Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

High-precision measurements of the equation of state (EOS) of polymers at 100-1000 GPa using laser-driven shock waves[1] M.A. BARRIOS, D.E FRATANDUONO, T.R. BOEHLY, D.D. MEYERHOFER, D.G. HICKS, J. EGGERT, P. CELLIER, G. COLLINS, UNIVERSITY OF ROCHESTER/ LLE COLLABORATION, LAWRENCE LIVERMORE NATIONAL LABORATORY COLLABORATION — The behavior of polymer materials at high-pressure (>100 GPa) is important for the design inertial-confinement-fusion capsules and the effect of stoichiometry at high-pressures. To address these we performed EOS measurements on polystyrene (CH), polypropylene (CH_2), and GDP ($C_{43}H_{56}O$) at shock pressures of ∼100-1000 GPa. These experiments use laser-driven shocks to drive impedance-match measurements using alpha quartz as a standard material. Shock velocities in these transparent samples and the standard can be measured to ∼1% or precision. This refines the impedance-match technique for laser-driven shock experiments to produce precise data at extreme pressures. A novel method for also acquiring reshock data is presented. These data are compared to various EOS models and other experiments driven by gas guns and lasers.

[1]This work was supported by U.S. DoE ICF Off. under Coop. Agreement No. DE-FC03-92SF19460, the U. of Rochester, and NYSERDA.

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Date submitted: 06 Apr 2009 Electronic form version 1.4