

Electrical transport properties and magnetoresistance of Pr_{0.67}Sr_{0.33}MnO₃-NiO composites

ABSTRACT

A series of polycrystalline bulk samples $(\text{Pr}_{0.67}\text{Sr}_{0.33}\text{MnO}_3)_{1-x}/(\text{NiO})_x$ were prepared by solid state reaction, and its structure, electrical transport and magnetoresistance properties were investigated. X-ray analysis showed that parent compound of $\text{Pr}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ (PSMO) formed in single phase with crystal structure of orthorhombic while secondary phase of NiO can be detected with the addition of composite. The electrical properties showed that the resistivity increased with the addition of NiO due to enhancement of spin dependent-tunneling scattering across the artificial grain boundaries of NiO layer. Magnetic field dependence MR curve at various temperatures clearly indicates that extrinsic magnetoresistance had been enhanced due to addition of NiO as the artificial grain boundary.

Keyword: Electrical transport; Magnetoresistance; Nano-composites