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Domain Size Dependence of Piezoelectric Properties of Ferroelectrics AVADH SAXENA, RAJEEV AHLUWALIA, TURAB LOOKMAN, Los Alamos National Lab, WENWU CAO, Penn State University — The domain size dependence of piezoelectric properties of ferroelectrics is investigated using a continuum Ginzburg-Landau model that incorporates the long-range elastic and electrostatic interactions. Microstructures with desired domain sizes are created by quenching from the paraelectric phase by biasing the initial conditions. Three different two-dimensional microstructures with different sizes of the 90^o domains are simulated. An electric field is applied along the polar as well as non-polar directions and the piezoelectric response is simulated as a function of domain size for both cases. The simulations show that the piezoelectric coefficients are enhanced by reducing the domain size, consistent with recent experimental results of Wada and Tsurumi (Brit. Ceram. Trans. **103**, 93, 2004) on domain engineered $BaTiO_3$ single crystals.

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