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# Effect of Cooling and Isothermal Aging on Microstructure Using Electroless Nickel (Boron) Plating

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**ABSTRACT**
This paper presents a study on relationship of cooling rates towards the intermetallic compound (IMC) morphology. Cooling rate is an important parameter as it has significant effect towards the IMC microstructure formation that indirectly affects solders joint reliability. However, there is still insufficient study regarding the effect of cooling rate on the IMC thickness and microstructure behavior by using Nickel Boron as surface finish material in the electronic packaging industry. In this study, Sn-3Ag-0.5Cu solder was used on Nickel Boron as coating layer. Cooling rates were obtained by cooling specimens in different media which is water and air. The elemental composition was confirmed using Energy-dispersive X-ray spectroscopy and the microstructure of each IMC then analyzed using optical microscope, image analyzer and ImageJ. In this study, faster cooling rate (water) found to provide thicker IMC (6µm) compared to the other medium used. The morphology shape of each IMC also differs between different medium of cooling. IMC that undergoes faster cooling showed continues like layer while the one using air cooling formed scallop like IMC.

**KEYWORDS**: Cooling Rate, Interfacial Reaction, Intermetallic Compound, Solder Alloy, Solder Joint, Surface Finish

**DOI: 10.4028/www.scientific.net/AMM.695.352**