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Memristive behavior in $BaTiO_3$ thin films integrated with semiconductors SRINIVASA RAO SINGAMANENI, NORTH CAROLINA STATE UNIVERSITY, JOHN PRATER, Army Research Office, JAY NARAYAN, NORTH CAROLINA STATE UNIVERSITY — $BaTiO_3$ has been studied for emerging non-volatile memory applications. However, most of the previous work has focused on this material when it was deposited on insulting oxide substrates such as $SrTiO_3$. Unfortunately, this substrate is not suitable for CMOS-based microelectronics applications. This motivated us to carry out the present work. We have studied the resistive switching behavior in $BaTiO_3/La_{0.7}Sr_{0.3}MnO_3$ (BTO/LSMO) heterostructures integrated with Si (100) using pulsed laser deposition[1,2]. I-V measurements were conducted on BTO (500nm)/LSMO (25nm) devices at 200K, with the compliance current of 10mA. Here, Pt was used as a top electrode and LSMO served as bottom electrode. A few important observations are noted: (a) broad hysteresis in forward and reverse voltage sweeps –ideal for memory applications, (b) the ratio of high resistance to low resistance state is ˜600 –important for switching devices, (c) the device is stable at least up to 50 cycles. However, we found that hysteretic behavior was collapsed after 36 cycles upon oxygen annealing of the device at 1 atmospheric pressure, 200^o C for 1 hour, inferring the important role of oxygen vacancies in the resistive switching behavior of BTO/LSMO device. The comprehensive experimental data will be presented and discussed.[1,2]S.R.S, *et al.,* J. Appl. Phys., **116**, 094103 (2014); J. Appl. Phys., **116**, 224104 (2014).

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