

Interfacial reaction analysis of Sn-Ag-Cu solder reinforced with 0.01wt% CNTs with isothermal aging

ABSTRACT

This study focused on the formation and growth of intermetallic compound (IMC) layer at the interfaces of pad finishes. The thickness of IMC layer, wetting angle, and defects such as floating IMC and voids formation after as reflow and isothermal aging were discussed. In this study, SAC237 (Sn: 99 wt.%, Ag: 0.3 wt.%, Cu: 0.7wt.%) reinforced with 0.01 wt.% of Multi-Walled Carbon Nanotubes (MWCNTs) were soldered on Electroless Nickel Immersion Gold (ENIG) and Immersion Tin (ImSn) pad finishes. Isothermal aging at 150°C for 400h, 800h, and 1200h were conducted after as reflow process. The IMC layer were analysed using optical microscope with image analyzer. The results shows the thickness of IMC layer for both ENIG and ImSn increased as the isothermal aging period increases. The increment was found from 1.49 μm to 1.73 μm for ENIG and 2.51 μm to 5.49 μm for ImSn. Floating IMC and voids formation were also observed on both pad finishes. Wetting angle for ENIG and ImSn varied from 16.21° to 36.85° and 24.27° to 34.41° respectively.

Keyword: SAC237; Multi-walled carbon nanotubes; ENIG; Immersion tin; As reflow; Isothermal aging; Intermetallic compound