

Morphological and Crystallographic Analysis of Cobalt Ferrite Thin Films Fabricated Through Spray Pyrolysis Methodology

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Abstract: *This study investigates the morphological and crystallographic characteristics of cobalt ferrite (CoFe_2O_4) thin films synthesized using spray pyrolysis techniques. The research examines how various processing parameters influence the structural development and resultant properties of these magnetic oxide films. Comprehensive characterization reveals that substrate temperature, precursor concentration, and post-deposition thermal treatments significantly affect crystalline quality, grain morphology, and phase composition. X-ray diffraction analysis confirms the formation of single-phase cubic spinel structures, while electron microscopy techniques provide insights into surface topography and microstructural evolution. The findings demonstrate that controlled manipulation of deposition parameters enables precise tailoring of film properties for specific technological applications. This work contributes to the understanding of structure-property relationships in ferrite thin films and establishes guidelines for optimizing synthesis conditions*

Keywords: Cobalt Ferrite, Thin Films, Spray Pyrolysis, Structural Characterization

