

# International Symposium on Magnetism and Magnetic Materials 2018

## ABSTRACTS



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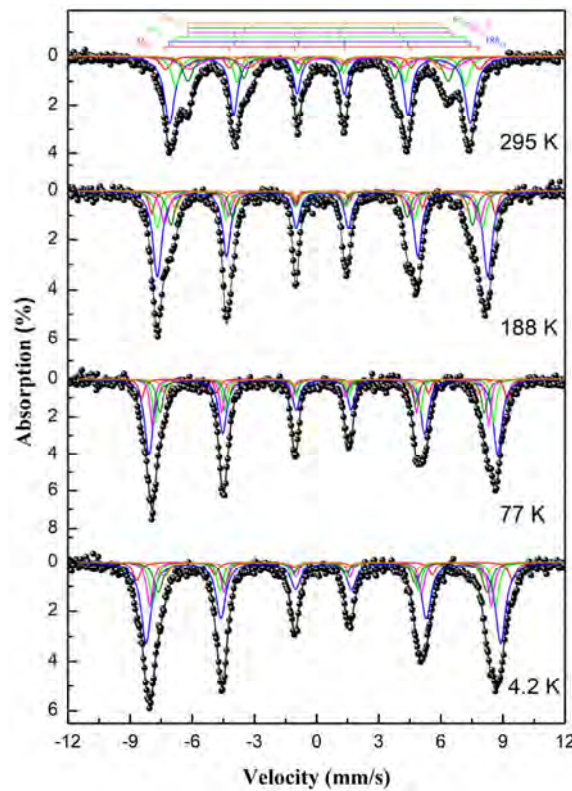
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# Mössbauer studies of $\text{Ba}_{0.5}\text{Sr}_{1.5}\text{Ni}_2\text{Fe}_{12}\text{O}_{22}$ Y-type hexaferrite

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The  $\text{Ba}_{0.5}\text{Sr}_{1.5}\text{Ni}_2\text{Fe}_{12}\text{O}_{22}$  polycrystal sample of Y-type hexaferrite was prepared by polymerizable complex method using  $\text{BaCO}_3$ ,  $\text{SrCO}_3$ ,  $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ ,  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  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  $R\bar{3}m$  at room temperature and the lattice constants of sample were  $a_0 = 5.8306 \text{ \AA}$ ,  $c_0 = 43.256 \text{ \AA}$ ,  $V = 1273.45 \text{ \AA}^3$ . 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  $T_S = 188 \text{ K}$  which the spin structure change from the helimagnet to the ferrimagnet, and  $T_C = 677 \text{ K}$  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 ( $3b_{\text{VI}}$ ,  $18h_{\text{VI}}$ ,  $6c_{\text{IV}}$ ,  $6c_{\text{IV}}^*$ ,  $6c_{\text{VI}}$ , and  $3a_{\text{VI}}$ ). The magnetic hyperfine field and the electric quadrupole splitting of sample have shown abrupt changes around  $T_S$ .



**Fig. 1.** Mössbauer spectra of  $\text{Ba}_{0.5}\text{Sr}_{1.5}\text{Ni}_2\text{Fe}_{12}\text{O}_{22}$  at various temperatures from 4.2 to 295 K.