Eletroplating of Nickel and Nickel Alloy in Cube-textured Copper Substrate

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Nickel and nickel-tungsten alloy were electroplated on a cube-textured copper substrate. Cube-textured copper substrate was prepared by cold rolling, texture conversion anneal and electroplating. 4 mm-thick high purity copper was rolled to various thickness of 50, 70, 100 and 150 micron. High reduction ratio of 30% was applied down to 150 micron. Rolled texture was converted into cube texture via high temperature heat treatment at 400-800℃. Grain size of copper was about 50 micron which is much smaller compared to >300 micron for the copper prepared using smaller reduction pass of 5%. 1.5 km-long 150 micron copper was fabricated with a rolling speed of 33 m/min and texture of copper was uniform along length. Abnormal grain growth and non-cube texture appeared for the specimen anneal above 850℃. 1-10 micron thick Ni and Ni-W film was electrodeposited onto a cube-textured annealed copper substrate using commercial electroplating solution. Electrodeposited Ni and Ni-W film duplicated the cube-texture of copper substrate and revealed the same quality cube-texture with that of copper. It was observed that the nickel plating on copper surface suppressed the abnormal grain growth at 900℃.

keywords : electroplating, nickel, tungsten, copper, abnormal grain growth, cube-texture

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