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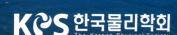
Program and Abstracts

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Spin

Studies of magnetic properties of Zn-doped Y-type haxaferrite

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Ba₂Zn_xCo_{2-x}Fe₁₂O₂₂ samples were prepared by solid state reaction method. The crystallographic and magnetic properties of the prepared compounds were investigated by x-ray diffractometer (XRD), vibrating sample magnetometer (VSM), and Mössbauer spectroscopy. Base on x-ray diffraction measurements, the crystal structures were found to be hexagonal with space group *R3-m*. The lattice constants of Ba₂Zn_xCo_{2-x}Fe₁₂O₂₂ samples were $a_0 = 5.8738$ and $c_0 = 43.5808$ Å for x=1, $a_0 = 5.8638$ and $c_0 = 43.5259$ Å for x=0. The X-ray density (ρ_D) of Ba₂Zn_xCo_{2-x}Fe₁₂O₂₂ samples were $3.2741 \times 10^{24} \text{ g/cm}^3$ (x=1) and $3.2744 \times 10^{24} \text{ g/cm}^3$ (x=0), respectively. The saturation magnetization (M_S) and coercivity (H_C) of the Ba₂ZnCoFe₁₂O₂₂ at 295 K were found to be $M_S = 42.7$ emu/g and $H_C = 129$ Oe, respectively, while M_S and H_C of the $Ba_2Co_2Fe_{12}O_{22}$ at 295 K were found to be $M_{\rm S}=29.7$ emu/g and $H_{\rm C}=209$ Oe. The permeability of the Ba₂ZnCoFe₁₂O₂₂ was 1.307 for 18.7 Oe and reached the maximum value of 1.613. The temperature dependent magnetization measurement between 4.2 and 740 K showed that the magneitic properties of Ba₂ZnCoFe₁₂O₂₂ changed to paramagnetic from ferrimagnetic around 473 K and that of non-doped (x=0) sample changed to paramagnetic from ferrimagnetic around 597 K. We found that transition temperature (T_C) of Ba₂ZnCoFe₁₂O₂₂ was about 130 K, which is lower than the non-doped (x=0) sample. Moreover, we have observed that magnetic structure of Zn-doped (x=1) sample changes to helimagnetic from ferrimagnetic around 128 K as expected. The magnetic susceptibility followed a Curie-Weiss law with a positive θ_{CW} of 518 K, showing ferrimagnetic behaviors. We have also obtained Mössbauer spectra of Ba₂Zn_xCo_{2-x}Fe₁₂O₂₂ from 4.2 to 700 K. At 295 K, average value of isomer shift of the Ba₂ZnCoFe₁₂O₂₂ was 0.159 mm/s, indicating the Fe³⁺ valence state.