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Study of Magnetic Properties of Lithium-Cadmium Ferrite Nanoparticles Prepared by Sol-Gel Method

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Abstract: *Lithium-Cadmium ferrite ($Li_{1-x}Cd_xFe_2O_4$, where x = 0, 0.1, 0.2) nanoparticles were synthesized using a simple, cost-effective sol-gel auto-combustion method at low temperature. Lithium-Cadmium ferrite belongs to the category of soft ferrites and has potential applications, particularly in gas sensors. The present study focuses on analyzing the structural and magnetic properties of the synthesized Lithium-Cadmium nanoferrite samples. The magnetization behavior of the nanoparticles was investigated, and key parameters such as saturation magnetization (Ms), remanence (Mr), and coercivity (Hc) were derived from the hysteresis loops. Vibrating Sample Magnetometry (VSM) results indicate that as Cd^{2+} substitution increases in Lithium ferrite, both remanence (Mr) and saturation magnetization (Ms) increase. However, coercivity (Hc) initially increases up to x = 0.1 and then decreases at x = 0.2. These magnetic property variations suggest that the synthesized materials transition from hard ferrite to soft ferrite behavior.*

Keywords: Nanoparticles, Lithium-Cadmium ferrite, Sol-Gel Method, Magnetic Properties

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