

Abstract Submitted
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Characterization and Magnetic Properties of Nano-ferrite $\text{ZnFe}_{2-x}\text{La}_x\text{O}_4$ prepared by Co-precipitation method ALY ABOU-ALY, Physics department, Faculty of Science, Alexandria University, Alexandria, Egypt, DOAA BAKEER, Physics department, Faculty of Science, Damanhur University, Damanhur, Egypt, NAYERA MOHAMMED, RAMADAN AWAD, MARWA HASEBBO, Physics department, Faculty of Science, Alexandria University, Alexandria, Egypt — Nano size spinel ferrite with nominal compositions $\text{ZnFe}_{2-x}\text{La}_x\text{O}_4$, $0.0 \leq x \leq 0.3$ were prepared using stoichiometric amounts of ZnCl_2 , $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ and $\text{LaCl}_3 \cdot 7\text{H}_2\text{O}$ by Co-precipitation method. The structures, optical and magnetic properties of the prepared samples were investigated, and compared with similar compositions prepared by different methods. The X-ray powder diffraction analysis shows single-phase cubic spinel structure up to $x = 0.2$. The lattice parameter “ a ” significantly increases with increasing x , which confirms the substitution of La at Fe sites. The crystallite size, estimated by different methods, has been found in the range of 7-14 nm. This crystallite size is found to be less than that prepared by sol gel combustion method. The FTIR spectra indicate the presence of absorption bands in the range of 390- 561 cm^{-1} . The magnetic hysteresis was studied using vibrating sample magnetometer (VSM). The saturation magnetization, coercivity and remanents magnetization have nonsystematic change as the La-substitution increases. This is because the magnetic properties of Nano- ferrites are strongly dependent on the cation distribution among tetrahedral and octahedral sites in the cubic spinel structure.

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