VOLUME EFFECTS ON ELECTRONIC TRANSITIONS IN $Pr_{0.7}$ $Ca_{0.3}$ MnO_3 – BASED PEROVSKITES

I.Medvedeva[a], A.Maignan[b], K.Bärner[c], B.Raveau[b]

[a]Instituite for Metal Physics, Ural Division of RAS, S.Kovalevskaya 18,620219 Ekaterinburg, Russia

[b]Laboratoire CRISTMAT, UMR 6508 associee au CNRS, Bulevard du Marechal Juin, 14050 Caen, France

[c]IV Physikalisches Institut, Georg–August–Universität Göttingen, Bunsenstrasse 11-15, D-37073 Göttingen, Germany

9.7 cm

The volume effect on the metal-insulator transition temperature T_{mi} and the charge ordering transition temperature T_{co} in $Pr_{0.7}Ca_{0.3}MnO_3$–based compounds was investigated. Different kinds of lattice modulation were used – the average cation size was changed via La substitution for Pr and Sr substitution for Ca [1]; hydrostatic pressure was applied to the resulting $Pr_{0.7-x}$ La_x $Ca_{0.3}MnO_3$ and $Pr_{0.7}$ $Ca_{0.3-x}Sr_xMnO_3$ systems. From the temperature dependences of the resistivity the pressure derivatives dT_{mi}/dP and dT_{co}/dP were determined. The main result of this study is evidence for a critical state of $Pr_{0.66}$ $Ca_{0.34}$ MnO_3 –based systems which is extremely sensitive to external forces, such as hydrostatic pressure, magnetic field and A-cation substitution (chemical pressure).

[1] A.Maignan, Ch.Simon, V.Caignaert, B.Raveau, Z.Phys.B.99 (1996) 305

13.4 cm

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Corresponding author :
K.Bärner

Address for correspondence :
IV Physikalisches Institut, Georg–August–Universität Göttingen, Bunsenstrasse 11-15, D-37073 Göttingen, Germany

Email address :
baerner@physik4.gwdg.de