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300 K Isothermal Equations of State of DADNE, DNAN, and LX-17[1] JOSEPH ZAUG, ELISSAIOS STAVROU, PAULIUS GRIVICKAS, PHIL PAGORIA, DONALD HANSEN, FRANCO GAGLIARDI, JOHN SAIN, SORIN BASTEA, LLNL — Using a direct optical-based measurement approach, we report 10 GPa scale, 300 K isothermal equations of state (EOS) of single crystal 1,1-Diamino-2,2-dinitroethylene (DADNE, FOX-7), single crystal 2,4, Dintrosoanisole (DNAN) and a polymer blended explosive (PBX) composite LX-17 (92.5% triamino trinitro benzene (TATB), and 7.5% KEL-F 800). Results from quasi-statically compressed LX-17 represent the first-ever isothermal EOS measurements of a PBX. Recently, we published a paper outlining the utility of using in-house optical microscopy and interferometry (OMI) diagnostics to directly measure pressure dependent sample volumes of single crystals TATB and alpha-NTO compressed within diamond-anvil cell sample chambers. (Our TATB OMI results agree remarkably well with two independent powder x-ray diffraction EOS studies.) In addition, here we report single crystal pressure dependent indices of refraction from DADNE that clearly signal the onset of electronic and/or molecular (structural) transitions that are otherwise indistinguishable in 300 K plotted pressure-volume EOS isotherms. EOS model parameters are reported from weighted and unweighted fits to the OMI experimental data.

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Joseph Zaug
LLNL

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