

## Electrodeposition of CoWP thin films on copper line on p-type silicon wafer

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The use of Cu for wiring in ULSI for chips and MEMS has some advantages over Al wiring, but a major drawback of Cu wiring is its oxidation and diffusion into SiO<sub>2</sub> layers. To prevent Cu from oxidation and diffusion, barrier layers with dielectric/metallic materials have been proposed. Among them, electrolessly deposited CoWP has been reported to have better barrier property. However, there is no report in the literature on electrodeposition of CoWP layers although it has some advantages over electroless deposition.

Therefore, the present study focuses on electrodeposition of CoWP thin films. At first the electrochemical studies on the deposition of CoWP have been performed using CV and LSV. The nucleation and growth mechanisms of CoWP on Cu have been investigated. Based on the electrochemical characterization, a bath for the deposition of CoWP films has been developed. The effects of various electrochemical process parameters on film properties have been studied. The characterization of the films has been carried out using XPS, EDX, XDR and SEM. It has been found that all of the process parameters have significant influences on the composition and other physical properties of the deposited thin films.