Structural and magnetic investigations of LaMn$_{1-x}$Co$_x$O$_3$
($x = 0.00, 0.25, 0.50, 0.75, 1.00$) perovskite nano-particles

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Abstract: In this work, the structural and magnetic properties of LaMn$_{1-x}$Co$_x$O$_3$ ($x = 0.00, 0.25, 0.50, 0.75, 1.00$) are investigated. The structural characterization of compounds by X-ray powder diffraction is evidence for a rhombohedral structure (R -3c space group). Much less increase of the unit cell volume suggests that Co enters in lattice as Co$^{2+}$ for $x \leq 0.5$ while much more decrease of the unit cell volume suggests that Co enters in lattice as Co$^{3+}$ for $x > 0.5$. The results of magnetic measurements show strong ferromagnetic interactions Mn$^{4+}$ - Co$^{2+}$ in the range ($0.0 < x \leq 0.5$) while antiferromagnetic interactions Mn$^{3+}$ - Co$^{3+}$ and Co$^{3+}$ - Co$^{2+}$ is progressively settled at higher cobalt concentrations.

Keywords: Manganite-Cobaltite compounds; Hexagonal to Rhombohedral Lattice Conversion; Magnetic Interactions

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