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Magnetic phase separation in $\mathbf{LaMn_{1-x}Fe_xO_{3+y}}$[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 $LaMn_{1-x}Fe_xO_{3+y}$ 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=2K) $m_S \sim 4\ \mu_B$ and Curie temperature $T_c \sim 160$ K, for x=0, to an antiferromagnetic (AFM) behavior, with T_N=790 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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