Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Ionic-bombardment, an effective way to create memory effect on undoped SrTiO3 YONG SEUNG KIM, HEIKO GROSS, NAMRATA BANSAL, CARLOS CHAPARRO, SEONGSHIK OH, Rutgers Univ. — Here we present bistable switching behaviors in undoped SrTiO3 single crystals treated by thermal annealing and Ar-ion-beam bombardment. So far, there have not been any reports of memory effect at a macroscopic scale for SrTiO3 having no cation dopants. We observed memory effects in both thermally annealed and ion-beam bombarded samples. However, the ion-beam bombarding provided significant better switching behaviors than the thermal annealing. We propose that this difference between the annealed and the ion-beam-bombarded sample in their switching performance is related to the concentration of oxygen vacancy clusters. Clustered vacancies are much less mobile than a single vacancy, and thus not an effective player for the switching event. Thermal annealing produces more clustered vacancies than ion-beam-bombardment. Creating vacancies while minimizing the clustering rate must be the key to a viable resistive memory device. We show that ionic bombardment is an effective method for such devices.

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Date submitted: 20 Nov 2009 Electronic form version 1.4