

Neutron Diffraction and Magnetic Properties of $\text{Ba}_2\text{Co}_2\text{Fe}_{12}\text{O}_{22}$: Co_2Y

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Polycrystalline Y-type barium cobalt ferrite ($\text{Ba}_2\text{Co}_2\text{Fe}_{12}\text{O}_{22}$; Co_2Y) was synthesized using by the conventional ceramic method. At temperatures below 260 K, the crystal structure of Co_2Y was determined to be hexagonal with the space group $R\bar{3}m$. It showed a soft ferrimagnetic behavior with $H_c = 113$ Oe at 297 K and the Néel temperature (T_N) was determined to be 615 K. Most of the super-lattice peaks of Co_2Y coming from the spin structure decreased with increasing temperature. However, the super-lattice peak at 21.8° increased with increasing temperature at temperatures above 200 K. In addition, we observed a change in the slope of the zero-field cooled magnetization under a low field of 0.01 T at 215 K due to a magnetic structure transition from a helical to a ferrimagnetic spin structure.

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