

### Effect of Process Variables on Electrodeposition of NiMoP Films

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The use of copper interconnection in ULSI and MEMS has some advantages over Al interconnection such as low electrical resistance and good reliability. However it was reported that Cu diffuses into dielectric materials and corrodes in air, which results in defects of devices. A barrier layer for Cu has been suggested to stop its diffusion. It has been claimed that Ni composite thin films have great barrier properties. In this work, electrodeposition of NiMoP barriers layer has been studied.

The deposition of NiMoP thin films was carried out from an electrolyte containing  $\text{NiSO}_4$ ,  $\text{Na}_2\text{MoO}_4$ ,  $\text{NaH}_2\text{PO}_2$  and tri-sodium citrate. The deposition of NiMoP is performed with a typical three-electrode electrochemical cell. The electrodeposition was conducted using a computer controlled potentiostat. The effect of process variables such as temperature, pH, applied potential, and current density on the properties of the NiMoP film has been studied. The compositional analysis was carried out by XPS and EDX, structural and morphological studies were performed using XRD, SEM, and AFM.