

Properties of Corrosion Stains on Thin Gold Plating

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Abstract --Surface analysis on gold platings with different thicknesses with after 3, 8, 15, 22 months indoor air exposure was carried out. Some attractive phenomena are described in this paper.

Corrosion products on gold plating are observed as the core products surrounding by different sizes of corrosion stain under optical microscope. The stain appears as numerous tiny islands under the SEM observation, which is spread and accumulated as rings or part of rings. The pore corrosion on thin gold plating is much more serious than that on the thick gold plating.

It is found that contact resistance changes from point to point along a straight line through the stain area, and the values are much higher than normal in the whole stain area no matter where the testing probe is located inside the stain. It is reasonable to count the whole stain area at the contact region as failure surface area. Ratio of corrosion stain area to the sampling area versus exposure time matches Weibull probability distribution curve. Calculation leads to prediction of the reliability of contacts. Gold plating thickness below 0.5um may appear high risk in this environment.

Dust particles are also deposited on gold plating during indoor air exposure. In some corrosion stain areas, elements of dust are found. Dust may enhance the corrosion and also cause high contact resistance.