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## Some Effects of Fe/Mo Disorder in Double Perovskite $\text{Ba}_2\text{Fe}_{1-x}\text{Mo}_{1+x}\text{O}_6$

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Some effects of disorder between the Fe and Mo sites on magnetic properties and magnetoresistance(MR) in double perovskite  $\text{Ba}_2\text{FeMoO}_6$ (BFMO) have been investigated. BFMO has been prepared by the conventional solid-state reaction in a stream of 5% $\text{H}_2$  at 1100°C. The x-ray data indicates that symmetry is cubic, and the data is compatible with the  $Fm\bar{3}m$  space group. The fact that superlattice lines such as (111) and (311) are observed in the diffraction pattern for would suggest the high degree of Fe/Mo ordering in BFMO. The Fe/Mo ordering is about 90% for  $x=0$ , while it is about 60% for  $x=0.2$ . The saturation magnetization is  $2.3\mu_B/\text{f.u.}$  for  $x=0.2$  which is much lower than the value of  $3.1\mu_B/\text{f.u.}$  for  $x=0$ . The magnitude of MR is 36 and 3% with the magnetic field of 0.7T at 20K for  $x=0$  and 0.2, respectively. The large variation of magnetization and MR between  $x=0$  and 0.2 arises from the disorder at the Fe and Mo sites. The observed MR is proportional to the square function of  $(M/M_s)$  at small magnetization region. This correlation indicates that the MR is due to the enhanced intergrain tunneling by reducing the relative angle of magnetization directions at the grain boundaries.