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ABSTRACTS

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HV-15. Investigation of thermal property of Co-Zn nanoparticles associated with plasma treatment for hyperthermia. *S. Lee*[1], S. Kim[1] and C. Kim[1] *1. Kookmin University, Seoul, Republic of Korea*

The $Co_xZn_{1-x}Fe_2O_4$ (x = 0.4, 0.6, 0.8) nanoparticles were prepared by high temperature thermal decomposition method [1]. The crystal structure was determined to be cubic spinel with space group *Fd-3m* and the lattice constant (a_0) of 8.34 Å from Rietveld refinement analysis. Based on the Scherrer equation, the average size of nanoparticles was obtained to be 10.2 nm. The magnetic properties were characterized using a vibrating sample magnetometer as well as Mössbauer spectroscopy. The saturation magnetization (M_s) and coercivity (H_c) of $Co_xZn_{1-x}Fe_2O_4$ (x = 0.4, 0.6, 0.8) samples were found to be M_s = 76.55, 77.44, 71.08 emu/g and H_c = 22.19, 18.46, 24.07 Oe, respectively. To characterize the thermal property of the samples, the nanoparticles were measured by magnetherm device at 112 kHz and 25 mT. The Initial curve of self-heating temperature of $Co_xZn_{1-x}Fe_2O_4$ (x = 0.4, 0.6, 0.8) samples determined to be the highest temperature measured in $Co_{0.6}Zn_{0.4}Fe_2O_4$ nanoparticles [2]. Since $Co_{0.6}Zn_{0.4}Fe_2O_4$ nanoparticles has high magnetic and thermal properties, this sample was treated argon plasma and compared with untreated sample [3]. There is no change in the XRD patterns, but we observed increasing the saturation magnetization and self-heating temperature. After plasma treatment sample was investigated using Mössbauer spectroscopy at room temperature. Our study suggest that the plasma treatment affects the magnetic properties of nanoparticles with enhanced self-heating temperature for hyperthermia application.

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