Influence of Second Reflow on the Intermetallic Compound Growth with Different Surface Finish

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Abstract. The formation and growth of the intermetallic were frequently discussed since lead-free solder took place replacing the lead solder. However, the effect of multiple reflow process on the intermetallic morphology that was subjected to aging still needs further investigation. Thus, this study aimed to investigate the effect of the second reflow towards the intermetallic compound formation and growth. Two types of surface finishes were used such as Immersion Tin (ImSn) and Electroless Nickel Immersion Gold (ENIG). Both test boards were reflowed once with Sn-3.0Ag-0.5Cu at the temperature of 225 ºC and soaking for 8 seconds. Then, they were reflowed again at the same temperature for 25 minutes prior to an isothermal aging process for 250, 500, 1000 and 2000 hours at the temperature of 150 ºC. The ProgRes C3 IM7200 Optical Microscope and ImageJ were used for the microstructural study, which includes morphology and thickness. Results indicated that IMC thickness formed between solder and ImSn surface finish increased significantly with 1.28 µm incremental when exposed to the second reflow whereas the IMC thickness of ENIG surface finish was increased for up to 0.15 µm. In addition, ENIG showed higher activation energy as compared to ImSn.