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# Effect Of Thickness On The Structural, Microstructural, Electrical And Magnetic Properties Of Ni Films Elaborated By Pulsed Electrodeposition On Si Substrate

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**Abstract:** We have studied the effect of thickness on the structural, microstructural, electrical and magnetic properties of Ni films electrodeposited onto nn-Si (100) substrates. A series of Ni films have been prepared for different potentials ranging from ??1.6V to ??2.6V. Rutherford backscattering spectrometry (RBS), X-ray diffraction (XRD), four point probe technique, atomic force microscopy (AFM) and vibrating sample magnetometry (VSM) have been used to investigate the physical properties of elaborated Ni thin films. From the analysis of RBS spectra, we have extracted the films thickness tt (tt ranges from 83nm to 422nm). We found that the Ni thickness, tt (nm), linearly increases with the applied potential. The Ni thin films are polycrystalline and grow with the ?111??111? texture. The lattice parameter aa (Å) monotonously decreases with increasing thickness. However, a positive strain was noted indicating that all the samples are subjected to a tensile stress. The mean grain sizes DD (nm) and the strain ?hkl?hkl decrease with increasing thickness. The electrical resistivity ?? (??.??.cm) increases with tt for tt less than 328nm. The diffusion at the grain boundaries may be the important factor in the electrical resistivity. From AFM images, we have shown that the Ni surface roughness decreases with increasing thickness. The coercive field HCHC, the squareness factor SS, the saturation field HSHS and the effective anisotropy constant K1effK1eff are investigated as a function of Ni thickness and grain sizes. The correlation between the magnetic and the structural properties is discussed

**Keywords :** Ni thin films; pulsed electrodeposition; structural properties; microstructure; magnetization curves; magnetic anisotropy.