EFFECT OF PRESSURE AND MAGNETIC FIELD ON CONDUCTIVITY AND MAGNETORESISTANCE IN La-Ca MANGANITES WITH EXCESS MANGANESE

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The pressure, magnetic field and excess manganese effects on transport and magnetoresistance effect (MRE) have been studied in both the epitaxial films and bulk ceramics of manganites (La\textsubscript{0.7}Ca\textsubscript{0.3})\textsubscript{1−x}Mn\textsubscript{1+x}O\textsubscript{3−δ} (x = 0 - 0.2). The pressure and magnetic field effects are shown to increase with increasing manganese content. Experimental data show that the pressure and magnetic field effects on temperatures of both metal-insulator transition (\textit{T}_{MD}) and MRE peak (\textit{T}_{MR}) are considerably stronger in the films than in ceramics. The hydrostatic pressure increases \textit{T}_{MD} and \textit{T}_{MR}. MRE for both types of samples was shown to be favored by the pressure and magnetic field in an opposite way. A direct correlation is established between \textit{T}_{MD} and conductivity bandwidth as well as between MRE and concentration of charge carriers at applied pressure. The origin of pressure-magnetic field effects is analyzed in the frame of double exchange interaction and small polaron hopping and variable range hopping models.

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