# POLAR PROPERTIES AND HYSTERESIS LOOPS IN MULTILAYERED THIN FILMS FERROELECTRIC/VIRTUAL FERROELECTRIC

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S u m m a r y

In the framework of Landau–Ginzburg–Devonshire (LGD) phenomenological theory, the influence of misfit strains, surface energy, and finite-size effects on phase diagrams, polar properties, and hysteresis loops has been calculated for multilayered thin films of the type ferroelectric/virtual ferroelectric. The influence of elastic deformations that arise at the interface thin film–substrate owing to a mismatch between the lattice constants in the film and the substrate on the phase diagrams of multilayered thin films virtual ferroelectric $SrTiO_3$/ferroelectric $BaTiO_3$ has been studied for the first time. In contrast to bulk $BaTiO_3$, in which only four phases (cubic, tetragonal, orthorhombic, and rhombohedral) can exist, it turned out that six thermodynamically stable $BaTiO_3$ phases (paraelectric phase and tetragonal (FEc), two monoclinic (FEaac and FEac), and two orthorhombic (FEa and FEaa) ferroelectric phases) can exist in multilayered $SrTiO_3$/$BaTiO_3$ films. The main polar properties of hysteresis loops (shape, coercive field, and spontaneous polarization) in thin multilayered $SrTiO_3$/$BaTiO_3$ films are calculated. It is shown that the system demonstrates a strong dependence of its polar properties on the thickness of $SrTiO_3$ and $BaTiO_3$ layers, as well as on the elastic misfit strains, with $SrTiO_3$ playing the role of dielectric layer: the thicker the layer, the stronger is the depolarization field, which, in its turn, reduces the spontaneous polarization in the $BaTiO_3$ film.