

The Electrical and Mechanical Performance of Corroded Products on Gold Plating after Long Term Indoor Air Exposure

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Abstract

The corroded products formed on gold plating after long term indoor air exposure appear as a set of concentric black rings surrounding a big corroded core on top of a pore. A visible stain is frequently observed between and even beyond the rings. Lots of dust particles also distribute on the exposed coupons. All of these insulated products cause high probability of static contact failure. Concentration of the corroded composition increases and decreases as the morphology is changed from the core to the rings. The contact resistance also goes up and down the same way as the composition alternates, which is high on both the core and the concentric rings, but low on the stained areas among the core and the rings. The contact resistance on the dark stains also fails, which seriously increases the failure probability. It is found that the wearing out of the products which reduces the contact resistance depends on the normal force, geometry of the contact pairs and shearing strength of the corroded products. The effect of pores on contact reliability is much more serious than that was predicted before especially in low signal applications.

Key words: discrete corroded products, gold plating, contact resistance, fretting, mechanical performance