

Anisotropic hyperfine field fluctuation in $\text{Sr}_2\text{FeMoO}_6$

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The double perovskite $\text{Sr}_2\text{FeMoO}_6$ has been studied by the Mössbauer technique, neutron, and x-ray diffraction. The structure is found to be tetragonal with lattice constants $a_0 = 5.5729 \text{ \AA}$ and $c_0 = 7.9077 \text{ \AA}$. Mössbauer spectra and neutron diffraction measurements of $\text{Sr}_2\text{FeMoO}_6$ have been taken at various temperatures ranging from 10 to 473 K. The low-field magnetoresistance magnitude ($\Delta\rho/\rho_0$) at 500 Oe was 3.1% and 1.8% at 77 and 300 K, respectively. As the temperature increases toward to the Curie temperature, $T_C = 425 \text{ K}$. Mössbauer spectra show the line broadening and 1, 6 and 3, 4 linewidth difference because of anisotropic hyperfine field fluctuation. The anisotropic field fluctuation of $+H(P_+ = 0.85)$ was great than $-H(P_- = 0.15)$. We also calculated frequency factor and anisotropy energy with values of $9.8 \text{ \Gamma}/\hbar$ and 149.6 erg/cm^3 , respectively, using the relatively accurate data for $T = 260 \text{ K}$ which is associated with the large line broadening. © 2001 American Institute of Physics. [DOI: 10.1063/1.1362654]