

Magnetic properties of CoFe_2O_4 thin films prepared by a sol-gel method

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Thin films with cobalt ferrite layers on thermally oxidized silicon wafers were fabricated by a sol-gel method. Magnetic and structural properties of the films were investigated with an x-ray diffractometer, a vibrating sample magnetometer and atomic force microscopy. The crystallization temperature for Co ferrite thin films was determined by using Mössbauer spectroscopy. Co ferrite films annealed at and above 450 °C have only a single phase spinel structure without any preferred crystallite orientation. Their rms surface roughness is less than 3 nm and the size of grains is about 30 nm for annealing temperatures greater than 650 °C. Films fired at and above 550 °C have moderate saturation magnetization and there is no significant difference of their magnetic properties for external fields applied parallel and perpendicular to their planes. The coercivity shows a strong dependence on the annealing temperature. © 1998 American Institute of Physics.

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