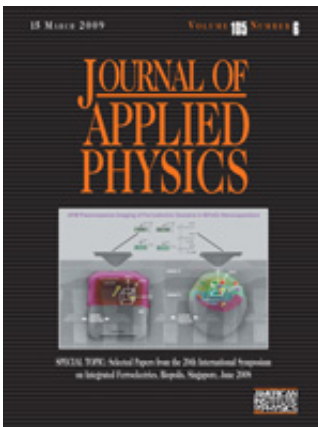


Highlight: Nanoscale piezoresponse of ferroelectric domains

October 20 2009



The first fundamental studies of the dependence of ferroelectric domain configuration and switching behavior on the shape of epitaxial BiFeO₃ (BFO) nanostructures has been reported by users from Northwestern University, Korea Advanced Institute of Science & Technology, and Argonne's Materials Science Division working collaboratively with CNM's Nanofabrication & Devices Group.

The nanostructures were produced by growing BFO films on SrRuO₃ (SRO) (001) oriented electrode layers on single-crystal SrTiO₃ (STO) (100) substrates. Shapes were fabricated using rf-magnetron sputtering deposition followed by focused ion-beam lithography.

Domain configuration was investigated using piezoelectric force microscopy, revealing that the square-shaped nanostructures have a single variant domain configuration, whereas the round-shaped nanostructures exhibit seven variants of domain configuration.

The results have implications for the development of nanocapacitors for gigabyte to terabyte nonvolatile ferroelectric memories.

More information: S. Hong, J. Klug, M. Park, A. Imre, M. Bedzyk, K. No, A. Petford-Long, and O. Auciello, *J. Appl. Phys.*, 105, 061619 2009

Provided by Argonne National Laboratory ([news](#) : [web](#))

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