 Sn solder ball and an under bump metallurgy (UBM) interface. Scanning electron microscopy, energy dispersive x-ray, atomic force microscopy, focused ion beam, and an Intellectest STORM series FA 1500 shear tester were used as analytical tools in this study. The results suggest that the first zincation process follows the contour of the initial bond pad. The second zincation produces a slightly better surface appearance with a smooth and fine Zn crystallite. The Zn crystallites become a continuous film with the deposits looking like an island formation after the third zincation. The smooth surface of the third zincation, as an effect of multiple zincation, is later transferred to Ni and Au surfaces. The smooth surface of the UBM leads to a better shear strength with only a minimum Al dissolved.