

Supplementary Materials

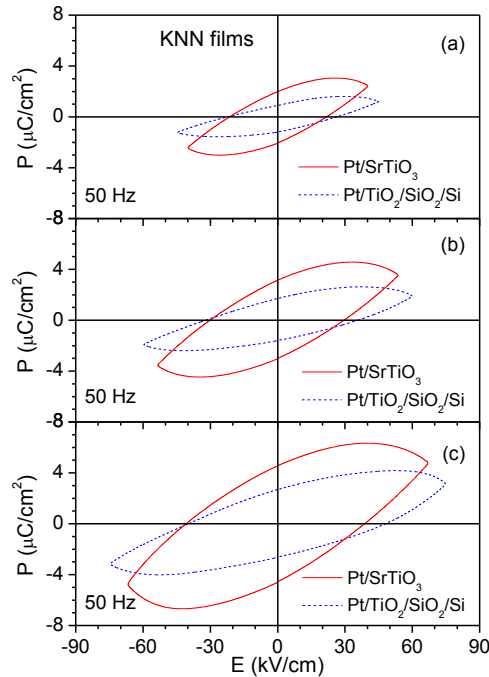


Figure S1. Polarization (P)-electric field (E) loops of KNN films deposited on Pt/SrTiO₃ (solid line) and Pt/TiO₂/SiO₂/Si substrates (dash line) measured at room temperature and 50 Hz under electric field up to 45 (a), 60 (b) and 75 kV/cm (c).

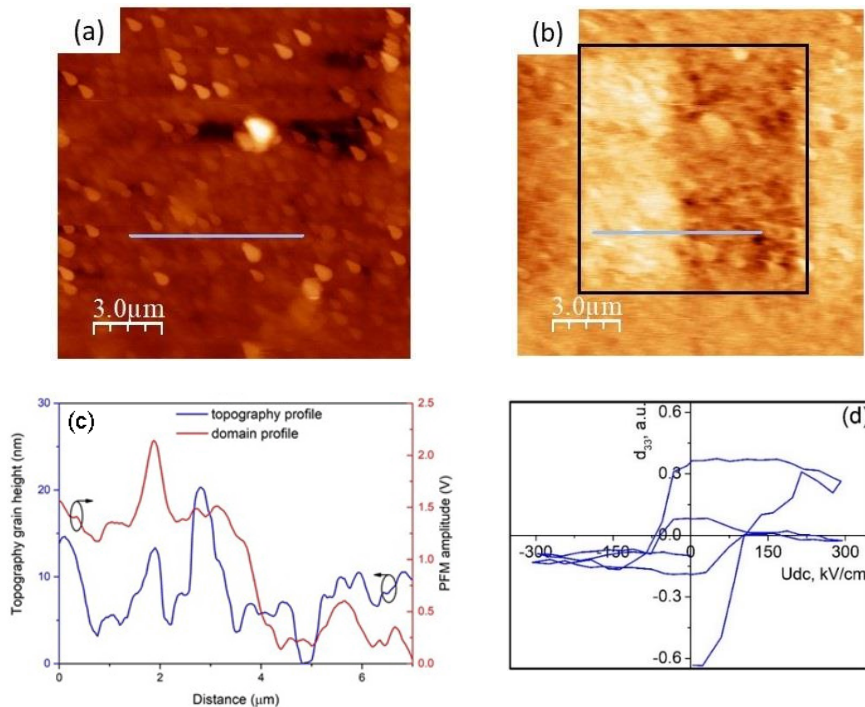


Figure S2. Topography (a), out-of-plane PFM signal (b), cross-section profile of topography and PFM amplitude (c) and local piezoelectric hysteresis loops (d) of KNN thin films deposited on Pt/SrTiO₃ substrates. No out-of-plane piezoresponse could be obtained for KNN films on Pt/TiO₂/SiO₂/Si substrates.

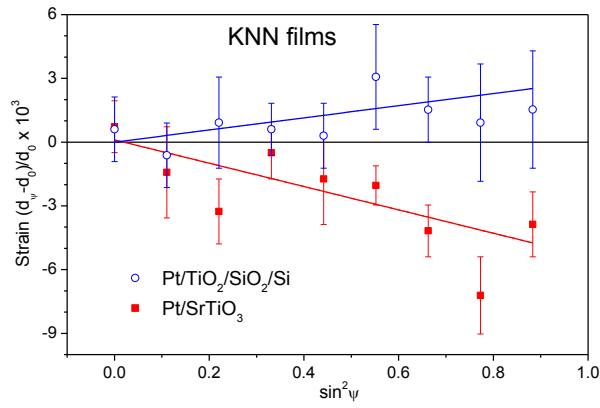


Figure S3. Strain $(d_\psi - d_0)/d_0$ of KNN films on Pt/TiO₂/SiO₂/Si (open circles) and Pt/SrTiO₃ substrates (solid squares) as a function of $\sin^2 \psi$ together with linear fits used for stress calculations at room temperature.



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