Dielectric properties of bismuth magnesium niobate thin films deposited by sputtering using two main phase target in the system

Jun-ku Ahn, Hae-won Kim and Soon-Gil Yoon
School of Nano Science and Technology, Chungnam National University, Daejeon, 305-764, Korea

Abstract: B$_2$Mg$_{23}$Nb$_{59}$O$_{97}$ (B$_2$MN) thin films and Bi$_{33}$Mg$_{33}$Nb$_{33}$O$_{97}$ (B$_{13}$MN) thin films were deposited as a function of various deposition temperatures on Pt/TiO$_2$/SiO$_2$/Si substrates by radio frequency magnetron sputtering system. Both of their thin films are shown to crystalline phase at 500$^\circ$C, deposition temperature, using 100W RF power. The composition of them and structural micro properties are investigated by RBS spectrum and SEM, AFM. 200 nm-thick B$_2$MN thin films were deposited at room temperature had capacitance density of 151nF/cm$^2$ at 100kHz, dissipation factor of 0.003 and had capacitance density of 584nF/cm$^2$ at 100kHz, dissipation factor of 0.0045 at 500$^\circ$C deposition temperature. Both of their dielectric constant deposited at room temperature and at 500$^\circ$C were each approximately 40 and 100.

Key Words: Embedded capacitor, sputtering system, dielectrics, crystalline structure.