

Leakage Current Behavior of PZT Ferroelectric Thin Films on Annealed LaNiO₃ Bottom Electrodes

Heesan Kim*, Jai-Hyun Kim, and Woong Kil Choo

Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology, 373-1 Guseong-Dong, Yuseong-Gu, Daejeon, Republic of Korea

*Corresponding author: e-mail: Heesan@kaist.ac.kr, Phone: +82 42 869 4253, Fax: +82 42 869 4273

The leakage current control of Pb(Zr_{0.35}Ti_{0.65})O₃ (PZT) thin films is very important for industrial application. For this reason, there have been intensive studies of the conductivity of PZT thin films during last several years^[1,2]. In this study, we have focused our attention on the leakage current problems of PZT films on annealed LaNiO₃ (LNO) bottom electrode.

PZT thin films on LaNiO₃ (LNO) bottom electrode which was annealed at different temperature and time were synthesized by spin coating the alkoxide solution precursor. LNO thin films were prepared by reactive RF magnetron sputtering on the SiO₂/Si (100) substrate. Instead of the oxide target, La metal chips on a 3-inch Ni metal target were used. LNO films were annealed using the rapid thermal annealing (RTA) at 600 °C for 1 min ~ 30 min. X-ray diffraction study of LNO films was conducted. Cross sectional scanning electron microscopy (SEM) revealed that the microstructure changed from the granular structure to columnar structure.

The leakage current behavior of PZT thin films was measured for different annealing conditions. The leakage current densities decreased as the annealing time was increased. However, annealing for 10min using RTA led to the current density increase again. Also, the electrical properties of LNO oxide electrodes were improved by annealing.

References

- [1] M. S. Chen, J. M. Wu, and T. B. Wu; Jpn. J. Appl. Phys. 34 (1995) 4870.
- [2] Rasmi R., and A.S. Bhalla; J. Appl. Phys. 92 (2002) 6160.