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Abstracts
CORRELATION BETWEEN ANTI-SITE DISORDER AND MAGNETIC PROPERTIES IN ORDERED PEROVSKITE Sr$_2$FeMoO$_6$.

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We have investigated correlation between Fe/Mo disorder and magnetic properties in double perovskite Sr$_2$FeMoO$_6$ (SFMO). SFMO samples have been prepared by the conventional solid state reaction followed by sintering in a stream of 5% H$_2$/Ar at various sintering temperatures. The crystal structure and physical properties of the samples were examined by x-ray power diffraction, magnetization, and electrical resistivity measurements. The x-ray power diffraction pattern for polycrystalline SFMO shows a clean single phase without detectable secondary phases. The fact that superlattice lines are observed in x-ray diffraction pattern suggests the high degree of ordering of Fe and Mo in SFMO. Degree of Fe/Mo ordering in SFMO is controlled by thermal treatment conditions. As sintering temperatures increase from 900°C to 1400°C, anti-site disorder decreases, magnetization measured under a magnetic field of 0.7T increases from 1.7 $\mu_B$/f.u. to 3.5$\mu_B$/f.u., and Curie temperature increases from 377K to 405K. SFMO exhibits a sharp low-field magnetoresistance (MR). The magnitude of negative MR at room temperature decreases from 5.8% (sample prepared at 1200 °C) to 1.9% (sample prepared at 1400 °C).