

Preparation and Characterization of MFIS Using PT/BFO/HfO₂/Si Structures

KIM Kwi-junga, JEONG Shin-Woo, HAN Hui-Seong, HAN Dae-hee, JEON Ho-Seung,
IM Jong-Hyun, PARK Byung-Eun

Department of Electrical and Computer Engineering, University of Seoul,
90 Jennong-dong, Dongdaemoon-gu, Seoul 130-743 KOREA

pbe@uos.ac.kr

Abstract : Recently, multiferroics have attracted much attention due to their numerous potentials. In this work, we attempted to utilize the multiferroics as an alternative material for ferroelectrics. Ferroelectric materials have been studied to ferroelectric random access memories, however, some inevitable problems prevent it from implementation. multiferroics shows a ferroelectricity and has low process temperature BiFeO₃(BFO) films have good ferroelectric properties but poor leakage characterization. Thus we tried, in this work, to adopt HfO₂ insulating layer for metal-ferroelectric-insulator-semiconductor(MFMIS) structure to suppress to leakage current. BiFeO₃(BFO) thin films were fabricated by using a sol-gel method on HfO₂/Si structure. Ferroelectric BFO films on a p-type Si(100)wafer with a HfO₂ buffer layer have been fabricated to form a metal-ferroelectric-insulator-semiconductor (MFIS) structure. The HfO₂ insulator were deposited by using a sol-gel method. Then, they were carried out a rapid thermal annealing(RTA) furnace at 750 °C for 10 min in N₂. BFO films on the HfO₂/Si structures were deposited by sol-gel method and they were crystallized rapid thermal annealing in N₂ atmosphere at 550 °C for 5 min. They were characterized by atomic force microscopy(AFM) and Capacitance-voltage(C-V) curve.

Key Words : BiFeO₃, HfO₂, MFIS