

Abstract Submitted
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Magnetic phase separation in $\text{LaMn}_{1-x}\text{Fe}_x\text{O}_{3+y}$ ¹ O.F. DE LIMA, Instituto de Fisica Gleb Wataghin, UNICAMP, Campinas, J.A.H. COAQUIRA, R.L. DE ALMEIDA, L.B. DE CARVALHO, S.K. MALIK, Centro Internacional de Fisica da Materia Condensada, UnB, Brasilia — We have investigated the $\text{LaMn}_{1-x}\text{Fe}_x\text{O}_{3+y}$ system in the whole range of $0 \leq x \leq 1$, for polycrystalline samples prepared by solid state reaction in air. All samples show orthorhombic structure (space group Pnma). For $x=0$ the oxygen excess, estimated to be $y \sim 0.1$, produces vacancies in the La and Mn sites and generates a fraction around 20% of Mn^{4+} ions ($3t_{2g}$) and 80% of the usual Mn^{3+} ions ($3t_{2g}, 1e_g$), with possible double exchange interaction between them. The Fe-doping in this system is known to produce only stable Fe^{3+} ions ($3t_{2g}, 2e_g$). We find an evolution from a fairly strong ferromagnetic (FM) behavior, with saturation magnetization ($T=2\text{K}$) $m_S \sim 4 \mu_B$ and Curie temperature $T_c \sim 160 \text{ K}$, for $x=0$, to an antiferromagnetic (AFM) behavior, with $T_N=790 \text{ K}$, for $x=1$. For intermediate Fe contents a mixed phase scenario occurs, with a gradual decrease (increase) of the FM (AFM) phase, accompanied by a systematic transition broadening for $0.2 < x < 0.7$. A calculation based on the expected exchange interaction among the various magnetic-ion types, accounts very well for the m_S dependence on Fe doping.

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