

## Characteristics of resistance change of $\text{Pr}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ film with $\text{SrRuO}_3$ buffer layer

Sanghyun Joo<sup>1</sup>, Jooyoun Kim<sup>2</sup>, Eunjip Choi<sup>2</sup>, Wansik Hong<sup>1</sup>,  
Kyoungwan Park<sup>1</sup> and Junghyun Sok<sup>1</sup>

<sup>1</sup>Department of Nano Science and Technology, University of Seoul, Seoul 130-743, Korea

<sup>2</sup>Department of Physics, University of Seoul, Seoul 130-743, Korea

The resistance change behavior of a perovskite material has been studied. Particularly,  $\text{Pr}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ (PCMO) film is candidate material for the active material in nonvolatile memory device. The resistance change of PCMO film with  $\text{SrRuO}_3$ (SRO) buffer layer deposited by using rf-magnetron sputtering system was investigated at room-temperature. The ratio of the resistance change of the PCMO film with SRO buffer layer in the high-resistance state to that in the low-resistance state turned out to be much larger than that of the PCMO film without SRO buffer layer. The ER ratio(defined as the ratio of  $\Delta R/R = (R_{\text{high}} - R_{\text{low}})/R_{\text{low}}$ ) of PCMO film with the buffer layer is over  $3 \times 10^5\%$  at maximum. Moreover, the reproducible property of the fabricated samples was improved. It is thought that the SRO buffer layer seems to serve as a good barrier for the degradation of oxygen contents and defects in the PCMO film, at the interfacial layer between PCMO and electrode. When post-annealing in  $\text{O}_2$  atmosphere for 2 hours after depositing SRO/PCMO/SRO, ER ratio showed improvement. In addition, having changed the electrode from Ag to Au, it was shown that not only resistance change was improved, but also I-V characteristics turned symmetric.

The reproducibility and nonvolatile property of the fabricated samples were not so good. But PCMO film with SRO buffer layer still have the possibility of the candidate for the active material in nonvolatile memory device.