

SIZE EFFECTS IN FERROELECTRIC NANOMATERIALS

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The results of modern theoretical and experimental studies of ferroelectric nanomaterials are reviewed and analyzed. The essential influence of size and surface effects on polar and dielectric properties of spatially confined ferroelectric systems of various kinds, including ferroelectrics of the displacement and order-disorder types, relaxor ferroelectrics, virtual ferroelectrics, and antiferroelectrics, is demonstrated. With decrease in a size, the properties of a ferroelectric nanosystem can be either enhanced or depressed, so that even the appearance of ferroelectricity in virtual ferroelectric and antiferroelectric nanosystems is possible. It is shown that the flexoelectric coupling between the polarization and strain gradients can induce qualitatively novel phenomena in heterogeneous ferroelectric systems.