

Mössbauer Studies of $\text{Ba}_3\text{Zn}_2\text{Fe}_{24}\text{O}_{41}$ Z-type Hexaferrite

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A $\text{Ba}_3\text{Zn}_2\text{Fe}_{24}\text{O}_{41}$ polycrystalline sample of Zn doped Z-type hexaferrite was prepared by using solid-state reaction method. From the XRD pattern, analyzed by using the Rietveld refinement method at 295 K, the samples were found to be single-phased, and the crystal structure of sample was determined to be hexagonal with space group $P6_3/mmc$. From the magnetic hysteresis curves at 295 K, the saturation magnetization (M_s) and coercivity (H_c) of sample were $M_s = 58.70$ emu/g and $H_c = 69.58$ Oe, respectively, and the samples showed ferrimagnetic behavior. From the temperature dependence of the zero-field-cooled magnetization curves under a magnetic field of 100 Oe at temperatures between 300 and 800 K, the spin transition from planar order to uniaxial order was observed around 400 K, and the Curie temperature (T_C) was found to be 643 K. Mössbauer spectra of sample were also taken and analyzed at various temperatures ranging from 4.2 to 295 K. The relative areas obtained from the Mössbauer spectra suggest that the Zn ions preferentially occupy the tetrahedral sublattices.

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