

MS38 P01

Effect of monovalent doping in the A site on structural and physical properties of $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ manganese oxides A. Cheikhrouhou^{a,b}, W. Cheikh-Rouhou Koubaa^a, A. Mehri^a, M. Koubaa^a, ^aLaboratoire de Physique des Matériaux, Faculté des Sciences de Sfax, B. P. 802, 3018 Sfax, Tunisia, ^bLaboratoire Louis NEEL, CNRS, B. P. 166, 38042 Grenoble Cedex 9, France.

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The mixed valence perovskite manganese oxides $\text{Ln}_{1-x}\text{M}_x\text{MnO}_3$ where Ln is a rare earth element (Ln=La, Pr, Nd) and M is a divalent element (M=Sr, Ca, Ba, Pb) have been widely studied during the last decade in reason of their considerable interest owing to a colossal resistivity decrease in an applied magnetic field near the metal-insulator transition temperature. However only few studies have been performed on manganites where the divalent element (Ca/Sr) has been partially substituted by monovalent element (Na, K, Ag). We studied the monovalent doping effect on the structural and physical properties of $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ manganese oxides, we elaborated using the solid state reaction method $\text{La}_{1-x}\text{Ca}_x\text{A}_y\text{MnO}_3$ and $\text{La}_{1-x-y}\text{A}_y\text{Ca}_x\text{MnO}_3$ samples with A=Na, K and Ag and $x=0.35$ and $x=0.5$ and studied their structural and physical properties and particularly the correlations between structure and physical properties. The parent compounds $\text{La}_{0.65}\text{Ca}_{0.35}\text{MnO}_3$ and $\text{La}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ have been chosen in reason of their physical properties; in fact $\text{La}_{0.65}\text{Ca}_{0.35}\text{MnO}_3$ compound exhibits a paramagnetic-ferromagnetic transition at $T_C=265\text{K}$ while $\text{La}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ exhibits an antiferromagnetic charge order at about 175K.

MS38 P02

Deficiency effects on structure and physical properties in the A-site of $\text{Pr}_{1-x}\text{Sr}_x\text{MnO}_3$ manganese oxides with ($x=0.2$; 0.3 ; 0.4 and 0.5) W. Cheikh-Rouhou Koubaa^a, M. Koubaa^a, W. Boujelben^a, A. Cheikhrouhou^{a,b} ^aLaboratoire de Physique des Matériaux, Faculté des Sciences de Sfax, B. P. 802, 3018 Sfax, Tunisia, ^bLaboratoire Louis NEEL, CNRS, B. P. 166, 38042 Grenoble Cedex 9, France.

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We investigate the structural, magnetic and electrical properties of praseodymium and strontium deficient $\text{Pr}_{1-x-y}\text{Sr}_x\text{MnO}_3$ and $\text{Pr}_{1-x}\text{Sr}_{x-y}\text{MnO}_3$ compounds with $x=0.2$, 0.3 ; 0.4 and 0.5 and $0 < y < 0.2$. All our samples have been elaborated using the conventional solid state reaction at high temperature. Rietveld refinements of the X-ray diffraction patterns show that all our samples are single phase. The crystallographic structure depends strongly on the composition parent compound, the nature and the amount of the deficiency. For $x=0.2$ and $x=0.3$, praseodymium deficiencies lead to a reinforcing of the ferromagnetic-metallic behaviour at low temperature and an increase of the Curie temperature T_C while strontium deficiencies lead to a weakening of the ferromagnetic-metallic behaviour at low temperature and a decrease of the Curie temperature T_C . For $x=0.4$ and 0.5 the praseodymium and strontium deficiencies have not the same effects as for $x=0.2$ and $x=0.3$. The physical

properties are strongly correlated to the crystallographic structure of our synthesized samples.

MS38 P03

Coexistence of the canted ferromagnetism and canted antiferromagnetism in $\text{La}_{0.6}\text{Pr}_{0.4}\text{Mn}_2\text{Si}_2$ Yalcin Elerman^a, Ilker Dincer^a, Helmut Ehrenberg^b, Hartmut Fuess^b, Gilles André^c, Ayhan Elmali^a ^aAnkara University, Faculty of Engineering, Department of Engineering Physics, 06100 Besevler-Ankara Turkey, ^bInstitute for Materials Science, Darmstadt University of Technology, Petersenstrasse 23 D-64287 Darmstadt Germany, ^cLaboratoire Léon Brillouin (CEA-CNRS), CEN-Saclay, 91191 Gif-Sur-Yvette, France

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Keywords: Neutron diffraction, Magnetic structures, Magnetic transitions

The magnetic structures of $\text{La}_{0.6}\text{Pr}_{0.4}\text{Mn}_2\text{Si}_2$ have been determined by the powder neutron diffraction between 1.5 and 308 K. According to magnetic measurements, this compound is antiferromagnetic below T_N^{inter} , ferromagnetic above T_N^{inter} up to T_C^{inter} and antiferromagnetic between T_C^{inter} and T_N^{intra} . The powder neutron diffraction results show that the magnetic structure is canted antiferromagnetic below 130 K and canted ferromagnetic between 240 and 297 K. The neutron diffraction patterns between $130 < T < 240$ K indicate that the canted antiferromagnetic and ferromagnetic structure coexist. Since the magnetic moment values, the unit cell parameters and the scale parameters of the canted antiferromagnetism and canted ferromagnetism overlap at this temperature range, we use a special refinement procedure to refine the neutron diffraction patterns. Hofmann et al. [1] used a similar method to analyze the neutron diffraction patterns for $\text{La}_{0.8}\text{Y}_{0.2}\text{Mn}_2\text{Si}_2$. They assumed an identical canting angle for the canted antiferromagnetic and ferromagnetic structures. Because of the contraction on a and expansion on c, an identical canting angle for the antiferromagnetic and ferromagnetic structures is excluded. $\text{La}_{0.6}\text{Pr}_{0.4}\text{Mn}_2\text{Si}_2$ reveals a single ferromagnetic phase above 240 K, and the Rietveld refinements indicate different canting angles for the antiferromagnetic and ferromagnetic structures [2]. Therefore the model proposed in Ref. [1] is wrong. The spontaneous volume change and linear magnetostriction are derived. The maximum value of the spontaneous volume magnetostriction is about -0.37% at 50 K [2].

[1] Hofmann M., Campbell S.J., Kennedy S.J., *J. Phys.: Condens. Matter*, 2000, 12, 3241.

[2] Dincer I., Elerman Y., Elmali A., H. Ehrenberg H., André G., *J. Magn. Magn. Mater.*, in press.

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We have consider the one-, two-, and three-dimensional magnetic space groups and the two- and three-dimensional magnetic subperiodic groups, i.e. magnetic rod and magnetic layer groups. We have tabulated the