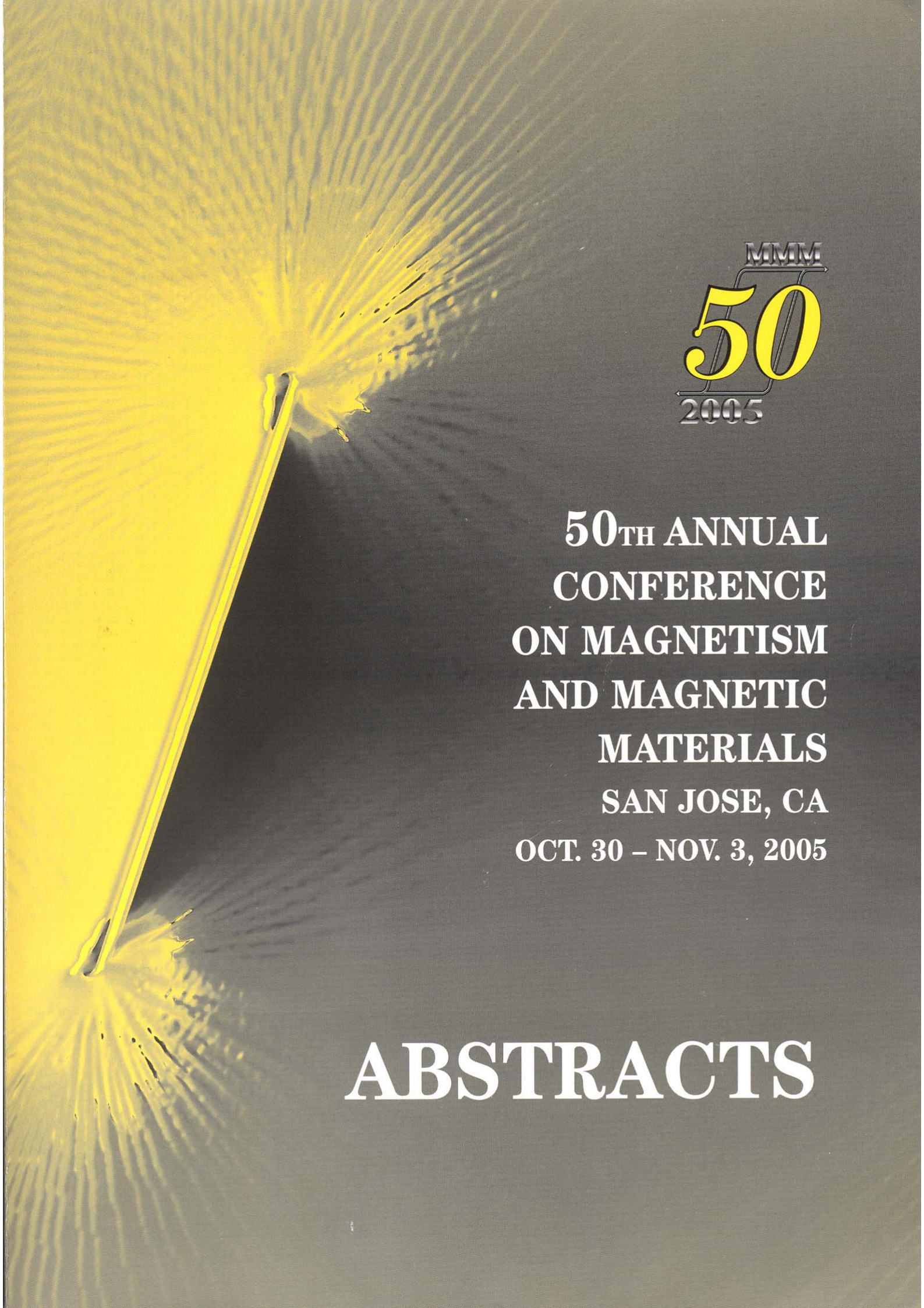

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ABSTRACTS

FU-12. Mössbauer studies of Fe-doped $HoMnO_3$. *S. Kim*[1], S. Kim[1], J. Park[2], S. Cheong[3] and C. Kim[1] *1. Department of Physics, Kookmin University, Seoul, South Korea; 2. Department of Physics, SungKyunKwan University, Suwon, South Korea; 3. Department of Physics & Astronomy, Rutgers University, Piscataway, NJ, USA*

The Fe-doped $HoMnO_3$ has been prepared with the aim of investigating the spin-lattice coupling that the Mn moments occupy a fully frustrated triangular lattice by Mössbauer technique. A single phase of the $HoMn_{0.99}{}^{57}Fe_{0.01}O_3$ powder was obtained by general solid-state reaction method. The crystal structure was refined hexagonal with the lattice parameters $a_0 = 6.134(7)$ and $c_0 = 11.412(6)$ Å. The magnetic susceptibility follows a Curie-Weiss law behavior, the Curie-Weiss temperature was determined $\theta_p = -19$ K. The effective paramagnetic moment and the magnetic frustration factor were calculated $\mu_{eff.} = 10.2\ \mu_B$ and $|\theta_p| / T_N = 0.26$, respectively. Mössbauer spectra of the $HoMn_{0.99}{}^{57}Fe_{0.01}O_3$ have been taken at various temperatures ranging from 4.2 K to room temperature. The spectra consist of quadrupole doublet above $T_N = 72$ K, the quadrupole splitting value is 1.86 ± 0.01 mm/s at T_N. It could be interpreted directly that the spontaneous electric polarization of hexagonal Ho manganese for multiferroic material is caused by asymmetry distribution between cations and anions. Also, the isomer shift value at room temperature is found to be 0.28 ± 0.01 mm/s relative to the Fe metal that are consistent with the high-spin Fe^{3+} valence state.