PSMo-G-312 MAGNETORESISTANCE IN DOUBLE PEROVSKITES
Ba$_{2-x}$La$_x$FeMoO$_6$

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We have studied effects of the partial substitution of La$^{3+}$ for Ba$^{2+}$ on the magnetoresistance (MR) in double perovskites Ba$_2$FeMoO$_6$. Polycrystalline Ba$_{2-x}$La$_x$FeMoO$_6$ ($0 \leq x \leq 0.3$) samples were prepared by solid-state reaction in a stream of 5% H$_2$/Ar gas. The x-ray data are compatible with the cubic $Fm\bar{3}m$ space group. The substitution of La$^{3+}$ for Ba$^{2+}$ results in the decrease of the lattice parameter from 8.075Å for $x=0$ to 8.045Å for $x=0.2$, and considerably enhances the Curie temperature from 316 K for $x=0$ to 334 K for $x=0.2$ [1]. The mis-site defect concentration is increased upon La substitution, which results in the increase of coercivity, high saturation fields, and reduction of saturation magnetization. The magnitude of MR of Ba$_2$FeMoO$_6$ is greatly enhanced by doping La. The MR with low magnetic field of 0.5T for $x=0$ and 0.3 are as large as 6% and 13% at 15 K, respectively. These phenomena are found to originate from the change of spin-dependent scattering in Ba$_2$FeMoO$_6$ after doping La.