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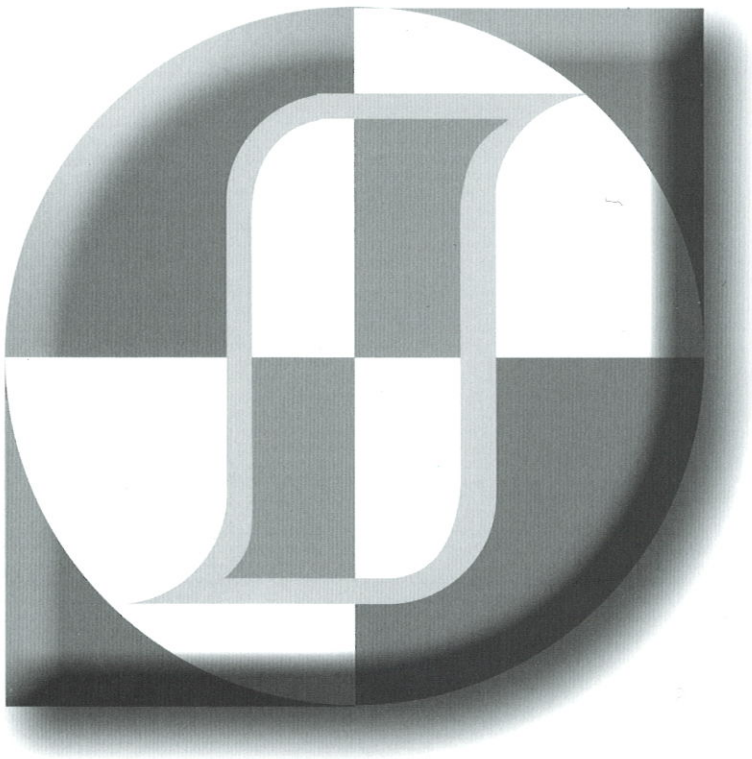
ABSTRACTS



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Digests of the International Symposium on Magnetism and Magnetic Materials 2017
The Korean Magnetics Society

○ Session SA[Sensor and Applications]

○ Session SM[Soft-magnetic Materials]

Magnetic properties of cobalt based core-shell nanoparticles studied by Mössbauer spectroscopy

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We have investigated the magnetic properties of cobalt based core-shell nanoparticles (NP) of CoFe2O4@MgFe2O4 and $CoFe_2O_4$@$AlFe_2O_4$ prepared by the HTTD method. The core-shell NPs has been investigated by X-ray diffraction, vibrating sample magnetometer, hyperthermia and Mössbauer spectroscopy. According to XRD analyzation by Rietveld refinement method, the nanoparticles has single phase and cubic spinel structure with space group *Fd-3m*. The lattice constants were found to be 8.3686 Å for CoFe2O4@$MgFe_2O_4$, 8.4207 Å for $Cofe_2O_4$@$AlFe_2O_4$. The size and morphology of the $CoFe_2O_4$@$MgFe_2O_4$ nanoparticles were confirmed by HR-TEM and using Scherrer's formula. The CoFe2O4@$MgFe_2O_4$ and $Cofe_2O_4$@$AlFe_2O_4$ saturation magnetization were 77.9 emu/g and 52.2 emu/g, respectively. The self-heating temperatures of CoFe2O4@ MgFe2O4 and CoFe2O4@AlFe2O4 were had intermediate values of the materials used as core and shell. The increase in the self-heating temperature of core-shell nanoparticles was observed to be considerable over the first 100 s. The magnetic field was fixed at 250 Oe with a frequency of 112 kHz. The Mössbauer spectra of cobalt based core-shell NPs were performed taken at 4.2 K–295 K. The cobalt based nanoparticles can be considered to have soft-magnetic properties and confirmed by hyperthermia experiments. The core/shell nanoparticles structure investigated in this study has high saturation magnetization and moderate thermal property.

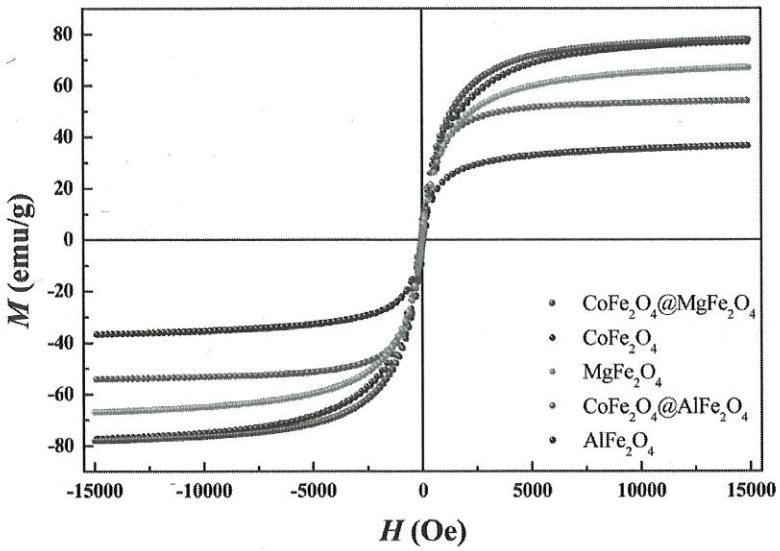

Fig. 1. Hysteresis loops measured at room temperature for the nanoparticles.