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Competing Magnetic Interactions in $La_{0.7}$ $Sr_{0.3}$ $Co_xMn_{1-x}O_3$(x=0.6, 0.7, 0.8, 0.9) J. LAMSAL, Universiy of Missouri, J. YANG, Peking University, R. NIRMALA, Indian Institute of Technology Madras, Chennai, T. HEITMANN, Missouri Research Reactor, M.S. KIM, Institute for Shock Physics, S.K. MALIK, S.A. QUEZADO, ICCMP, Brasilia, T.F. CREEL, W.B. YELON, W.J. JAMES, Missouri University of Science and Technolgy — DC magnetization measurements and neutron diffraction (ND) techniques have been used to study the magnetic properties of $La_{0.7}$ $Sr_{0.3}$ $Co_xMn_{1-x}O_3$(x=0.6, 0.7, 0.8, 0.9) compounds. The field cooled and zero field cooled dc magnetization data in 500 Oe applied field indicates that T_c is suppressed with increasing Co content reaching 80K for the x = 0.9 composition. ND data at 300K and 16K confirms that increasing Co in the lattice results in the reduction of ferromagnetic exchange interaction thereby lowering T_c. This indicates that an antiferromagnetic (AFM) superexchange interaction between Mn and Co ions is responsible for the diminished ferromagnetism in the system. This fact also suggests that the double exchange interaction in manganites is weak and can be easily destroyed. The magnetization vs field data obtained at 5 K indicates linear field dependence as expected for an antiferromagnet and an interesting field-induced transition in low applied fields confirming the presence of mixed magnetic phases. Preliminary analysis of ND data supports the notion of competing FM and AFM interactions in these systems.

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