Synthesis and characterization of cobalt doped zinc spinel ferrite

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**Abstract**. Synthesis and investigation of structural, morphological, and magnetic propertiesof cobaltdoped zinc spinel ferrite nano-composite materials are reported. The material was synthesized by the solution-gelation method followed by auto combustion using nitrate precursors. The synthesized materials were characterized by X-ray diffraction (XRD), X-ray absorption fine structure (XFAS), Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy and Vibrating Sample Magnetometer (VSM) to study their structural, morphological and magnetic properties.Single phase having fd3m space group of the zinc ferrites was revealed by HRXRD. Minimum crystallite size of Co doped ZnFe2O4 was found to be 27.5 nm for x = 0.3. The effect of cobalt in the prepared composites was studied using VESTA and Match3! Software for structural analysis. The FTIR spectra show two bands in the range 544-565 cm-1 and 410-431 cm-1 which confirm the formation of the spinel ferrite phase. Vibrating Sample Magnetometer (VSM) was used for magnetic parameters like remanence, coercivity and saturation magnetization etc., of the prepared nano materials.