



# ABSTRACTS

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**HS-04. Effect of Cr doping on Mössbauer studies of double perovskite  $\text{Sr}_2\text{FeMoO}_6$ .** *H. Ryu*<sup>1</sup>, *S. Kim*<sup>1</sup>, *C. Kim*<sup>1</sup> and *B. Lee*<sup>2</sup> *1. Physics, Kookmin University, Seoul, South Korea; 2. Physics, Hankuk Univ. of Foreign Studies, Young In, Kyungki, South Korea*

We investigated the crystallographic and magnetic properties of double perovskite  $\text{Sr}_2\text{Fe}_{0.9}\text{Cr}_{0.1}\text{MoO}_6$  and compared these with those of  $\text{Sr}_2\text{FeMoO}_6$  [1]. We prepared single phases of the polycrystalline  $\text{Sr}_2\text{Fe}_{0.9}\text{Cr}_{0.1}\text{MoO}_6$  powder using the solid-state reaction method, and confirmed the chemical composition of Sr, Fe, Cr, and Mo of the sample as stoichiometric using Rutherford backscattering spectrometry analysis. We found the structure of the  $\text{Sr}_2\text{Fe}_{0.9}\text{Cr}_{0.1}\text{MoO}_6$  to be tetragonal, with lattice constants  $a_0=5.5789 \text{ \AA}$ ,  $c_0=7.9129 \text{ \AA}$ . The magnetoresistance magnitude ( $\Delta\rho/\rho_0$ ) was 14.9 % and 1.4 % at 77 K and 300 K, respectively, under the applied field with 1 T. The Curie temperature of the Cr doped sample ( $T_C = 415 \text{ K}$ ) was slightly smaller than that of the pure sample ( $T_C = 425 \text{ K}$ ). Mössbauer spectra of the  $\text{Sr}_2\text{Fe}_{0.9}\text{Cr}_{0.1}\text{MoO}_6$  have been taken at various temperatures ranging from 15 to 415 K. As the temperature increased towards  $T_C$ , the Mössbauer spectra showed line broadening and 1, 6 and 3, 4 line width differences because of anisotropic hyperfine field fluctuation. The Mössbauer spectra indicated that an anisotropic field fluctuation of  $+H$  ( $P_+ = 0.85$ ) was greater than  $-H$  ( $P_- = 0.15$ ). We calculated the temperature dependence of anisotropy energy from its relaxation rate. The field fluctuation frequency factor and the anisotropy energy were calculated as  $8.2 \text{ \Gamma/h}$  and  $143.52 \text{ erg/cm}^3$ , respectively, using the relatively accurate data for  $T = 260 \text{ K}$  that is associated with the large line broadening. We interpreted of effect of Cr ( $t_{2g}^3$ ) doping as a decrease in the anisotropy energy.

[1] Sung Baek Kim, Key Taeck Park, and Chul Sung Kim, *J. Appl. Phys.* **89**, 7681 (2001).