

STRUCTURAL AND ELECTRICAL STUDIES ON CU-MN NANOPARTICLES FERRITES

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ABSTRACT

A series of nanometer-size $\text{Cu}_x\text{Mn}_{1-x}\text{Fe}_2\text{O}_4$ ferrite samples, with ($x=0.0, 0.2, 0.4, 0.6, 0.8, 1$) were prepared using the co-precipitation method. The samples were synthesized with varying calcinations temperature over the range of 600–1275°C. The synthesis conditions have strongly influenced on the crystal structure, crystallite size, microstructure, and electrical properties. The powders obtained were characterized by X-ray diffraction (XRD) and Fourier transformation infrared (FTIR) spectroscopy. For the crystalline structure investigated, single cubic spinel is gained when the precursor was decomposed at 800–1000 °C, whereas separated crystal CuO formed when calcinations temperature is below 800. The IR absorption spectra analyses were used for the detection and confirmation of the chemical bonds in spinel ferrites. The D.C. electrical conductivity of the samples was measured as a function of temperature. The temperature, and time of reaction during synthesis has been shown to play a deterministic role in obtaining the semiconducting oxide in the required size regime with improved.

KEYWORDS: Nanoparticles, Ferrites, Infrared Spectroscopy, DC Electrical Measurements