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ABSTRACTS

CS-06. Crystallographic and Mössbauer studies of $\text{Li}_{0.5}\text{Fe}_{2.5}\text{O}_4$ prepared by HTTD and sol-gel methods. *S. Hyun*¹ and *C. Kim*¹. *Physics, Kookmin University, Seoul, South Korea*

$\text{Li}_{0.5}\text{Fe}_{2.5}\text{O}_4$ powders are prepared by high temperature thermal decomposition (HTTD) and sol-gel methods. The sample prepared by HTTD method has space group, Fd3m, and the sample annealed at 700 °C prepared by sol-gel method has space group, P4₃32 with ordered cation distribution on the octahedral site. Otherwise the sample annealed at 1000 °C prepared by sol-gel method has space group, Fd3m. Particle sizes determined by x-ray analysis are 6, 40 and 46 nm for the samples prepared by HTTD and annealed at 700 °C and 1000 °C prepared by sol-gel methods, respectively. The saturation magnetization (M_s) for the sample prepared by HTTD method at room temperature is 55 emu/g and that for the each sample annealed at 700 °C and 1000 °C prepared by sol-gel method is 59 emu/g and 62 emu/g, respectively. In contrast, the coercivity (H_c) of the each sample is 4.1, 93.7 and 9.1 Oe, respectively. Mössbauer spectra of each sample have been obtained from 4.2 to 800 K. The isomer shifts (δ) at room temperature for the A and B sites of the sample prepared by HTTD method are found to 0.33 and 0.26 mm/s, and the samples annealed at 700 °C and 1000 °C prepared by sol-gel method are found to 0.14 ~ 0.16 and 0.21 ~ 0.24 mm/s relative to the Fe metal, respectively, which are consistent with the Fe^{3+} valence state. In case of the sample prepared by HTTD method, Mössbauer spectrum at room temperature shows superparamagnetic behavior. Otherwise, in case of sol-gel method, Mössbauer spectra show ferrimagnetic state of six-line have the hyperfine field (H_f) values of 500 kOe for the tetrahedral sites and 510 kOe for the octahedral sites.