

Kinetics of the Formation of Cu(I)BTA Films

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Benzotriazole (BTA) is used as a corrosion inhibitor in chemical mechanical polishing (CMP) of copper. In copper CMP the addition of BTA to the polishing slurry reduces the material removal rate and reduces the resultant surface roughness. This leads to the conclusion that the BTA in the CMP slurries protects the low lying areas on the copper surface from the attack of the oxidizing slurry, thus reducing the overall rate of material removal and reducing the roughness.

Previous electrochemical studies of the copper-BTA system have focused in the long-term behavior. However, during CMP the surface of copper is exposed to constant mechanical abrasion from the rotating pad leaving little chance for the formation of the continuous intact polymeric film of Cu(I)BTA. This study investigates the growth of the Cu(I)BTA with special emphasis on the initial stages of growth as a means of understanding more about the reactions taking place during copper CMP.

In the present study the polarization of copper shows the region of passive film formation and the potential step experiments reveal the modes of growth of the film. The mass of the film is also monitored in-situ and the porosity of the film is estimated.