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【648】Tuning of the depolarization field, built-in voltage and nanodomain structure in ferroelectric thin films and heterostructures

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Deterministic control of the intrinsic polarisation state of ferroelectric thin films is essential for devises applications. Additionally to the now well-established role of electrostatic boundary condition and epitaxial strain, we show also the importance of Pb-O divacancy gradients. We report on the full control of the polarisation orientation of ferroelectric thin films through changes in the growth temperature and electrical boundary conditions. Using piezo-force microscopy, x-ray diffraction and transmission electron microscopy, we investigated PbTiO3 ultrathin films, PbTiO3/SrTiO3 superlattices and PbTiO3-SrTiO3 solid solution in thin film form, and showed how to fully control their intrinsic polarisation state by tuning the electrostatic boundary conditions and the divacancy dipole gradients.

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