

Determination of Texture Orientation Related Magnetic Properties of Nickel-Cobalt Films

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The determination of texture effects in nickel-cobalt (Ni-Co) films with different thickness, which were obtained by electrodeposition, has been investigated by the measurement of hysteresis loops at different angles. Easy-axis distribution measurements were performed as a function of the squareness $M_p(\beta)$ and the correlations were established among the different thicknesses. The composition of Ni-Co films was determined by energy dispersive X-ray spectroscopy. The structural analysis made by X-ray diffraction revealed that all films have a polycrystalline face-centered cubic structure but their texture degrees vary depending on the film thickness. The determination of the easy-axis orientation in 2-D films from the $M_p(\beta)$ obtained by the hysteresis loops was studied using Fourier series analyses. The coefficient A_0 have a value of less than unity while A_2 is inversely proportional to the width of the distribution function which may cause the change in the texture preferential orientations. Therefore, the differences observed in the magnetic easy-axis distributions were attributed to the changes in texture orientations caused by the compositional differences at different thicknesses of the polycrystalline films.

Key words: Texture Orientation; Magnetic Easy-Axis Distribution; Ni-Co Films; Fourier Series; Magnetic Properties.