RF Magnetron Sputtered Conducting $La_{1/2}Sr_{1/2}CoO_3$ Electrode on $PbZr_{0.4}Ti_{0.6}O_3$ Thin Film

Jai-Hyun Kim[1*], Hyoun Soo Kim[1], Woong Kil Choo[1], Bong Jin Kuh[2], Ki Vin Im[2] and Soon Ho Park[2]

[1] Department of Material Science and Engineering, Korea Advanced Institute of Science and Technology, 373-1 Gusong-Dong, Yusong-Gu, Taejon, Korea,

[2] Process Development Team, Semiconductor R&D Center, Samsung electronics Company, San No. 24, Nongseo-Lee, Kiheung-Eup, Yongin-Si, Kyungki-Do, Korea

*Corresponding author: e-mail: s_k2@kaist.ac.kr, Phone: +82 42 869 4253, Fax: +82 42 869 4273

The best possible ferroelectrics which are used in non-volatile memory application may be either PZT or strontium bismuth tantalate ($SrBi_2Ta_2O_9$ or SBT).[1] In this study, we have investigated the ferroelectric and electrical properties of PZT 40/60 films grown on $La_{1/2}Sr_{1/2}CoO_3$ electrodes. Especially, the effect of the sputtered bottom LSCO electrode on the crystallographic orientation of the upper PZT ferroelectric films and the electrical properties or the cpapcitors will be described.

Bottom LSCO electrode films were deposited on the SiO_2/Si substrate by dc magnetron sputtering method. 150nm-200nm thin PZT 40/60 interlayer films were synthesized by spin coating of alkoxide sol-gel solutions.[2]

Conductive LSCO thin films can be obtained at relatively low temperature (at 450 °C) by magnetron sputtering of ceramic LSCO targets. From the XRD measurement, the electrode is shown to be in (100) film orienntation.

With increasing the deposition temperature, however, the crystallographic orientation of PZT films changes from the (100) to a random orientation. From the I-V measurement, the leakeage current is lowered with the deposition temperature while the polarization and fatigue shows only a small change. On annealing of PZT on LSCO, the leakage current beneficially goes down with annealing temperature below 650°C.

To investigate the LSCO top electrode effect, top LSCO electrodes have been deposited at RT and then annealed. A proper combination of adjusting the annealing temperature and time can reduce the resistivity of LSCO.

References

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