

## **Intermetallic Compound Formation on Solder Alloy/Cu-Substrate Interface Using Lead-Free Sn-0.7Cu/Recycled-Aluminum Composite Solder**

### Abstract

Feasibility of using recycled-Aluminum (re-Al) as reinforcement particulates in Sn-0.7Cu is assessed by powder technology method, whereby re-Al particulates are produced from discarded aluminum beverage cans. This paper focuses on the intermetallic compound (IMC) formation study between the fabricated solder composite on Cu-substrate. Throughout this study, four different composition of Sn-0.7Cu/re-Al (0.0, 3.0, 3.5, 4.0 wt.%) were studied. X-ray diffraction (XRD) was used to analyze the IMCs phase formation between the interfaces. New IMC phase of  $\text{Cu}_9\text{Al}_4$  was detected beside  $\text{Cu}_6\text{Sn}_5$  and  $\text{Cu}_3\text{Sn}$  in the composite solder samples. However, Sn-0.7Cu/3.0re-Al showed least formation of brittle IMCs compared to the monolithic solder.

Keywords; Composite Solder, Intermetallic Compound, Powder Metallurgy, Recycle-Aluminum, Sn-0.7Cu