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ABSTRACTS

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HR-02. Investigation of spin reorientation in $YMn_{1-x}Fe_xO_3$ (x = 0.55, 0.6, 0.7, 0.8, 0.9, 1.0) by Mössbauer spectroscopy. *J. Lim*[1], Y. Choi[2], B. Lee[3] and C. Kim[1] *1. Department of Physics, Kookmin University, Seoul, Republic of Korea; 2. Department of Physics, Yonsei University, Seoul, Republic of Korea; 3. Department of Physics, Hankuk University of Foreign studies, Yongin, Republic of Korea*

The $YMn_{1-x}Fe_xO_3$ (x = 0.55, 0.6, 0.7, 0.8, 0.9, 1.0) polycrystalline samples were prepared by the solid-state-reaction method. The crystal structure and magnetic properties of samples were investigated with x-ray diffractometer (XRD), vibrating sample magnetometer (VSM), and Mössbauer spectroscopy. From the XRD pattens analyzed by Rietveld refinement at 295 K, all samples were single-phased with the Bragg factor (R_B) and structure factor (R_F) less than 5 % and confirmed to be orthorhombic with space group *Pnma*. With increasing Fe ion contents, the lattice parameter a_0 decreases whereas b_0 and c_0 increase. From the temperature dependence of magnetization curves under 100 Oe between 4.2 and 500 K, we observed the decrease of spin reorientation (T_{SR}) with increasing Fe ion contents. However, for x = 1.0 sample, showed the disappearance of T_{SR}. Mössbauer spectra of all samples were obtained at various temperature ranging from 4.2 to 500 K, and below T_C were fitted by least-square method on the function of the Fe atom distribution. Isomer shift (δ) values of all samples indicate that the charge states are Fe^{3+}. In addition, the magnitude and slope of the temperature dependence of the hyperfine field (H_{hf}), averaged electric quadrupole shift $\langle E_Q \rangle$, and averaged isomer shift $\langle \delta \rangle$ have shown abrupt changes around T_{SR} due to the change in charge states of Mn ions.

[1] P. Mandal, V. S. Bhadram, Y. Sundarayya, C. Narayana, A. Sundaresan, and C. N. R. Rao, Phys. Rev. Lett. 107, 137202 (2011).