

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 (0.36×10^{-2} and 0.41×10^{-2} Å² 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.

Author Keywords: Electron paramagnetic resonance; EXAFS; Magnetically ordered materials; Spin-lattice interaction

Index Keywords: Chemical bonds; Composition; Crystal lattices; Electromagnetic wave absorption; Electron spin resonance spectroscopy; Molecular structure; Polarons; X rays; Dopants; Lanthanum compounds

Year: 2003

Source title: Physica B: Condensed Matter

Volume: 327

Issue: 4-Feb

Page : 183-186

Cited by: 4

Link: [Scopus Link](#)

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Editors: Boer F R, Brommer P E, Franse J J M

Conference name: ISAMM 2002

Conference date: 2 October 2002 through 4 October 2002

Conference location: Ha Long Bay

Conference code: 60799

ISSN: 9214526

CODEN: PHYBE

DOI: 10.1016/S0921-4526(02)01722-2

Language of Original Document: English

Abbreviated Source Title: Physica B: Condensed Matter

Document Type: Conference Paper

Source: Scopus

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