

**Evidence of charge ordering and ferromagnetic ground state in bismuth doped
lanthanum sodium manganites**

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Abstract

The effect of bismuth doping on electrical and magnetic properties of $\text{La}_{3/4}\text{Na}_{1/4}\text{MnO}_3$ was reported here. The samples were synthesized by polyvinyl alcohol precursor method. X-ray diffraction data confirmed that the samples exhibit single phase and crystallize into hexagonal symmetry with R3-c space group. Lanthanum site was partially doped with bismuth by maintaining the same ratio of Mn^{3+} : Mn^{4+} with 50:50. Doping of bismuth at La site resulted in simultaneous occurrence of both ferromagnetic and charge ordering antiferromagnetic transitions at 69K and 200K, respectively. Hysteresis behaviour was observed across the charge ordering transition in temperature dependent resistivity and magnetization measurements. Temperature and magnetic field dependent magnetization and resistivity measurements were carried out to explain the cause of the observed behaviour. It has been concluded that among the coexistence phases the predominant ground state magnetic state is the ferromagnetic phase. A huge magnetoresistance was observed due to the suppression of charge ordering phase in the presence of external magnetic field. The high sensitivity of magnetic field on the transport properties of these bismuth doped manganites may be explored for magnetic sensor applications.

Keywords: Manganites, Charge ordering, Magnetic properties, Magnetoresistance

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