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Mössbauer Studies of Double Perovskite $Sr_2Fe_{1-x}Cr_xMoO_6$

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We investigated the crystallographic and magnetic properties of double perovskite $Sr_2Fe_{1-x}Cr_xMoO_6$ (x=0.0, 0.01, 0.03, 0.05, and 0.10). Mössbauer spectra of the $Sr_2Fe_{0.9}Cr_{0.1}MoO_6$ have been taken at various temperatures ranging from 15 to 415 K. As the temperature increased towards T_C (415 K), 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 that of $-H$ (P_- = 0.15). We also calculated the field fluctuation frequency factors and the temperature dependence of anisotropy energies from its relaxation rate. We interpreted the effect of Cr (t^3_{2g}) doping as a decrease in the anisotropy energy.

Key words : Mössbauer, $Sr_2Fe_{1-x}Cr_xMoO_6$, Double perovskite