Long-range symmetry breaking in embedded ferroelectrics

The characteristic functionality of ferroelectric materials is due to the symmetry of their crystalline structure. As such, ferroelectrics lend themselves to design approaches that manipulate this structural symmetry by introducing extrinsic strain. Using in situ dark-field X-ray microscopy to map lattice distortions around deeply embedded domain walls and grain boundaries in BaTiO$_3$, we reveal that symmetry-breaking strain fields extend up to several micrometres from domain walls. As this exceeds the average domain width, no part of the material is elastically relaxed, and symmetry is universally broken. Such extrinsic strains are pivotal in defining the local properties and self-organization of embedded domain walls, and must be accounted for by emerging computational approaches to material design.
Scopus rating (2011): CiteScore 19.84 SJR 17.79 SNIP 7.876
Web of Science (2011): Impact factor 32.841
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 18.404 SNIP 7.654
Web of Science (2010): Impact factor 29.92
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 10.274 SNIP 5.685
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 6.911 SNIP 4.183
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 5.009 SNIP 3.713
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 3.868 SNIP 2.761
Web of Science (2002): Indexed yes
Original language: English
Electronic versions:
Untitled.pdf. Embargo ended: 25/12/2018
DOIs:
10.1038/s41563-018-0116-3
Source: FindIt
Source-ID: 2436088779
Research output: Research - peer-review › Journal article – Annual report year: 2018