Abstract Submitted
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Writing and Reading of Ultrathin Ferroelectric Domains on Commensurate $SrTiO_3$ on Silicon[1] JEREMY LEVY, CHENG CEN, CHARLES R. SLEASMAN, MAITRI WARUSAWITHANA, DARRELL G. SCHLOM — Ferroelectricity in ultrathin epitaxial $SrTiO_3$ grown commensurately by oxide-molecular beam epitaxy (MBE) on silicon substrates was investigated using piezoforce microscopy (PFM). A series of samples containing n molecular layers (ML) of $SrTiO_3$ (n = 3, 4, 5, 6, 8, 10, 20) was grown on silicon substrates. Room-temperature ferroelectricity was observed for samples containing n = 5, 6, 8, 10 ML. Temperature-dependent measurements indicate that the sample with $n = 5$ exhibits a ferroelectric phase transition at T_c ∼317 K. Sample with $n = 6$ remains ferroelectric up to at least 393K. Polar domains created on the $n = 6$ was found to be stable at room temperature for more than 72 hours. The implications of these results for fundamental and device-related applications will be discussed briefly.

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