



Synthesis and characterization of Cadmium Substituted Copper Nano-Ferrites

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Abstract: This report presents the synthesis of copper cadmium nano-ferrite ($\text{Cu}_{1-x}\text{Cd}_x\text{Fe}_2\text{O}_4$) $x=0.3, 0.4, 0.5, 0.6$ and 0.7 by Sol gel method and its subsequent characterization by using X-ray diffraction (XRD). Cadmium substituted copper nano-ferrites were synthesized using the sol-gel auto-combustion method, which offers advantages such as low cost, simplicity, and the ability to produce nanoparticles with controlled size and morphology. Copper cadmium nano ferrites

(Cu-CdFeO_4) have emerged as promising materials due to their unique structural, magnetic, and electrical properties, making them suitable for diverse applications in electronics, catalysis, and biomedical fields.

Keywords: XRD, Combustion Method, Structural Properties, $\text{Cu}_{1-x}\text{Cd}_x\text{Fe}_2\text{O}_4$.

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Introduction:

Spinel ferrites have been studied extensively due to ease to synthesis and abundant uses in technological and industrial applications. The useful properties of the spinel ferrites mostly depend upon the chemical composition, preparation methods, sintering temperature, nature of the additives and their distribution as reported earlier by Kefeni et al., (2020).

Among the spinel structures, Cu-Cd nano-ferrite has been widely used in different kinds of materials. Thus, the magnetic and electric properties of nickel ferrite have been researched and improved. Cu-containing ferrites form an interesting group of ferrites because of their typical electrical and magnetic properties and change in crystal structure on thermal treatment. Cu-Cd nano-ferrites are low cost materials and have important magnetic and electrical properties for technological applications in Magnetic device, such as inductors, magnetic heads, magnetic refrigeration and magnetic