

LOW-FIELD MAGNETORESISTIVE AND MAGNETIC PROPERTIES IN $(\text{La}_{1-x}\text{Er}_x)_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ MANGANITES PEROVSKITE

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ABSTRACT

Polycrystalline manganites of $(\text{La}_{1-x}\text{Er}_x)_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ ($x=0.00, 0.05$ and 0.10) had been prepared by conventional solid-state reaction method. X-ray diffraction analysis confirms that all samples are in single phase with distorted perovskite rhombohedral structure. Scanning electron microscope shows that small amount of Er substitution in La site affect the grain formation and this might affect the grain boundaries layer which resulting the reduction of Tc. All sample shows quite similar Low-field magnetoresistance (MR) effect with a large negative MR at low field (0-0.1T) region followed by a slower varying MR at high field (0.1-1T) region. The highest low-field MR value of -3% (at 0.1T, 300K) and high-field MR value of -8.3% (at 1T, 300K) are observed for sample X=0.10.

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REFERENCES

- [1]. C. Zener, (1951). "Interaction between the d-Shells in the Transition Metals. II. Ferromagnetic Compounds of Manganese with Perovskite Structure", *Physics Review* 82, 403.
- [2]. E. Dagotto, Takashi Hotta and Adriana Moreo, (2001). "Colossal magnetoresistant materials: the key role of phase separation", *Physics Reports*, 344, 1-153,
- [3]. K.P.Lim, S.A.Halim, E.Saion, H.A.A. Sidek and A. Zulkifly Abbas, (2003). "Low- Field Magnetoresistance of La-Sr-Mn-O Thin Films" *Proceedings, 2003 IEEE National Symposium on Microelectronics, NSM 2003*, 26-28,
- [4]. Y.M. Mukovskii and A.V. Shmatok, (1999). "CMR effect in mono- and polycrystalline $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$ -z thin film", *Journal of Magnetism and Magnetic Materials*, 196-197, 136-137
- [5]. Z.C. Xia, S.L. Yuan, F. Tu, C.Q. Tang, G. Peng, G.Q. Zhang, L. Liu, J. Liu, Z.Y. Li, Y.P. Yang, C.S. Xiong and Y.H. Xiong, (2002). "Grain boundaries and low-field transport properties in colossal magnetoresistance materials", *Journal of Physics D: Applied Physics*, 35, 177-180,
- [6]. M. J. Zhang, J. Li, Z. H. Peng, S. L. Li, D. N. Zheng, A. Z. Jin, C. Z. Gu, R. Y. Li and C. C. Liu, (2007). "Enhanced extrinsic magnetoresistance in $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ artificial grain boundaries induced by ion implantation", *J. Magn. Mater.*, 316, L1
- [7]. Z. X. Cheng, T. M. Silver, A. H. Li, X. L. Wang and H. Kimura, (2004). "Effect

of progressive substitution of La^{3+} by Bi^{3+} on the structure, magnetic and transport properties of $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ ”, *J. Magn. Magn. Mater.*, 283, 143-149

[8]. Cahngjin Zhang, B. H. Kim, J.S.Kim and Y.W.Park, (2005). “Lattice effects on magnetic and transport properties in La site doping $\text{La}_{0.67}\text{Sr}_{0.33}\text{CoO}_3$ ”, *Physics Letters A*, 348, 58-65