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BOOK
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ABSTRACTS

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Anisotropic hyperfine field fluctuation in Ba$_2$FeMoO$_6$

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The double perovskite Ba$_2$FeMoO$_6$ has been studied by Mössbauer technique, x-ray diffraction, and vibrating sample magnetometry. A single phase of the polycrystalline Ba$_2$FeMoO$_6$ powder has been prepared by a solid-state reaction method, and chemical composition of the sample was confirmed to be stoichiometric by Rutherford backscattering spectrometer (RBS) analysis. The structure is found to be cubic with lattice constant $a_0 = 8.0747$ Å. The Magnetoresistance magnitude ($\Delta \rho /\rho_0$) was 18.83 % and 2.96 %, at 77 K and 300 K under the applied field with 1 T. The saturation magnetization was 3.7 $\mu_B$ and 2.16 $\mu_B$ per formula unit, at 77 K and 300 K, respectively. Mössbauer spectra measurements of the Ba$_2$FeMoO$_6$ have been taken at various temperatures ranging from 18 to 345 K. As the temperature increases toward to the Curie temperature, $T_C = 345$ K, Mössbauer spectra show the line broadening and 1, 6 and 3, 4 line-with difference because of anisotropic hyperfine field fluctuation. The anisotropic field fluctuation of $+H$ ($P_+ = 0.85$) was greater than $-H$ ($P_- = 0.15$). We also calculated frequency factor and anisotropy energy with values of 6.04 $\Gamma/h$ and 76.8 erg/cm$^3$, respectively, using the relatively accurate data for $T = 230$ K which is associated with the large line broadening.