

Microstructural, mossbauer and magnetic characterization of barium doped Li-Zn nanoferrite system

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Nanomaterials often have unique electrical, chemical, structural, and magnetic properties, with potential applications in information and high energy storage devices. Magnetic nanoparticle and nanostructural studies combine a broad range of synthetic and investigative techniques from physics, chemistry, and materials science. During the last few years nanoscale spinel ferrites have drawn a major attention because of their technological importance. The synthesis of ferrite nanoparticles is of great interest for studying and tailoring of specific magnetic properties. Further, magnetic properties of nanoparticles are of broad interest in fundamental science. Keeping in view, we have synthesized the $Li_{0.25}Ba_{0.5-x}Zn_xFe_{2.25}O_4$ ferrite system, where 'x' varies from 0→0.5 by using solution combustion method. This low temperature, self-propagating and gas producing exothermic combustion method is safe, simple economic and attractive. The capping agent i.e. Oxalyl-Dihydrazide used in this method as fuel acts to accelerate the process leading to the obtention of nanomaterials. X-ray diffraction confirmed the formation of cubic spinel nanophase ferrites and their crystallite size was calculated using Scherrer's formula. The particle size was also estimated using Transmission Electron Microscope (TEM) and was found to be in the range 28-32 nm. Mossbauer studies have also been undertaken and are in good agreement with Neel's 'local molecular field' model. Magnetic properties, Curie Temperature (T_C), Saturation Magnetization (M_s), Coercivity (H_C) and Remanence (M_r) have also been carried out. The materials synthesized are one of the major steps towards the formation of nanoelectronic devices like high speed integrated systems.

Biography

I am pursuing my PhD under the supervision of Dr. B. S. Randhawa, Professor & Head, Department of Chemistry, Guru Nanak Dev University, Amritsar. I have published 4 papers in reputed international journals. I have also attended the 11th Joint MMM international conference held at Washington DC, 2010.

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