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High-pressure x-ray diffraction of $PbTiO_3$at low temperature MUHTAR AHART, MADDURY SOMAYAZULU, RONALD COHEN, RUSSELL HEMLEY, Geophysical Laboratory, Carnegie Institution of Washington — We combined the angular and energy dispersive x-ray diffraction methods to investigate the structural behaviors of $PbTiO_3$ (PT) in a diamond anvil cell (pressure up to 23 GPa) at 10 K. The energy dispersive x-ray diffraction results show drastic change in Bragg peak intensities at 16 and 20 GPa which indicate that lead titanate undergoes successive phase transitions with pressure. The results of angular dispersive x-ray diffraction indicate that the lattice parameters a and c decrease with pressure and crossover between 10 and 11 GPa. Pressure induced phase transitions at low temperature are reversible. The experimental results confirm theoretical calculations, including the predicted the phase diagram. This work is supported by the ONR under the contract number N000140210506 and the Carnegie/Department of Energy Alliance Center (CDAC) (DF-FC03N00144).

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