Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Interfacial engineering and mechanism of metal oxide memristive switching HONGWU ZHAO, ZHAOLIANG LIAO, ZIYU LIU, YANG MENG, DONGMIN CHEN, Institute of Physics, Chinese Academy of Sciences — Resistance switching in metal oxides has drawn growing interest because of its potential applications in high performance nonvolatile resistance random access memory devices. Resistive switching characteristics of a Pr0.7Ca0.3MnO3 (PCMO) film sandwiched between a Pt bottom electrode and top electrodes (TE) made of various metals are found to belong to two categories. Devices with TE made of Al, Ti, and Ta exhibit a large I-V hysteresis loop and bipolar RS, but those with TE made of Pt, Ag, Au, and Cu do not. Transmission electron microscopy reveals that a thin metal-oxide layer formed at the interface between the former group of TE and PCMO, but not for the latter group of TE. Analysis shows that the categorization depends on the Gibbs free energy of oxidation of the TEs with respect to that of PCMO. As an effort to investigate the interfacial layer and its effect on the resistance switching, the thin Ta films with difference thickness were inserted between the PCMO and Au electrodes, and the I-V characteristics will be presented.

Hongwu Zhao
Institute of Physics, Chinese Academy of Sciences

Date submitted: 01 Dec 2009 Electronic form version 1.4