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Effect of different Sulfur concentration on structural and magnetic properties of electrodeposited NiCoS magnetic thin films

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Abstract: Nano crystalline NiCoS alloy thin films were deposited on the copper substrate with different concentration of Sulfur by electrodeposition method. Electro deposited NiCoS thin films were subjected to the structural, mechanical and magnetic characterization analysis. The chemical composition of the coated films was analyzed by EDAX. The surface and structural morphology of the coated film were analyzed by using SEM and XRD. The mechanical properties of NiCoS films have been studied by VHT. The magnetic properties of thin films have been analyzed by VSM. The electroplated NiCoS thin films were strongly adherent to the copper substrate .The SEM pictures of NiCoS thin films shows that the deposits of thin films are crack free, uniform and bright surface with fine grain size. All the electro deposited NiCoS films exhibit FCC crystalline structure with crystalline size in the order of nano scale. The VSM result of NiCoS thin films shows that the NiCoS thin films coated withhigh concentration of sulfur have highest saturation magnetisation value with lower coercivity. Due to highest magnetisation value with low coercivity, NiCoS thin films can be used for the manufacturing of MEMS and NEMS devices.

Keywords : Electrodeposition ,thin films, characterization, crystalline size,X-ray diffraction, temperature , surface morphology,micro hardness.

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