AMC2008
Asian Magnetics Conference 2008
December 10-13, 2008, Paradise Hotel, Busan, Korea

Hosted by
The Korean Magnetics Society

Sponsored by
Korea Research Foundation
Korea Science and Engineering Foundation
Korean Federation of Science and Technology Societies

The Korean Magnetics Society
Effects of NiO Addition on the Structure and Electric Properties Dy$_{3-x}$Ni$_x$Fe$_5$O$_{12}$ Garnet Ferrite

Dalal Hemed
Tanta University, Egypt

Polycrystalline garnet ferrites Dy$_{3-x}$Ni$_x$Fe$_5$O$_{12}$ 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 $\nu_2, \nu_3$ and $\nu_4$ which represent the tetrahedral, octahedral and dodecahedral sites respectively which characterize the garnet ferrite.

The dielectric constant ($\varepsilon'$), and dielectric loss (tan$\delta$) of the prepared samples were measured at 1 KHz in the temperature range $300$ to $700$ K. The dielectric constant ($\varepsilon'$), and dielectric loss (tan$\delta$) are function temperature.

The initial magnetic permeability has been studied at different temperatures. The initial magnetic permeability ($\mu_0$) increases gradually with increasing temperature and then drop suddenly at certain temperature $T_c$.

Keywords: garnet ferrite, structural, Magnetic properties.

REFERENCES

A Study of Co Substituted Mn-ferrite, Mn$_{x}$Co$_{x}$Fe$_2$O$_4$ ($x=0.0, 0.5, 1.0$)

Han Na Choi, Sung Wook Hyun, In-Bo Shim, and Chul Sung Kim*
Department of Physics, Kookmin University, 136-702, Korea
*Corresponding author: Chul Sung Kim, e-mail: cskim@phys.kookmin.ac.kr

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$_{x}$Co$_{x}$Fe$_2$O$_4$ ($x=0.0, 0.5, 1.0$) materials prepared by HTTD (High Temperature Thermal Decomposition) method using the starting materials with valent manganese chloride (MnCl$_2$) and iron nitrate in the presence of dodecanol and $1$-dodecane as surfactants. Mn$_{x}$Co$_{x}$Fe$_2$O$_4$ ($x=0.0, 0.5, 1.0$) 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$_{x}$Co$_{x}$Fe$_2$O$_4$ ($x=0.0, 0.5, 1.0$) which samples show magnetization ($M$) of $54.2, 29.4$ and $46.0$ 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 observed 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$_{x}$Co$_{x}$Fe$_2$O$_4$ ($x=0.0, 0.5, 1.0$) at room temperature.](image)