Effect of plating parameters on the magnetic structure distribution in electrodeposited Co/Cu alloy films by Magnetic Force Microscope

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Abstract:

Co-Cu alloys were electrodeposited with varying applied potential and Cu concentration on graphite from sulphate bath. Electrochemical characterization was investigated by cyclic voltammetry (CV) and chronoamperometry (CA). It was found that the nucleation time for alloy deposition was shorter for high negative potential and low Cu concentration in the depositing bath. Alloy morphology and composition were determined by using scanning electron microscopy (SEM)/energy dispersive spectroscopy (EDS). SEM micrographs revealed a transition of branched dendritic structures to well covered, agglomerated and compact alloy morphology with reduced Cu concentrations in the depositing bath. Magnetic Force Microscopy technique made possible to detect changes on the magnetic phase distribution between different Cu concentrations and applied potential in the alloy film. The magnetic domains were found to be bigger at high Cu concentrations and low deposition potential. The magnetization of the alloys was found to be enhanced for low Cu concentrations and high deposition potential.

Key words:
Co/Cu alloy, Magnetic Force Microscope (MFM), Electrodeposition, Cyclic voltammetry

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