Ferroelectric nanoparticles and their use in disparate optical devices

DEAN EVANS, SERGEY BASUN, CARL LIEBIG, IGHODALO IDEHENRE, Air Force Research Laboratory — The fabrication [1] and “harvesting” [2] of stressed ferroelectric nanoparticles and the characterization of these materials will be discussed. Due to the induced surface stress in <10 nm size nanoparticles, a strong spontaneous polarization is achieved (4-5 times greater than found in the bulk for the case of BaTiO$_3$) [3,4]. These materials have been characterized in both isotropic and anisotropic liquids. The benefits of using these nanoparticles have been demonstrated by a significant enhancement in the field sensitivity (display) and optical gain (hybrid photorefractive) liquid crystal systems.