

Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Raman Spectroscopy Measurements in RDX Single Crystals Shock Compressed Along Different Orientations JAMES PATTERSON, ZBIGNIEW DREGER, YOGENDRA GUPTA, Washington State University — Raman spectroscopy was used to examine the molecular level response of hexahydro-1,3,5-trinitro-*s*-triazine (RDX) single crystals to shock wave compression. Oriented single crystals were shocked under stepwise loading to peak stresses from 3.0 to 5.5 GPa. Changes in the Raman spectra of the CH stretching modes were monitored to determine the stress and orientation dependence of the shock response. Spectral shifts appeared to be similar for three crystal orientations below 3.5 GPa. Significant changes were observed in crystals shocked above 4.5 GPa. These changes were similar to those observed in static pressure measurements, indicating the occurrence of the $\alpha - \gamma$ phase transition in shocked RDX crystals. No measurable orientation dependence in the molecular response of RDX to shock compression was observed up to 5.5 GPa. The phase transition had an incubation time of about 100 ns when RDX was shocked to 5.5 GPa peak stress. The occurrence of the $\alpha - \gamma$ phase transition under shock wave loading has important implications for understanding the onset of chemical decomposition in shocked RDX. Work supported by DOE and ONR.

James Patterson
Washington State University

Date submitted: 19 Feb 2007

Electronic form version 1.4