

Corrosion behavior of Co-Based and Ni-Based Surface Finishes in Sulfur-Containing Gas

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Abstract

With the development of 5G network and automobile industry, the reliability of electronic devices is important issues. Damaging of the devices may occur when exposed to air-pollution, such as nitrogen oxide, sulfur oxide, and sulfide. It is necessary to design effective layers to protect devices from corrosion. In this study, the corrosion behaviors of different surface coatings on printed circuit boards (PCBs) are investigated. Sample surfaces are coated with electroless Co-based and Ni-based surface layers. The samples are put in a chamber at 80 °C and 100% relative humidity (RH) with high concentration of SO₂ for corrosion test. The morphology and composition of samples after corrosion test are compared, but corrosion products are too thin to be analyzed by conventional X-ray method; therefore, the grazing incident X-ray diffraction (GIXRD) at NSRRC beamline was adopted to characterize the crystal structure of corrosion products. The results show that the Co-based surface finishes are more efficient than Ni-based layer to inhibit the diffusion of Cu from PCBs.

Keywords – *Co-based coating, Ni-based coating, Gaseous Corrosion, surface finishes, GIXRD*