

INFLUENCE OF A SURFACE STATE
AND SCREENING PHENOMENA
ON THE NUCLEATION AND GROWTH
OF ARTIFICIAL NANODOMAINS
IN FERROELECTRICS-SEMICONDUCTORS

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S u m m a r y

A review of recent theoretical studies of the effects of a surface state and the screening on the nucleation and growth of artificial nanodomains in ferroelectrics-semiconductors. The obtained results prove that the formation of nanodomains caused by the inhomogeneous electric field of a biased force microscope probe is a first-order phase transition, since the domains with finite radii appear at the critical voltage applied to the probe. The critical voltage depends on the probe geometry, films thickness, surface state, and screening effects. The activation barrier height and domain nucleus critical sizes strongly depend on the surface charge state: a value and the distribution of charge density that screen the spontaneous polarization outside the sample.