Bilbao, 5-7 September 2001

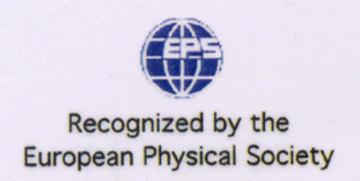


Soft Magnetic Materials Conference

ORGANIZED BY THE UNIVERSITY OF THE BASQUE COUNTRY Universidad del Pais Vasco / Euskal Herriko Unibertsitatea

BOOK OF ABSTRACTS





The study of Mössbauer spectroscopy for (Nd_{1-x}Sm_x)_{1/3}Sr_{2/3}FeO₃.

Yong Rang Uhm, Key-Taeck Park and Chul Sung Kim

Department of Physics, Kookmin University, Seoul 136-702, Korea

The (Nd_{1-x}Sm_x)_{1/3}Sr_{2/3}FeO₃ were synthesized by floating zone method and their magnetic properties and charge ordering(CO) transition related with lattice distortion be systematically investigated. Mössbauer spectra of (Nd_{1-x}Sm_x)_{1/3}Sr_{2/3}FeO₃ were taken at various temperatures range from 4.2 K to room temperature. The (Nd_{1-x}Sm_x)_{1/3}Sr_{2/3}FeO₃ (x=0.0, 0.2, 0.4, 0.6, and 0.8) with lattice distortion present charge ordering(CO) and canted antiferromagnetic spin ordering below Tco= TN. This phase transition is accompanying by charge disproportionation(CD) into nominally Fe3+ and Fe5+ sites. In this charge ordering state, a sequence of Fe⁺³ Fe⁺³ Fe⁺⁵ Fe⁺⁵ Fe⁺⁵ exist align the [111] direction of pseudo cubic perovskite structure. The CD in (Nd_{1-x}Sm_x)_{1/3}Sr_{2/3}FeO₃ was detected below Néel temperature, in which three kinds of iron with valence state Fe3+, Fe5+ and Fe4+ was found. The function of tetravalent iron(low spin) increases from 13 to 66 % as temperature rises. This phenomenon can be interpreted to mean the charge ordering and disordering phase coexist in (Nd_{1-x}Sm_x)_{1/3}Sr_{2/3}FeO₃. Indeed, such CO transition was detected by systematic decrease of a spontaneous magnetization with increase of x in the system of (Nd1-_xSm_x)_{1/3}Sr_{2/3}FeO₃. This result shows that the charge ordering state is realized with strong hybridization between Fe and O atoms. The Néel temperature decreases with the increase of the Sm concentration.