

## THIN FILM ELECTROLESS CoReP FOR CAPPING/BARRIER LAYER APPLICATIONS

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Copper electrodeposition proved to be a successful process for copper interconnects fabrication in ultra large scale (ULSI) microelectronic devices. Nevertheless, this technology faces few problems such as metal corrosion, weak adhesion, high chemical reactivity, and considerable diffusion of copper in silicon. One of the recent approaches to successfully address these issues is the formation of barrier/capping layer by electroless deposition. Thin films of Co(W,P) and Ni(Re,P) prepared by electroless deposition have already been shown to have potential application as the barrier/capping layers on copper interconnects.<sup>1,2</sup> These films provide significantly lower resistivity than other barriers and the formation of very thin, selective, and conformal deposition can be achieved through the electroless deposition.

Several slightly different deposition chemistries have been developed and published recently for depositing phosphorous containing cobalt or nickel based amorphous barriers. The aim of the current work is to characterize an alternative of the above mentioned barrier systems. Specifically, the material as well as barrier properties of Co(Re,P) alloy will be scrutinized and compared with that of former results obtained on Co(W,P) layers. The film composition versus some critical bath parameters such as bath composition, pH, and bath temperature as well as the influence of thermal treatment on the film structure, grain size and phase transition will also be presented.

### References

1. Y. Shacham-Diamand, B. Israel, Y. Sverdlov, in Proceedings of Advanced Metallization Conference 1999 (AMC 1999); P. 301-306, 2000
2. T. Osaka, N. Takano, T. Kurokawa, and K. Ueno, *Electrochem. Solid-State Lett.*, **5**, C7-C10 (2002).