

Spin glass-like state, charge ordering, phase diagram and positive entropy change in $\text{Nd}_{0.5-x}\text{Pr}_x\text{Sr}_{0.5}\text{MnO}_3$ perovskites

Chau N., Tho N.D., Luong N.H., Giang B.H., Cong B.T.

Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai Street, Hanoi, Viet Nam; Department of Physics, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai Street, Hanoi, Viet Nam

Abstract: The mixed rare earth manganites $\text{Nd}_{0.5-x}\text{Pr}_x\text{Sr}_{0.5}\text{MnO}_3$ ($x=0.1-0.5$) have been prepared using solid state reaction technique. All samples are of single phase with orthorhombic structure. The microstructure of the samples was determined by SEM. The field-cooled (FC) and zero-field-cooled (ZFC) curves showed that samples with $x \geq 0.25$ exhibit the spin glass-like state at low field and low temperatures, whereas, in the samples with $x < 0.25$, there is the charge ordering (coexisting with FM-AFM transition) established at low temperatures. The Curie temperature of the samples increases with increasing Pr content due to increase of $\langle r_A \rangle$. Interesting feature is that at the FM-AFM transition region, the magnetic entropy change has positive value, in contrary to that at FM-PM transition region. The electrical property of the samples from 10 K to room temperature is examined in detail. © 2006 Elsevier B.V. All rights reserved.

Author Keywords: Charge ordering; Magnetocaloric effect; Manganites

Index Keywords: Electric properties; Entropy; Magnetic materials; Microstructure; Phase diagrams; Rare earths; Scanning electron microscopy; Charge ordering; Magnetocaloric effect; Manganites; Positive entropy change; Perovskite

Year: 2006

Source title: Journal of Magnetism and Magnetic Materials

Volume: 303

Issue: 2 SPEC. ISS.

Cited by: 4

Link: [Scopus Link](#)

Correspondence Address: Chau, N.; Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai Street, Hanoi, Viet Nam; email: chau@cms.edu.vn

ISSN: 3048853

CODEN: JMMMD

DOI: 10.1016/j.jmmm.2006.01.062

Language of Original Document: English

Abbreviated Source Title: Journal of Magnetism and Magnetic Materials

Document Type: Article

Source: Scopus

Authors with affiliations:

- Chau, N., Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai Street,

Hanoi, Viet Nam

- Tho, N.D., Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai Street, Hanoi, Viet Nam
- Luong, N.H., Center for Materials Science, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai Street, Hanoi, Viet Nam
- Giang, B.H., Department of Physics, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai Street, Hanoi, Viet Nam
- Cong, B.T., Department of Physics, University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai Street, Hanoi, Viet Nam

References:

- Kuwahara, H., Tomioka, Y., Asamitsu, A., Moritomo, Y., Tokura, Y., (1995) *Science*, 270, p. 961
- Wolfman, J., Simon, C., Hervieu, M., Maignan, A., Raveau, B., (1996) *J. Solid State Chem.*, 123, p. 413
- Kumar, N., Rao, C.N.R., (1997) *J. Solid State Chem.*, 129, p. 362
- Rao, C.N.R., Cheetham, A.K., (1997) *Adv. Mater.*, 9, p. 1009
- Arulraj, A., Gundakaram, R., Biswas, A., Gayathri, N., Raychaudhuri, A.K., Rao, C.N.R., (1998) *J. Phys.: Condens. Matter*, 10, p. 4447
- Arulraj, A., Santosh, P.N., Gopalan, R.S., Guha, A., Raychaudhuri, A.K., Kumar, N., Rao, C.N.R., (1998) *J. Phys.:Condens. Matter*, 10, p. 8497
- Rao, C.N.R., Arulraj, A., Santosh, P.N., Cheetham, A.K., (1998) *Chem. Mater.*, 10, p. 2714
- Chau, N., Cuong, D.H., Tho, N.D., Nhat, H.N., Luong, N.H., Cong, B.T., (2004) *J. Magn. Magn. Mater.*, 272-276, p. 1292
- Chinh, H.D., Hanh, N., Chau, N., Sudheendra, L., Rao, C.N.R., (2003) *Adv. Nat. Sci.*, 4, p. 1
- Coey, J.M.D., Viret, M., Molnar, S.V., (1999) *Adv. Phys.*, 48, p. 194
- Hwang, H.Y., Cheong, S.-W., Radaelli, P.G., Mazerio, M., Batlogg, B., (1995) *Phys. Rev. Lett.*, 75, p. 941
- Rodriguez-Martinez, L.M., Attfield, J.P., (1996) *Phys. Rev. B*, 54, p. 15622
- Damay, F., Maignan, A., Martin, C., Raveau, B., (1997) *J. Appl. Phys.*, 81, p. 1372
- Sande, P., Hueso, L.E., Miguens, D.R., Rivas, J., Rivadulla, F., Lopez-Quintela, M.A., (2001) *Appl. Phys. Lett.*, 59, p. 2040
- Szewczyk, A., Szymczak, H., Wisniewski, A., Piotrowski, K., Kartaszynski, R., Dabrowski, B., Kolesnik, S., Bukowski, Z., (2000) *Appl. Phys. Lett.*, 77, p. 1026

Download: 0647.pdf