

The Migration Path of Co Ions in Co-Substituted Spinel Ferrite Thin Films during Magnetic Annealing

Jong-Gab NA, Taek-Dong LEE, Eng-Chan KIM¹, Chul-Sung KIM² and Soon-Ja PARK³

Korea Institute of Science and Technology, Sungbuk, Seoul 136-791, Korea

¹*Yonsei University, Seodaemun, Seoul 120-749, Korea*

²*Kookmin University, Sungbuk, Seoul 136-702, Korea*

³*Seoul National University, Kwanak, Seoul 151-742, Korea*

(Received February 22, 1992; accepted for publication October 17, 1992)

The migration path of Co ions in Co-substituted spinel ferrite thin films is investigated in detail during magnetic annealing. To this end, changes in the saturation magnetization were measured as a function of magnetic annealing time at various temperatures. Changes in Mössbauer spectra were also taken. The ferrite thin films were prepared by a reactive sputtering method. For Co-substituted ferrite thin films annealed at various temperatures, peaks were observed in the plots of the saturation magnetization vs annealing time, whilst the saturation magnetization remained nearly constant for Co-free ferrite thin films during magnetic annealing. From a subsequent Mössbauer spectroscopic investigation, it was confirmed that the peaks in the saturation magnetization-annealing time curves for Co-substituted ferrite thin films are originated from cation redistribution, i.e., the migration of Fe ions on tetrahedral sites (A sites) to octahedral sites (B sites) and Co ions on the B sites to the A sites.

KEYWORDS: Co-substituted ferrite thin film, reactive sputtering, magnetic annealing, migration path of Co ion, Mössbauer spectrum