

# Inhomogeneous distribution of the fatigue in lead zirconate titanate ceramics

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Polarization and strain as a function of electric field have been recorded for lead zirconate titanate ceramics fatigued under bipolar electrical loading. Using a checkered top electrode individual spots on the sample surface could be tested separately. The remarkable variation of switchable polarization and asymmetric strain demonstrates the inhomogeneous distribution of fatigue behavior within the samples. A microstructural characterization using optical microscopy and scanning electron microscopy was performed to clarify the microstructural source of the inhomogeneity. The origin of the electric fatigue is discussed and a tentative damage evolution scenario is suggested based on the observed microscopic and macroscopic local changes.