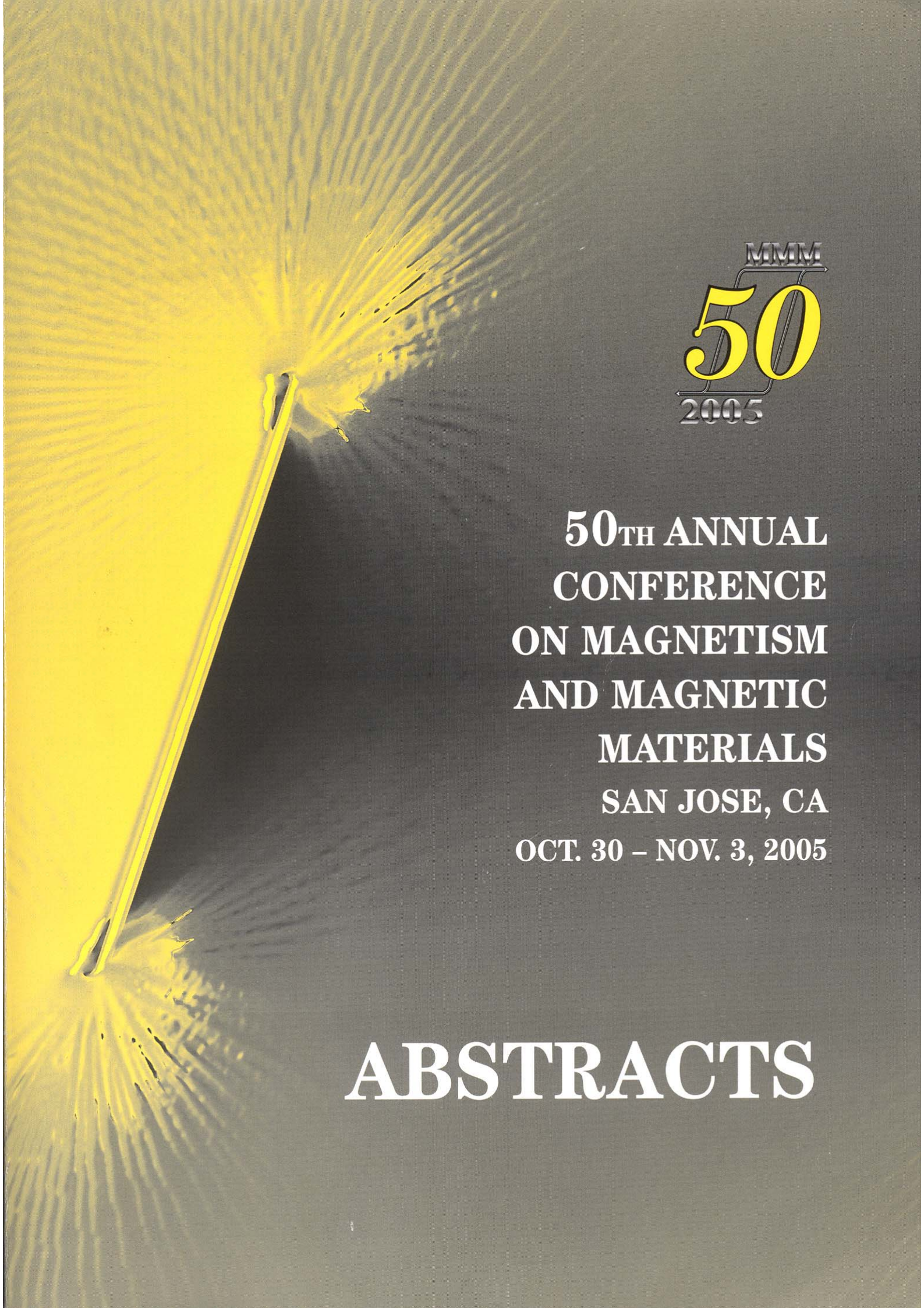

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ABSTRACTS

ER-07. Size dependent Magnetic properties of Ordered $Li_{0.5}Fe_{2.5}O_4$ prepared by Sol-Gel method. *K. Kang*[1], S. Hyun[1] and C. Kim[1] *1. Department of Physics, Kookmin University, Seoul, South Korea*

Size dependent magnetic properties of ordered Li-ferrites prepared by sol-gel method have been studied by x-ray diffraction, vibrating sample magnetometer (VSM), and Mössbauer spectroscopy. X-ray diffraction patterns were analyzed by the Rietveld refinement. Samples annealed below 500 °C have been the cubic spinel structure (space group, Fd3m) with a small amount of α-Fe_2O_3 and γ-Fe_2O_3. As annealing temperature increase above 500 °C, hematite and maghemite are vanished and then the crystals form the single phase spinel structure (space group, $P4_332$) with ordered cation distribution on the octahedral site. Particle sizes determined by x-ray analysis are from 37 nm to 87 nm as the annealing temperature increase from 450 °C to 700 °C and the lattice parameter of all samples has the same value, 8.3329 Å within an experimental error limit. The saturation magnetization is 46 emu/g for low annealing temperature and increases up to 63.3 emu/g for sample annealed at 700 °C. In contrast, coercivity of each sample has maximum value of 152.5 Oe at 500 °C. Mössbauer spectra of each sample have been obtained from 4.2 K to Néel room temperature. We verified a quantitative amount of α-Fe_2O_3 and γ-Fe_2O_3, 9 % and 13.7 %, for the sample annealed at 450 °C,respectively, from the hyperfine field analyses and refined absorption area ratio. The ordered cation distribution by the local symmetry reduction of sublattice gives a reasonable interpretation about the magnetic properties of nanosize particles.