

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

High-pressure x-ray diffraction and Raman scattering studies of $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-xPbTiO}_3$ ¹ MUKHTAR AHART, MADDURY SOMAYAZULU, RONALD COHEN, RUSSELL HEMLEY, Geophysical Laboratory, Carnegie Institution of Washington — Motivated to determine and understand the compositional-pressure phase diagram for PMN-xPT solid solutions, we employed the angular dispersive x-ray diffraction methods (Advanced Photon Source, Argonne National Laboratory) and high pressure Raman scattering to investigate a series of PMN-xPT solid solutions (x=0.2, 0.3, 0.33, 0.35, 0.37, 0.4) in a diamond anvil cell up to 20 GPa. The x-ray diffraction results show changes in Bragg peaks at about 6 or 7 GPa which indicate that PMN-xPT systems undergo a ferroelectric to a paraelectric phase transition. In addition, a new peak centered at 380 cm^{-1} appears above 6 GPa for all the samples. The morphotropic phase boundary (x=0.33 to 0.37) with the monoclinic symmetry persists up to 7 GPa. Based on our results, we suggest a possible structure for high pressure phase, which is R3c. We suggest a phase diagram for PMN-PT system which is slightly different from the one predicted by B. Chaabane et al (Phys. Rev. B 70, 134114, 2004).

¹This work is supported by the ONR under the contract number N000140210506 and the Carnegie/Department of Energy Alliance Center (CDAC) (DF-FC03N00144).

Maddury Somayazulu
Geophysical Laboratory, Carnegie Institution of Washington

Date submitted: 21 Nov 2008

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