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# ABSTRACTS

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# Magnetic Properties and Superexchange Interactions in Co-In Ferrite.

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Co-In has been studies with Mössbauer spectroscopy, X-ray diffractometer (XRD), and vibrating sample magnetometer (VSM). The crystal structure for this system is spinel structure, and the lattice constant is in accord with Vegard's law. The Mössbauer spectra consist of two six-line patterns corresponding to Fe3+ at the tetrahedral (A) and octahedral (B) sites. The Néel temperature of CoFe1.9In0.1O4 was TN = 765 ± 3 K. Debye temperature for the A and B sites of CoFe1.9In0.1O4 is found to be A = 664 5 K and B = 207 5 K, respectively. The temperature dependence of the magnetic hyperfine fields at 57Fe nuclei at the tetrahedral(A) and octahedral(B) sites is analyzed by the Néel theory of ferrimagnetismand calculate superexchange integral parameters. The intersublattice A-O-B and intersublattice A-O-A superexchange interactions of CoFe1.9In0.1O4 are found to be antiferomagnetic with their strength of JA-B=-14.7 kB and JA-A=-3.6 kB, respectively, while intrasublattice B-O-B superexchange interaction is ferromagnetic with its strength JB-B=7.4 kB. The VSM data showed that the satration magnetization decreased with increasing x from about 83.7 emu/g for x=0.1 to 63.6 emu/g for x=0.5.