Abstract Submitted
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Investigation of local and integral polarization switching behavior of ultrathin HfO_{2-}based films[1] PRATYUSH BURAGOHAIN, OHHEUM BAK, Department of Physics and Astronomy, Univ of Nebraska - Lincoln, Lincoln NE 68588-0299, USA, ANNA CHERNIKOVA, ANDREI ZENKEVICH, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow Region 141700, Russia, UWE SCHROEDER, TERENCE MITTMAN, FRANZ FENGLER, NaMLab gGmbH, Noethnitzer Str. 64, 01187 Dresden, Germany, HAIDONG LU, ALEXEI GRUVERMAN, Department of Physics and Astronomy, Univ of Nebraska - Lincoln, Lincoln NE 68588-0299, USA — The discovery of ferroelectricity in hafnium oxide (HfO_2) based thin films represents an important step forward in ferroelectric based memory devices as they have several advantages over conventional perovskite based ferroelectrics like easy integration with existing Silicon technology, ease of fabrication and large band gap. Here, we report Piezoresponse Force Microscopy (PFM) investigation of the ferroelectric switching behavior in ultrathin $Hf_{0.5}Zr_{0.5}O_2$ (HZO) structures with the HZO thickness range from 30 nm down to 3 nm and sub-m lateral dimensions. A 'Positive Up Negative Down' (PUND) technique was used to investigate the switching dynamics down on a 10-ns time scale. We also measured the electroresistance effect and the R_{OFF}/R_{ON} was found to be in the range of up to 15. The obtained results make ultrathin HfO_2-based films an attractive candidate for application in ferroelectric tunnel junctions as non-volatile, low-power memory devices.

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