

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Promise of new multiferroics: Synthesis and characterization of epitaxial NiTiO₃ films TAMAS VARGA, EMSL at PNNL, Richland, WA, TIMOTHY DROUBAY, PNNL, Richland, WA, MARK BOWDEN, EMSL at PNNL, Richland, WA, SCOTT CHAMBERS, PNNL, Richland, WA, BERND KABIOUS, WILLIAM SHELTON, PONNUSAMY NACHIMUTHU, VAITHIYALINGAM SHUTTHANANDAN, EMSL at PNNL, Richland, WA, EMSL INTRAMURAL TEAM — In a search for new multiferroic materials where the direction of magnetization can be switched by an applied electric field, we have looked for materials in which polarization and magnetization are strongly coupled. Recent theory calculations predicted that the family of compounds MTiO₃ (M = Mn, Fe, Ni), in a certain polymorphic structure (acentric *R3c*), are promising candidates where a polar lattice distortion can induce weak ferromagnetism. Guided by these insights, a rhombohedral phase of NiTiO₃ has been prepared in epitaxial thin film form, whose structure is very close to that predicted to be a multiferroic. The synthesis of such new epitaxial films, their full structural characterization and physical property measurements along with our first-principles DFT calculations to predict the desired NiTiO₃ structure and its stability are reported.

Tamas Varga
EMSL at PNNL, Richland, WA

Date submitted: 28 Nov 2011

Electronic form version 1.4