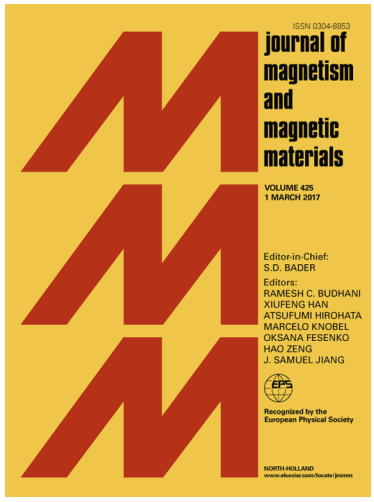

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Low temperature transport anomaly in Cr substituted $(La_{0.67}Sr_{0.33})MnO_3$ manganites

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Abstract

The structural, electrical, and magnetic properties of $La_{0.67}Sr_{0.33}Mn_{1-x}Cr_xO_3$ ($0 \le x \le 0.10$) manganites have been studied by substitution of antiferromagnetic trivalent Cr ion at Mn-site. Systematic efforts have been carried out to understand the electrical resistivity behavior in the ferromagnetic metallic and paramagnetic semi-conducting phases of Cr substituted $La_{0.67}Sr_{0.33}Mn_{1-x}Cr_xO_3$ manganites. Polycrystalline samples show a resistivity minimum at a temperature (T_{min}) of <40 K in the ferromagnetic metallic phase. T_{min} shifts to higher temperatures on application of magnetic fields. The appearance of this resistivity minimum was analyzed by fittings the data according to the model that considers *e-e* scattering caused by enhanced Coulombic interactions. The electrical resistivity data has been best fitted in the metallic and semiconducting regime using various models. Present results suggest that intrinsic magnetic inhomogeneity like Cr^{3+} ions in these strongly electron-correlated manganite systems is originating due to the existence of the ferromagnetic interactions.

Keywords: Manganite, Colossal magnetoresistance; Ferromagnetic; VRH Model;

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