

# EXAFS and EPR study of $\text{La}_{0.6}\text{Sr}_{0.2}\text{Ca}_{0.2}\text{MnO}_3$ and $\text{La}_{0.6}\text{Sr}_{0.2}\text{Ba}_{0.2}\text{MnO}_3$

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Abstract: Extended X-ray absorption fine structure (EXAFS) analysis and electron-paramagnetic resonance (EPR) have been used to examine the local structure and the internal dynamics of  $\text{La}_{0.6}\text{Sr}_{0.2}\text{Ca}_{0.2}\text{MnO}_3$  and  $\text{La}_{0.6}\text{Sr}_{0.2}\text{Ba}_{0.2}\text{MnO}_3$  lanthanum manganites. The Mn-O bond distance (1.94 Å for both samples) and the Debye-Waller factors ( $0.36 \times 10^{-2}$  and  $0.41 \times 10^{-2} \text{Å}^2$  for  $\text{La}_{0.6}\text{Sr}_{0.2}\text{Ca}_{0.2}\text{MnO}_3$  and for  $\text{La}_{0.6}\text{Sr}_{0.2}\text{Ba}_{0.2}\text{MnO}_3$ , respectively) were obtained from the EXAFS analysis. The dependence of the EPR line width on dopant kind (Ca or Ba) showed a decrease of the spin-lattice interaction with an increase of the Curie temperature. For both compositions, the EPR line intensity followed the exponential law  $I(T) = I_0 \exp(E_a/k_B T)$ , deduced on the basis of the adiabatic polaron hopping model. © 2002 Elsevier Science B.V. All rights reserved.

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