ENHANCED LOW-FIELD- MAGNETORESISTANCE AND ELECTRO-MAGNETIC BEHAVIOR OF LA0.7SR0.3MNO3/ BATIO3 COMPOSITES (SCI)

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TÓM TẮT:

We report the structural, magentoresistance and electro-magnetic properties of ferromagnet–ferroelectric–type (1-x) La0.7Sr0.3MnO3/xBaTiO3 (with x = 0.0%, 3.0%, 6.0%, 12%, 15.0% and 18.0%, in wt%) composites fabricated through a solid-state reaction method combined with a high energy milling method. The insulator-metal transition temperature shifts to a lower temperature and resistivity increases while the feromagnetic-paramagnetic transition temperature remains almost unchanged with the increase of BaTiO3 content. Magnetoresistance of the composites at an applied magnetic field H = 3kOe is enhanced in the wide temperature ranges with the introduction of BaTiO3, which could be explained by the enhanced spin polarized tunneling effect induced by the introduction of BaTiO3. The low-field magnetoresistance of the composite is analyzed in the light of a phenomenological model based on the spin polarized tunneling at the grain boundaries. Furthermore, the temperature dependence of resistivity for this series has been best–fitted by using the adiabatic small polaron and variable range hopping models. These models may be used to explain effect of BTO on the electronic transport properties on high temperature paramagnetic insulating region.