

## Compared Corrosion Test and Reliability Test of Electroplating and Electroless Ni/Pd/Au in Sulfur-Containing Corrosive Gas

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### Abstract

The reliability of electronics devices is greatly affected by air-pollution, such as sulfide, sulfur oxide, and nitrogen oxide. In this study, the corrosion resistance of electroplating Ni/Pd/Au and electroless Ni/Pd/Au (ENEPIG) surface finishes on Cu pad are investigated. Samples coated with electroplating Ni/Pd/Au and ENEPIG surface finishes were placed in a chamber at 80 °C and 100% RH (relative humidity) with different concentration of SO<sub>2</sub>, such as 15, 150 and 1500 ppm. After the corrosion test, the morphology of corrosion products could be observed by scanning electron microscopy (SEM), and compositions of corrosion products were analyzed by energy-dispersive X-ray spectroscopy (EDS). The electron spectroscopy of chemical analysis (ESCA) was used to observe the diffusion profile of the elements. 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 characterized the crystal structure of corrosion products. The results reveal that the electroplating Ni/Pd/Au shows better corrosion resistance than the ENEPIG. A mechanism is proposed to discuss the corrosion behaviors.

**Keywords – Electroplating Ni/Pd/Au, ENEPIG, Gaseous Corrosion, GIXRD, and Surface coating.**