

Abstract Submitted  
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**Ferroelectric polarizations of  $\text{Pb}(\text{Zr}_{0.5}\text{Ti}_{0.5})\text{O}_3$  nanotube array** R. ADHIKARI, HUAXIANG FU, Department of Physics, University of Arkansas, Fayetteville, AR 72701 — Ferroelectric polarization and structural properties are determined for the  $\text{Pb}(\text{Zr}_{0.5}\text{Ti}_{0.5})\text{O}_3$  (PZT) nanotube array embedded in matrix materials of different polarizability, by means of first-principles derived effective Hamiltonian and finite-temperature Monte Carlo simulations. The polarizability of the matrix is controlled by the on-site  $\kappa_2$  quantity. We found three drastically different structural phases in PZT nanotubes, depending on the polarizability of the matrix. Microscopic insight for these structural phases will be revealed.

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