

Magnetic and Magnetotransport Properties of (1-x) $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3 - x\text{RE}_2\text{O}_3$ (RE=La, Nd) Composites

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Magnetic and magnetotransport properties of (1-x) $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3 - x\text{RE}_2\text{O}_3$ (RE=La, Nd) ($x = 0.025, 0.05, 0.075, 0.1, 0.2, 0.3$) composite polycrystalline samples were systematically studied. Samples were prepared using conventional solid-state reaction. LSMO and RE_2O_3 react at high temperature and become chemically compatible. The ferromagnetic-paramagnetic transition temperatures (T_c) of the LSMO- Nd_2O_3 composite samples were decreased 313K~349K with increasing x , while the T_c values of the LSMO- La_2O_3 composite samples were almost unaltered in the range of 355K~358K, representing that the ferromagnetism of LSMO might be more seriously degraded by Nd substitution on the ($\text{La}_{0.7}\text{Sr}_{0.3}$) site. However, LSMO- RE_2O_3 composite samples exhibit greatly enhanced low field magnetoresistance (LFMR) and dMR/dH value without an appreciable increase in its resistivity. Remarkably improved LFMR properties are attributed to LSMO grain boundaries acting as effective spin-dependent scattering centers. The relationship among the RE_2O_3 addition, microstructure, magnetic and magnetotransport properties will be discussed in this paper. This work was supported by the Korea Research Foundation Grant funded by the Korean Government(MOEHRD, Basic Research Promotion Fund)(KRF-0417-20090029)

Keywords : LSMO, Rare earth, LFMR