Abstract Submitted
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Ultrafast Shock Compression Hugoniot Data of beta-CL-20 and TATB Thin Films[1] JOSEPH ZAUG, MICHAEL ARMSTRONG, PAULIUS GRIVICKAS, LLNL, ALEXANDER TAPPAN, IAN KOHL, MARK RODRIGUEZ, ROBERT KNEPPER, SNL/ABQ, JONATHAN CROWHURST, ELISSAIOS STAVROU, SORIN BASTEA, LLNL — The shock induced initiation threshold of two energetic materials, CL-20 and TATB are remarkably different; CL-20 is a relatively shock sensitive energetic material and TATB is considered an insensitive high explosive (IHE). Here we report ultrafast laser-based shockwave hydrodynamic data on the 100 ps timescale with 10 ps time resolution to further develop density dependent unreacted shock Hugoniot equations of state (UEOS) and to elucidate ultrafast timescale shock initiation processes for these two vastly different HEs. Thin film samples were made by vacuum thermal evaporation of the explosive on a deposited aluminum ablator layer. The deposited explosives were characterized by scanning electron microscopy, surface profilometry, and x-ray diffraction. Our preliminary UEOS results (u_p range of 1.3 – 1.8 km/s) from shock compressed beta-CL-20 agree reasonably well with extrapolated pseudo-velocities computed from epsilon-CL-20 isothermal diamond-anvil cell EOS measurements.

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