MMM2020
Virtual Conference

65th Annual Conference on Magnetism and Magnetic Materials

ABSTRACTS

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IEEE MAGNETICS

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Session F5
MAGNETISM AND SUPERCONDUCTIVITY
(Poster Session)

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F5-02. MöSsbauer Studies on Magnetism in FeSe. *H. Choi*[1], J. Seo[1], Y. Uhm[2], G. Sun[2] and C. Kim[1] *1. Department of Physics, Kookmin University, Seoul, The Republic of Korea; 2. HANARO Operation and Utilization, Korea Atomic Energy Research Institute, Daejeon, The Republic of Korea*

Iron selenide has a complicated with several structures phase diagram in existing only in very narrow compositional ranges. The structure and magnetic properties of this phase diagram depend sensitively on the relative ratio of Fe and Se. In this paper, we have investigated the magnetism of FeSe by focusing on Mössbauer spectroscopy measurement. The crystal structure of FeSe was characterized by powder X-ray diffraction. The FeSe contains a mixture of tetragonal (*P*4/*nmm* space group) and hexagonal (*P*63/*mmc* space group) peak. Magnetization measurements were performed with vibrating sample magnetometer (VSM) and Mössbauer spectroscopy. The magnetic hysteresis curve of FeSe measured at 295 K. The saturation magnetization and coercivity were found to be 8.03 emu/g and 357.40 Oe. Temperature dependence of magnetization was measured using VSM at $H = 100$ Oe. The Mössbauer spectra were taken at various temperatures ranging from 4.2 to 295 K. Fig. 1 shows the spectra at 4.2 and 295 K. Theses spectra have been fitted one-doublet (tetragonal) and three sets (hexagonal) of six Lorentzian assigned to three magnetically nonequivalent A, B, and C-sites. The isomer shift (δ) values at temperatures from 4.2 to 295 K were confirmed Fe^{2+} state at all sites. The magnetic hyperfine field (H_{hf}) and electric quadrupole splitting (ΔE_Q) values of FeSe at 295 K were determined to be 241.0, 193.2, and 105.8 kOe for A, B, and C-sites, 0.01, 0.02, and 0.02 mm/s for A, B, and C-sites. The ΔE_Q and δ values of one-doublet at 295 K were analyzed 0.29 and 0.31 mm/s, respectively. The H_{hf} and ΔE_Q values at 4.2 K were determined to be 283.2, 230.1, and 128.7 kOe for A, B, and C-sites, 0.0, -0.04, and 0.01 mm/s for A, B, and C-sites. The ΔE_Q and δ values of one-doublet at 4.2 K were analyzed 0.33 and 0.41 mm/s, respectively. It can be seen that as the temperature decreases, the ratio of doublet (tetragonal) decreases and the ratio of sextet (hexagonal) increases relatively.

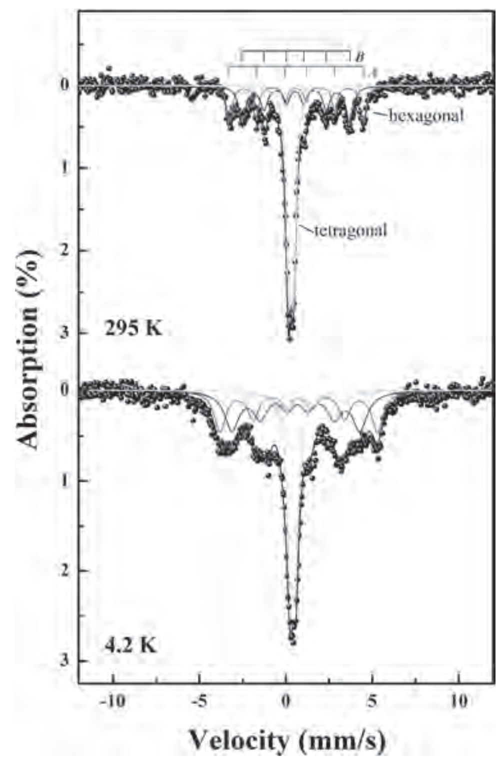

Fig. 1. Mössbauer spectra of FeSe at 4.2 and 295 K.