

Synthesis and investigation on structural and magnetic properties of Cu doped Ni Zn ferrite nanopowders prepared via sol-gel method

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Abstract: In this study, a series of copper substituted in nickel–zinc ferrite nanoparticles with composition of $\text{Ni}_{0.3}\text{Zn}_{0.7-x}\text{Cu}_x\text{Fe}_2\text{O}_4$ (where $x = 0.1 - 0.6$ by step 0.1) were synthesized by sol-gel method. The effect of Cu substitution on phase formation and crystal structure of sample were investigated by X-Ray diffraction (XRD), Thermogravimetry (TG), Differential thermal analysis (DTA), Fourier transform infrared spectroscopy (FT-IR), Scanning electron microscopy (SEM) and Transmission electron microscopy (TEM). Moreover the room saturation magnetization of samples was studied by Vibration sample magnetometer (VSM). Hysteresis loops measurements exhibited an increase in the saturation magnetization value (M_s) up to sample with $x = 0.3$ followed by a linearly decrease. The increases in the coercivity (H_c) with increase in copper content is attributed to the bigger magneto crystalline anisotropy of Cu^{2+} ions compared with Zn^{2+} ions.

Keywords: *cu substituted nickel-zinc ferrite; nano particles; sol-gel; magnetic properties.*

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