

Supplementary material

to

Hysteresis-free piezoresponse in thermally strained ferroelectric barium titanate films

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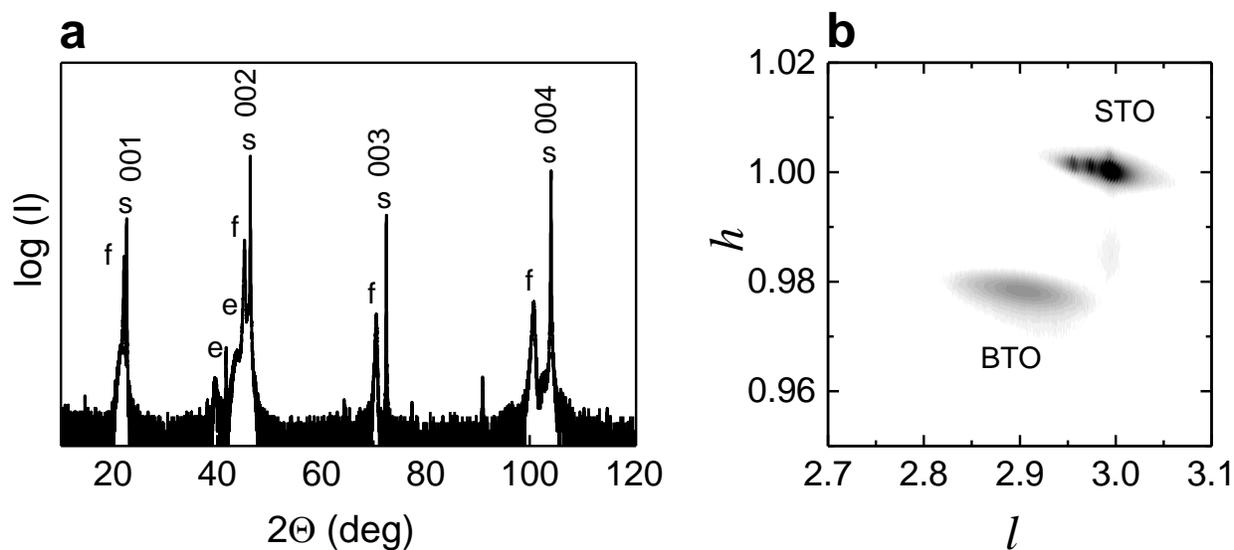


Figure S1. X-ray diffraction analysis. (a) Θ - 2Θ scan. Peaks are indexed in terms of perovskite cell and marked by s, f, and e for the substrate, BTO film, and electrodes, correspondingly. (b) Reciprocal space map around (103) reciprocal lattice point. Indices are expressed in reciprocal lattice units of STO.

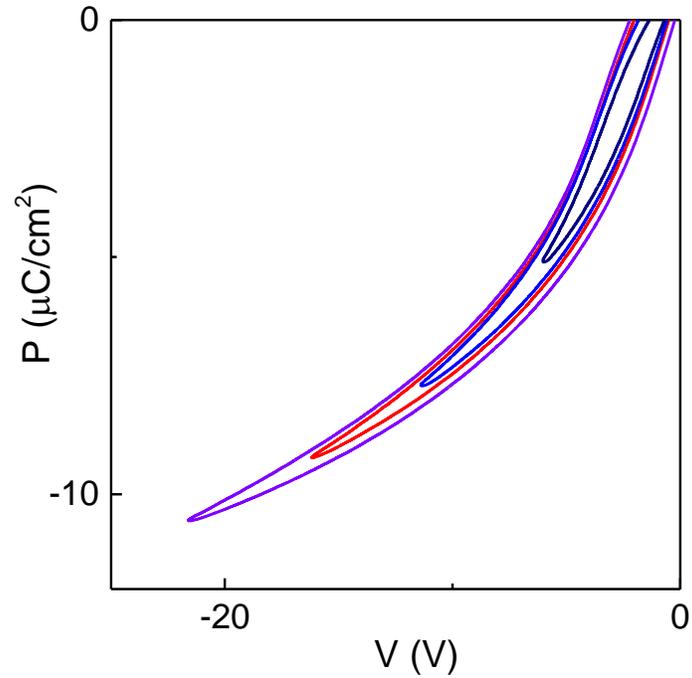


Figure S2. Detailed fraction of the dynamic (P-V) loops at 1 kHz for different V_{MAX} .

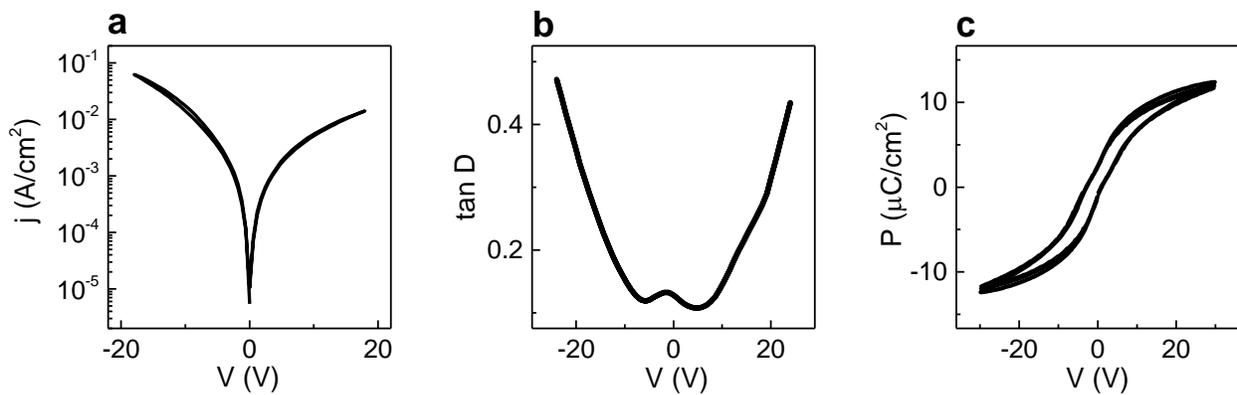


Figure S3. (a) Density of leakage current and (b) loss factor $\tan D$ as a function of applied dc voltage in the BTO capacitor. (c) Dynamic polarization-voltage loops measured at frequencies 100 Hz, 500 Hz, and 1 kHz.