

Abstract Submitted
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Polarization Domain Switching of Improper Hybrid Ferroelectric (Ca,Sr)₃Ti₂O₇ Crystals¹ SEONG JOON LIM, BIN GAO, JAEWOOK KIM, FEI-TING HUANG, SANG-WOOK CHEONG, Rutgers Center for Emergent Materials, Rutgers University, Piscataway, New Jersey, 08854, RCEM TEAM — The observation of switchable polarization loops at room temperature in (Ca,Sr)₃Ti₂O₇, induced by improper hybrid ferroelectricity, has drawn much attention. Since the ferroelectric polarization directly couples with structural distortions (oxygen octahedral tilting and rotation) in hybrid improper ferroelectrics, the energy barrier for polarization switching is predicted to be large, and the observation of ferroelectric polarization loops was a surprise. Furthermore, the observed complexity of the domain wall configuration in (Ca,Sr)₃Ti₂O₇ may complicate the domain wall motion or the domain nucleation for polarization switching. Thus, it is imperative to understand the mechanism and dynamics of polarization domain switching. Particularly, it has to be clarified if polarization switching occurs through 90° or 180° switching. Comparing piezoresponse force microscope and polarized optical microscope images before and after applying electric fields consecutively, we explored the mechanism and dynamics of polarization domain switching.

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