Journal of Magnetics 17(2), 78-82 (2012) http://dx.doi.org/10.4283/JMAG.2012.17.2.078

Possibility of Magnetocapacitor for Multilayered Thin Films

Jong Soo Hong, Sung Wook Yoon, Chul Sung Kim, and In-Bo Shim*

Department of Nano and Electronic Physics, Kookmin University, Seoul 136-702, Korea

(Received 16 January 2012, Received in final form 20 January 2012, Accepted 21 January 2012)

CoNiFe(CNF)/$BaTiO_3$(BTO)/CoNiFe(CNF) multilayered thin films were deposited on Pt/Ti/SiO_2/Si substrates by using pulsed laser deposition (PLD) system. We fabricated three different thin films of BTO, BTO/CNF and CNF/BTO/CNF for magneto-capacitor and studied their crystalline structure, surface and interface morphology, and magnetic and electrical properties. When three different structures of multilayered thin film were compared, magnetization of CNF/BTO/CNF thin films was decreased by magnetic and dielectric interaction. Also we confirmed that capacitance of CNF/BTO/CNF multilayered thin film was enhanced as being near tetragonal structure with increasing of c/a ratio because of atomic bonding at interface between BTO dielectric and CNF magnetic materials. Finally, we studied the change of the capacitance of CNF/BTO/CNF multilayered thin film with magnetic field for emergence of magnetocapacitance and suggested a possibility of enhanced capacitance.

Keywords : magnetocapacitance, multilayer thin film, pulsed laser deposition, interface effect