DR06

Effects of NiO Addition on the Structure and Electric Properties $Dy_{3-x}Ni_xFe_5O_{12}$ Garnet Ferrite

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Polycrystalline garnet ferrites $Dy_{3-x}Ni_xFe_5O_{12}$ with varying Ni substitution (x=0.0, 0.1, 0.2, 0.3, 0.4, and 0.5) have been prepared by the standard ceramic technique and their crystalline structure were investigated by using X-ray diffraction and IR spectroscopy. The X-ray diffraction analysis showed that all samples have a single cubic garnet phase. The materials prepared are identified by infrared rays which indicate the presence of three absorption bands υ2, υ3 and υ4 which represent the tetrahedral, octahedral and dodecahedral sites respectively which characterize the garnet ferrite.

The dielectric constant (ε), and dielectric loss (tanδ) of the prepared samples were measured at 1 KHz in the temperature rage 300 to 700 K. The dielectric constant (ε), and dielectric loss (tanδ) are afunction temperature.

The initial magnetic permeability has been studied at different temperatures. The initial magnetic permeability (μ_i) increases gradually with increasing temperature and then drop suddenly at certain temperature Tc.

Keywords : garnet ferrite, structural, Magnetic properties

DR07

A Study of Co Substituted Mn-ferrite, $Mn_{1-x}Co_xFe_2O_4$ (x=0.0, 0.5, 1.0)

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The unique magnetic phenomena of magnetic nanoparticles have been studied, because these properties have the potentiality for utilization in a variety of applications from biomedical science such as hyperthermia, drug delivery, MRI contrast etc [1-3]. Nano ferrite has been fabricated by various synthetic methods [4]. The $Mn_{1-x}Co_xFe_2O_4$ (x=0.0, 0.5, 1.0) materials prepared by HTTD (High Temperature Thermal Decomposition) method using the starting materials with divalent manganese chloride ($MnCl_2$) and iron nitrate in the presence of dodecanoic acid and 1-dodecylamine as surfactants. $Mn_{1-x}Co_xFe_2O_4$ (x=0.0, 0.5, 1.0) has been studied by XRD, VSM and Mössbauer spectroscopy. The crystal structure is found to be an inverse cubic spinel with space group of Fd3m and the lattice constants (a_0) of 8.432, 8.486 and 8.407, respectively. We investigated $Mn_{1-x}Co_xFe_2O_4$ (x=0.0, 0.5, 1.0), which samples show magnetization (M_s) of 54.2, 29.4 and 46.9 emu/g, respectively. Also, the coercivity (H_c) of all samples is 32.4, 86.9 and 90.7 Oe, respectively. Mössbauer spectra of all samples were obtained at room temperature. Mössbauer spectra show ferrimagnetic state of six-line have the hyperfine field (H_f) values of 456, 472, and 474 kOe for the tetrahedral sites and 400, 422, and 430 kOe for the octahedral sites, respectively, which increases with doping Co concentration.

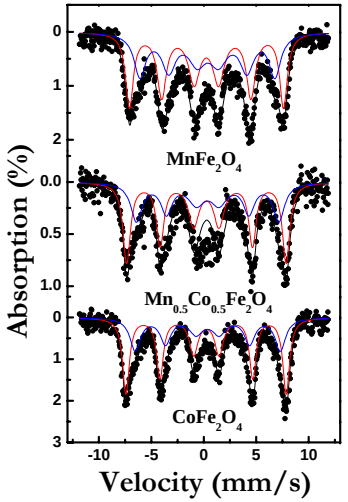

Fig. 1. Mössbauer spectra of $Mn_{1-x}Co_xFe_2O_4$ (x= 0.0, 0.5, 1.0) at room temperature.

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