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The effect of misfit strains on ferroelectric domain formation at the morphotropic phase boundary ZHEN LIU, Condensed Matter Science and Technology Institute, School of Science, Harbin Institute of Technology, Harbin 150080, China — In the morphotropic phase boundary region where tetragonal and rhombohedral phases coexist in the ferroelectric solid solution $PbZr^{1-x}Ti^{x}O^{x}$ (PZT), large strains can be induced at the interface due to the lattice misfit of the two structures. We show that for bulk PZT the misfit strains between tetragonal and rhombohedral phases can lead to an adaptive monoclinic structure in the morphotropic phase boundary (MPB) region, similar to the effects of misfit strains between a crystal and substrate in epitaxial ferroelectric thin films. We use Landau theory to sixth order in polarization to provide insight into factors controlling the occurrence of the monoclinic phase in the MPB region.

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