Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Diffusion with traps as the mechanism behind the retentivity relaxation of the resistive state on bipolar RRAM devices ALEJANDRO SCHULMAN, University of Buenos Aires and IFIBA (Conicet), MARCELO J. ROZENBERG, Laboratoire de Physique des Solides, UMR8502 Université Paris-Sud, Orsay, France, CARLOS ACHA, University of Buenos Aires and IFIBA (Conicet) — The relaxation of the remnant resistance state obtained immediately after the electric-pulse switching process on metal/complex oxide interfaces [(Au, Pt) / (YBCO, LSMO)] has been studied. We have found that resistance relaxes following a stretched exponential law, with a temperature and applied switching power independent exponent. More interesting and unlike ordinary thermal diffusion processes, we observe that the characteristic relaxation time increases with increasing temperature and applied power. This anomalous dependence of the characteristic time gave us the opportunity to find an interesting physic process related to the oxygen diffusion on complex oxides, like superconducting cuprates or colossal magnetoresistant manganites: We argue that the observed behavior, common for both complex oxide interfaces, points to a generic phenomenon that can be understood as due to the diffusion of oxygen ions (or oxygen vacancies) moving on a 2D surface (grain boundaries) with a temperature dependent density of trapping centers.

Carlos Acha
University of Buenos Aires and IFIBA (Conicet)

Date submitted: 28 Dec 2012 Electronic form version 1.4