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ABSTRACTS

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○ Session SM[Soft-magnetic Materials]

○ Session SO[Spin orbit coupling and related phenomena]

Mössbauer studies of $Ba_{0.5}Sr_{1.5}Ni_2Fe_{12}O_{22}$ Y-type hexaferrite

Jeonghun Kim*, Chul Sung Kim
Department of Physics, Kookmin University, Seoul 02707, Korea

The $Ba_{0.5}Sr_{1.5}Ni_2Fe_{12}O_{22}$ polycrystal sample of Y-type hexaferrite was prepared by polymerizable complex method using $BaCO_3$, $SrCO_3$, $Ni(NO_3)_2{\cdot}6H_2O$, $Fe(NO_3)_3{\cdot}9H_2O$ as the starting materials. The crystalline structure and phase purity of sample were confirmed X-ray diffractometer (XRD) and the measured XRD pattern was analyzed by using Rietveld refinement method with FULLPROF program. The measurements of magnetic properties were measured by using vibrating sample magnetometer (VSM) and Mössbauer spectrometer at various temperature. From the refined XRD pattern, the prepared sample was found to be rhombohedral structure with space group *R*-3*m* at room temperature and the lattice constants of sample were a_0 = 5.8306 Å, c_0 = 43.256 Å, V = 1273.45 Å^3. To determine the spin transition temperature (T_S) and Curie temperature (T_C), the temperature dependence of the zero-field-cooled magnetization curve was measured under applied 100 Oe at temperature ranging from 4.2 to 750 K. We determined T_S = 188 K which the spin structure change from the helimagnet to the ferrimagnet, and T_C = 677K which the spin structure changes from ferrimagnet to paramagnet. The Mössbauer spectra were obtained at temperature ranging from 4.2 to 295 K and fitting for six different sublattices ($3b_{VI}$, $18h_{VI}$, $6c_{IV}$, $6c_{IV}$*, $6c_{VI}$, and $3a_{VI}$). The magnetic hyperfine field and the electric quadrupole splitting of sample have shown abrupt changes around T_S.

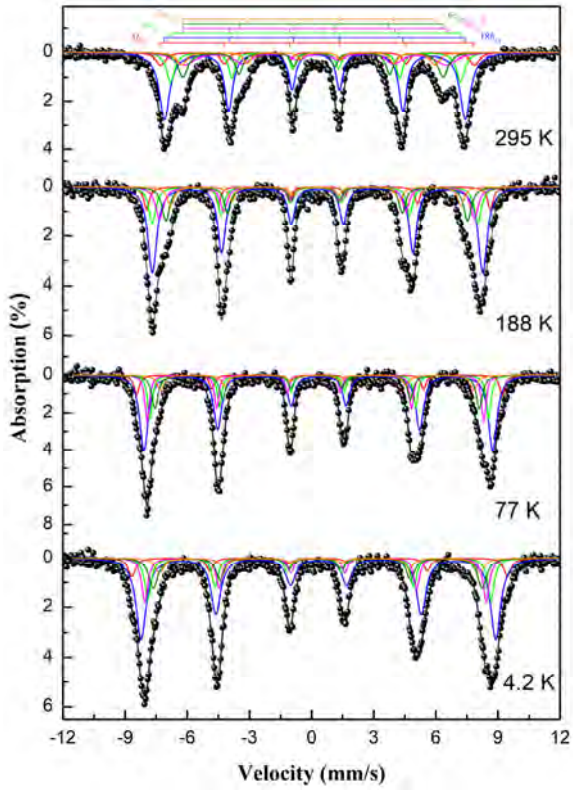

Fig. 1. Mössbauer spectra of $Ba_{0.5}Sr_{1.5}Ni_2Fe_{12}O_{22}$ at various temperatures from 4.2 to 295 K.