Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Ultra-low coercive field of improper ferroelectric $Ca_3Ti_2O_7$ epitaxial thin films. JUNMING LIU, XIANG LI, LIN LIN, Nanjing Univ, SANG-WOOK CHEONG, Rutgers University — Hybrid improper ferroelectrics have their electric polarization generated by two or more combined non-ferroelectric structural distortions such as the rotation and tilting of Ti-O octahedral in $Ca_3Ti_2O_7$ (CTO) family. In this work, we prepare the high quality (010)-oriented CTO thin films on (110) $SrTiO_3$ (STO) substrates using pulsed laser deposition. The well epitaxial growth of the CTO thin films on the substrates with the interfacial epitaxial relationship of [001]CTO//[001]STO and [100]CTO//[-110]STO is revealed. The in-plane ferroelectric hysteresis unveils an ultralow coercive field lower than ˜5 kV/cm even at low temperature, nearly two orders of magnitude lower than that of bulk CTO single crystals. The huge differences between the epitaxial thin films and bulk crystals is most likely due to the lattice imperfections in the thin films rather than substrate induced lattice strains, suggesting high sensitivity of the ferroelectric properties to lattice defects.

Junming Liu
Nanjing Univ

Date submitted: 10 Nov 2016 Electronic form version 1.4