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Investigation of $Ba_2Me_2Fe_{12}O_{22}$ (M = Co, Zn) Hexaferrite Based on External Magnetic Field Mössbauer Spectroscopy

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Polycrystalline $Ba_2Me_2Fe_{12}O_{22}$ (Me = Co, Zn) samples were prepared by using a solid-state reaction method. The crystal structures of samples were determined to be rhombohedral with space group (*R-3m*). Based on the magnetic hysteresis curves up to 10 kOe at 4.2 K, we found the saturation magnetization (M_s) of $Ba_2Me_2Fe_{12}O_{22}$ (Me = Co, Zn) samples to be M_s = 33.2, and 68.6 emu/g, respectively. From the zero-field-cooled (ZFC) magnetization curves under 100 Oe between at temperatures 4.2 K and 740 K, the Curie temperature (T_C) was found to be decrease with increasing Zn contents. Zero-field Mössbauer spectra of the samples were taken at various temperatures ranging from 4.2 to 750 K. The isomer shift values of samples showed that the charge states were Fe^{3+} high spin. From the Mössbauer spectra taken at 4.2 K with external field ranging from 0 to 50 kOe, the canting angles between the external field and the hyperfine field of samples containing Co and Zn were φ = 34 and 17°, respectively.

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