Fabricating PdCo pads on mixed surface of nickel and solder mask of a surface laminar carrier for Cobra Probe application

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Abstract

PdCo thin film is gaining wide popularity for applications in test substrate pads or test probes due to its hardness and strength over hard gold. IBM fabricates PdCo contact pads on Surface Laminate Carriers (SLC) for Cobra probe application. This poster show details of the surface treatment used to fabricate PdCo thin films on a mixed surface of Nickel and solder mask of the SLC.

Thin films adhesion on two different material surfaces present interesting challenges since the optimal surface preparation method for one material does not necessarily work for the other material. For example, engineers at IBM encountered situations where metal thin films, with chrome as adhesion layer, had to be deposited on SLC substrates comprised of TSM pads (Nickel) and solder mask (polymer).

We investigated four different surface preparation methods and evaluated the adhesion strength of Cr on the solder mask and Ni surfaces. The goal was to obtain the optimal surface treatment for the mixed surface. The four surface preparation methods were evaluated: O2 ashing, O2 reactive ion etch (RIE), Ar reactive ion etch (RIE), and Ar ion beam etch (IBE). The adhesion strength of Cr on the solder mask and mixed surface was measured by Instron pull test method using high strength epoxy or solder. For the Cr on nickel surface, a scratch test method was employed. We observed that the Cr adhesion on Ni was optimal with inert gas sputtering (Ar RIE), but failed prematurely with O2 ashing. For Cr adhesion on the solder mask surface, the interface was always stronger than the cohesive strength of the solder mask layer for all the surface treatments tested. In conclusion, the Ar RIE was the optimal treatment for the mixed surface.

Please contact the author for additional information.

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