

Enhanced Adhesion of Cu Film on the Aluminum Oxide by Applying an Ion-beam-mixed Al Seed Layer

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Adhesion of Copper film on the aluminum oxide layer formed by anodizing an aluminum plate was enhanced by applying ion beam mixing method. Forming a conductive metal layer on the insulating oxide surface without using adhesive epoxy bonds provide metal-PCB(Printed Circuit Board) better thermal conductivities, which are crucial for high power electric device working condition. IBM (Ion beam mixing) process consists of 3 steps; a preliminary deposition of a film, ion beam bombardment, and additional deposition of film with a proper thickness for the application. For the deposition of the films, e-beam evaporation method was used and 70 KeV N-ions were applied for the ion beam bombardment in this work. Adhesions of the interfaces measured by the adhesive tape test and the pull-off test showed an enhancement with the aid of IBM and the adhesion of the ion-beam-mixed films were commercially acceptable. The mixing feature of the atoms near the interface was studied by scanning electron microscopy, Auger electron spectroscopy, and X-ray photoelectron spectroscopy.

Keywords: Ion Beam Mixing, Metal PCB, Adhesion