

Crystallite Orientations in Copper Films plated on Cu-Single Crystals and Roll-Annealed Foils

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Vias connect current paths in different layers of printed circuit boards. Fine grained copper deposits are needed to fill these vias to make reliable electrical contacts. The standard process to achieve is a combination of “electroless” plating and electrodeposition. Roll-annealed foils are needed for flexible circuit boards. Problems can occur with these foils because many crystallites have the same orientation (cube texture), and this can cause uneven plating results. Even polycrystalline deposit can be achieved by using the right electroless process prior to electroplating. This investigation started with plating on single crystal substrates to see how the substrate orientation affects the plating result. Then we plated on roll annealed substrates that are used industrially. X-ray diffraction was the main tool to evaluate the plating results. The results show that specially designed electroless baths succeed in disrupting substrate-controlled crystallite orientations (epitaxy) in the electroplated layer, and this producing the desired fine-grained copper with even plating thickness.

