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Structural, Electrical and Infrared Studies of  $\text{Ni}_{0.7}\text{Cd}_{0.3}\text{Sm}_x\text{Fe}_{2-x}\text{O}_4$  Ferrite

M. Z. SAID, D. M. HEMEDA, S. Abdel KADER and G. Z. FARAG  
Physics Department, Faculty of Science, Tanta University, Tanta-EGYPT  
e-mail: dahemeda@yahoo.com

 [Keywords](#)  
 [Authors](#)



[phys@tubitak.gov.tr](mailto:phys@tubitak.gov.tr)

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**Abstract:** A series of samples of the system  $\text{Ni}_{0.7}\text{Cd}_{0.3}\text{Sm}_x\text{Fe}_{2-x}\text{O}_4$  ( $x = 0, 0.01, 0.02, 0.03, 0.04, 0.05$  and  $0.06$ ) were prepared by the usual ceramic technique. X-ray diffraction, infrared spectroscopy (IR) and electrical properties were studied. The X-ray diffraction pattern confirms the presence of spinel phase structure for the sample without Sm content. For the samples with Sm ions, some diffraction peaks appeared which belongs to the orthorhombic phase structure. The main two absorption bands in IR spectra were observed around  $600\text{ cm}^{-1}$  ( $\nu_1$ ), which was attributed to stretching vibration of tetrahedral groups  $\text{Fe}^{3+}\text{-O}^{2-}$ , and that around  $400\text{-cm}^{-1}$  ( $\nu_2$ ) was attributed to the octahedral group complex  $\text{Fe}^{3+}\text{-O}^{2-}$ . The DC conductivity was found to increase with increasing temperature and Sm addition, which improved the electrical conduction of the given ferrite.

**Key Words:** Orthoferrites; Spectral studies; DC conductivity; Electrical mobility.

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