

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Role of cationic/oxygen vacancies in transport and magnetic properties of NiFe₂O₄ thinfilms prepared by pulsed laser deposition

G. HASSNAIN JAFFARI, Department of Physics and Astronomy, University of Delaware, Newark, DE 19716, USA, SAFIA ANJUM, University of Engineering Technology, Lahore, Pakistan, ABDUL K. RUMAIZ, National Synchrotron Light Source, Brookhaven National Laboratory, Upton, NY 11973, USA., S. ISMAT SHAH, Department of Material Science and Engineering; Department of Physics and Astronomy, University of Delaware, Newark, DE 19716, USA, — Non-stoichiometric NiFe₂O₄ thin films have been synthesized pulsed laser deposition. We have found monotonic increase in saturation magnetization and non-monotonic increase in conductivity as a function of oxygen pressure during growth of the samples. Substantial reduction in magnetization is found which varies from 0.4% to 40% of bulk value as a function of oxygen partial pressure during the growth of the samples. Three orders of magnitude increase in the conductivity of the sample prepared at an excessive oxygen deficient environment. These variations in saturation magnetization and conductivity as been discussed within the framework of cation/oxygen vacancies in inverse spinel NiFe₂O₄ structure. The changes in the electronic structures due to the presences of the vacancies have been investigated using X-ray Photoelectron spectroscopy.

G. Hassnain Jaffari
Department of Physics and Astronomy,
University of Delaware, Newark, DE 19716, USA

Date submitted: 01 Dec 2009

Electronic form version 1.4