Abstract Submitted
for the NES17 Meeting of
The American Physical Society

Nanoscale Cross Sectional Mapping of Ferroelectric Domains ZACHARY THATCHER, University of Connecticut — Atomic Force Microscopy is typically employed for mapping the topography or properties of surfaces. In this work, cross sectional AFM is achieved to map functional properties through the depth of epitaxial and polycrystalline piezoelectric thin films. Direct DC biasing between a conducting probe and back electrode can orient local ferroelectric domains within these films. Subsequent or simultaneous imaging in Piezo Force Microscopy mode (PFM) then allows nanoscale mapping or dynamics of the domain distributions, respectively. Accordingly, both built-in as well as tip-induced domain patterns are recorded as a function of depth as well as film microstructure. This work literally provides a new perspective for ferroelectric switching processes and the influence of grain orientations on piezoelectricity.

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Date submitted: 29 Mar 2017 Electronic form version 1.4