Magnetic relaxation behavior in $Nd_{0.5}Sr_{0.5}MnO_3$: Observation of negative imaginary component of ac magnetic susceptibility

Ulyanov A.N., Quang H.D., Lee K.W., Yu S.C., Sinh N.H., Kang Y.M., Yoo S.I.

Department of Materials Science and Engineering, Seoul National University, Seoul 151-744, South Korea; Solid State Physics Group, Department of Physics and Astronomy, University of Glasgow, Glasgow G12 8QQ, United Kingdom; Korea Research Institute of Standards and Science, Taejon 305-340, South Korea; Department of Physics, Chungbuk National University, Cheongju 361-763, South Korea; Cryogenics Laboratory, Department of Physics, Hanoi National University, Hanoi, Viet Nam

Abstract: Short time relaxation effect in $Nd_{0.5}Sr_{0.5}MnO_3$ manganites was observed. The effect is manifested as negative peak of imaginary component of ac magnetic susceptibility near the point of first order phase transition. The effect is explained at the frame of Landau theory of phase transition, where the coexistence of metastable and stable phases is considered. ?? 2008 IEEE.

Author Keywords: Magnetic losses; Magnetic susceptibility; Relaxation processes

Index Keywords: AC Magnetic susceptibility; First-order phase transitions; Landau theory; Magnetic loss; Magnetic losses; Relaxation effect; Stable phasis; Magnetic susceptibility; Magnetism; Manganese oxide; Metastable phases; Neodymium; Oxide minerals; Phase transitions; Relaxation processes; Magnetic materials

Year: 2008

Source title: IEEE Transactions on Magnetics

Volume: 44

Issue: 11 PART 2

Page : 3060-3062

Cited by: 1

Link: Scorpus Link

Correspondence Address: Ulyanov, A. N.; Department of Materials Science and Engineering, Seoul National University, Seoul 151-744, South Korea; email: a_n_ulyanov@yahoo.com

ISSN: 189464

CODEN: IEMGA

DOI: 10.1109/TMAG.2008.2001792

Language of Original Document: English

Abbreviated Source Title: IEEE Transactions on Magnetics

Document Type: Conference Paper

Source: Scopus

Authors with affiliations:

1. Ulyanov, A.N., Department of Materials Science and Engineering, Seoul National University, Seoul 151-744, South Korea

2. Quang, H.D., Solid State Physics Group, Department of Physics and Astronomy, University of Glasgow, Glasgow G12 8QQ, United Kingdom
3. Lee, K.W., Korea Research Institute of Standards and Science, Taejon 305-340, South Korea
4. Yu, S.C., Department of Physics, Chungbuk National University, Cheongju 361-763, South Korea
5. Sinh, N.H., Cryogenics Laboratory, Department of Physics, Hanoi National University, Hanoi, Viet Nam
6. Kang, Y.M., Department of Materials Science and Engineering, Seoul National University, Seoul 151-744, South Korea
7. Yoo, S.I., Department of Materials Science and Engineering, Seoul National University, Seoul 151-744, South Korea

References:

1. Jonker, G.H., Van Santen, J.H., Ferromagnetic compounds of manganese with perovskite structure (1950) Physica, 16, pp. 337-349. , Mar
2. Van Santen, J.H., Jonker, G.H., Electrical conductivity of ferromagnetic compounds of manganese with perovskite structure (1950) Physica, 16, pp. 599-560. , Jul./Aug
3. Dagotto, E., Hotta, T., Moreo, A., Colossal magnetoresistant materials: The key role of phase separation (2001) Physics Reports, 344, pp. 1-153. , Apr
4. Zener, C., Interaction between the d-shells in the transition metals. II. Ferromagnetic compounds of manganese with perovskite structure (1951) Phys. Rev., 82, pp. 403-405. , May
5. L??pez, J., Lisboa-Filho, P.N., Passos, W.A.C., Ortiz, W.A., Araujo-Moreira, F.M., De Lima, O.F., Schaniel, D., Ghosh, K., Magnetic relaxation behavior in La0.5 Ca0.5 MnO3 and Nd0.5 Sr0. 5 MnO3 (2001) Phys. Rev. B., 63, pp. 2244221-2244229. , May
6. Anane, A., Renald, J.-P., Reversat, L., Dupas, C., Veillet, P.P., Viret, M., Pinsard, L., Revcolevschi, A., Colossal resistive relaxation effects in a Pr0.67Ca 0.33MnO3 single crystal (1999) Phys. Rev. B., 59, pp. 77-80. , Jan
7. Nam, D.D.N.H., Jonason, K., Nordblad, P., Khiem, N.V., Phuc, N.X., Coexistence of ferromagnetic and glassy behavior in the La 0.6Sr0.5CoO3 perovskite compound (1999) Phys. Rev. B., 59, pp. 4189-4194. , Feb
8. Nam, D.N.H., Mathieu, R., Nordblad, P., Khiem, N.V., Phuc, N.X., Ferromagnetism and frustration in Nd0.7Sr 0.3MnO3, (2000) Phys. Rev. B., 62, pp. 1027-1032. , July
9. J??nsson, P.E., Mathieu, R., Nordblad, P., Yoshino, H., Katori, H.A., Ito, A., Nonequilibrium dynamics of spin glasses: Examination of the ghost domain scenario (2004) Phys. Rev. B., 70, pp. 1744021-17440227. , Nov
10. Kuwahara, H., Tomioka, Y., Asamitsu, A., Moritomo, Y., Tokura, Y., A first-order phase transition induced by a magnetic field (1995) Science, 270, pp. 961-963. , Nov
11. Jir?k, Z., Damay, F., Hervieu, M., Martin, C., Raveau, B., Andr??, G., Bour??e, F., Magnetism and charge ordering in Pr0.5 Cax Sr 0.5-x MnO3 (x = 0.09 and 0.5) (2000) Phys. Rev. B., 61, pp. 1181-1188. , Jan
12. Palacio, F., Lazaro, F.J., Van Duyneveldt, A.J., Magnetic phenomena in molecular solids: A tutorial approach (1989) Mol. Cryst. Liq. Cryst., 176, pp. 289-306. , Jan./Feb
13. Levin, E.M., Pecharsky, V.K., Gscheidner Jr., K.A., Unusual magnetic behavior in Gd5 (Si1.5Ge 2.5) and Gd5 (Si2 Ge2) (2000) Phys. Rev. B., 62, pp. R14625-R14628. , Dec
14. Kou, X.C., Gr??ssinger, R., Hilscher, G., Kirchmayr, H.R., De Boer, F.R., Ac susceptibility study on R2Fe14B single crystals (R = Y, Pr, Nd, Sm, Gd, Tb, Dy, Ho, Er, Tm) (1996) Phys. Rev. B., 64, pp. 6421-6429. , Sept
15. Ginzburg, V.L., Levanyuk, A.P., Sobyanin, A.A., Light scattering near phase transition points in solids (1980) Phys. Rep., 57, pp. 151-240. , Jan