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Determination of Non-Accumulative Effects in PCMO Resistive Switches STEPHEN TSUI, NILANJAN DAS, Y.Q. WANG, Y.Y. XUE, Texas Center for Superconductivity at the University of Houston, C.W. CHU, Hong Kong University of Science and Technology, Texas Center for Superconductivity at the University of Houston, Lawrence Berkeley National Laboratory — In recent years, the observation of electric field induced resistive switching occurring at the interface between a Ag electrode and $Pr_{0.7}Ca_{0.3}MnO_3$ (PCMO) thin film has stirred a great deal of activity. The controllable switching, depending on the applied voltage polarity, associated with this and other perovskite oxide systems may very well be a means to develop new nonvolatile memory devices. However, a consensus has not yet been reached on the origins of the physical mechanism, be it lattice rearrangement, electromigration, charge trapping, or carrier doping. An important issue is whether the switching behaves in an accumulative fashion, e.g. driven by a change in oxygen stoichiometry through ion-migration. We explore the situation through transport properties, switching characters and the size dependence of the switching area. Our results indicate that a large scale accumulation driven mechanism is not likely for the switching and that a local structural rearrangement may be a more reasonable physical process.

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