

Structural, Morphological and Magnetic Properties of Co-Zn Ferrite Thin Films Deposited by Spray Pyrolysis

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Abstract: The structural, morphological and magnetic properties of $\text{Co}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ nanoferrite thin films on glass substrates were investigated by X-ray diffraction (XRD), field emission scanning electron microscopy (FE-SEM) and vibrating sample magnetometer (VSM), respectively. These thin films were deposited by spray pyrolysis method and subsequently calcined at 500 and 600 °C. The XRD results reveal that the calcined samples have a single-phase, and their crystallite size and lattice parameter increase as the calcination temperature increases. FE-SEM images exhibit a homogeneous grain size distribution for calcined thin films, and the grains size of samples calcined at 500 and 600 °C are ~ 20 and 35 nm respectively. The room temperature magnetic measurements indicate that the magnetization and coercivity of the samples in both parallel and perpendicular direction to applied magnetic field increase with calcination temperature. These can be attributed to the migration of non-magnetic Zn^{2+} ions from octahedral to tetrahedral sites.

Keywords: Co-Zn ferrite; Thin film; Structural properties; Magnetic properties; Spray pyrolysis.

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