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ABSTRACTS

CS-15. Mössbauer studies of Jahn-teller distortion on $Fe_{1-x}Zn_xCr_2S_4$.

S. Bae[1], S. Kim[1] and C. Kim[1] *1. Physics, Kookmin University, Seoul, South Korea*

The polycrystalline samples of Zn doped $Fe_{1-x}Zn_xCr_2S_4(0.1\leq x\leq 0.9)$ have been synthesized by solid-state method. The synthesized samples were confirmed to be a single phase by x-ray diffraction measurement and Rietveld refinement analysis. According to magnetization measurements for $Fe_{1-x}Zn_xCr_2S_4$, the ferrimagnetic behavior($0.1\leq x\leq 0.5$) increases with Zn concentration, while the Néel temperature decreases with increasing x in the all ranges. Also, the magnetic structure in the range $0.7\leq x\leq 0.9$ are transformed from the ferrimagnetic into the anti-ferromagnetic phase. The Mössbauer spectra of $Fe_{1-x}Zn_xCr_2S_4$ were fitted to asymmetrical 8-lines due to remarkable increasing electric quadrupole interactions below 10 K. The magnetic hyperfine field and electric quadrupole interaction for the sample x=0.5 at 4.2 K, have been fitted, yielding the following results:: H_{hf}=104 kOe, θ=26°, ϕ=0°, η=1, $\Delta E_Q=e^2qQ(1+\eta^2/3)^{1/2}/2$=2.56mm/s, $R=|e^2qQ/2g_1\mu_N H|$=2.9. The hyperfine field decreases inverse proportionally with increasing Zn concentration at 4.2 K. It is interpreted that the magnetic dipole interaction was weakened by the decrease of Jahn-teller ion Fe by the replacement of Zn ion for A site.