

Electrodeposition and characterisation of amorphous NiMoP thin films

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Amorphous NiMoP thin film can be an attractive candidate as barrier and capping layers of copper interconnections in microelectronic devices. In the present work, a bath has been developed for electrodeposition of NiMoP thin films on copper coated silicon wafers and characterisation of the deposited films have been carried out using various instrumental techniques. An optimisation of bath composition has been made and the effects of various plating parameters such as pH and temperature of the bath and applied current density and potential have been studied. Electrochemical experiments suggest that codeposition of Ni, Mo and P occurs under diffusion control. XPS and AES analyses show that the bulk of the films consist predominantly of elemental Ni, Mo and P. XRD studies revealed that the films are fully amorphous. It has also been found that the compositions of the films can be varied widely by controlling the plating conditions.