

The Effect of Manganese Substituted *M*-type Hexagonal Ba-ferrite

In Kyu Lee¹, Jung Chul Sur², In-Bo Shim¹, and Chul Sung Kim^{1*}

¹Department of Physics, Kookmin University, Seoul 136-702, Korea

²Department of Microelectronics and Display Technology, Wonkwang University, Iksan 570-749, Korea

(Received 15 January 2009, Received in final form 3 April 2009, Accepted 8 April 2009)

The Mn-substituted *M*-type Ba-ferrite ($\text{BaFe}_{12-x}\text{Mn}_x\text{O}_{19}$; $x = 0, 2, 4, 6$) powders were prepared by the HTTD (High Temperature Thermal Decomposition) method. The effect of Mn^{3+} Jahn-Teller ions on the magnetic properties has been studied by x-ray diffraction, vibrating sample magnetometry, and Mössbauer spectroscopy. With increasing Mn substitution, the lattice parameter a_0 increases while c_0 decreases. The magnetocrystalline anisotropy constants (K_1) were determined as 2.9, 2.2, 1.8, and, 1.3×10^6 erg/cm³ for $x = 0, 2, 4,$ and $6,$ respectively, by the LAS method. We have studied the change of cation distribution by Mössbauer spectroscopy which is closely related to K_1 .

Keywords : Ba-ferrite, Mössbauer spectra, magnetocrystalline anisotropy, cation distribution