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Static Field Anisotropies in Composition-Graded Ferroics J.V. MANTESE, A.L. MICHELI, N.W. SCHUBRING, Delphi Research Laboratories, R.W. HAYES, G. SRINIVASAN, Oakland University, S.P. ALPAY, University of Connecticut — Compositionally graded ferroelectrics and ferrites are formed as the dielectric and inductive analogues of semiconductor junction devices. The internal, or "built-in," ferroic fields are intrinsic to the structures and are determined from ferroelectric hysteresis and ferromagnetic resonance microscopy. The dynamic response of the ferroelectric and magnetic analysis graded ferroic devices (GFD's) is determined from quasi-static analysis in terms of the spatially dependent order parameters, the polarization and magnetization, respectively; yielding values for the internal ferroic fields consistent with experimental observations. Our results are extended to the general class of ferroic and other "smart" materials via a spatially dependent free energy potential.

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