

Abstract Submitted
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Shock Compression Dynamics of Double-layer Explosive Charges¹ WEI ZHANG², University of Illinois at Urbana-Champaign, WILL BASSETT, Lawrence Livermore National Laboratory, MEYSAM AKHTAR, LAWRENCE SALVATI, DANA DLOTT, University of Illinois at Urbana-Champaign — In order to investigate the shock compression dynamics from sensitive explosive to insensitive explosive, double-layer polymer-bound explosive charges (PBXs) were prepared. The samples were composed of PETN and TATB-based PBXs with a poly(dimethylsiloxane) binder and charge diameters of 1.5 mm and 1.0 mm, respectively. The PBXs can be layered in varying thicknesses ranging from 25 μm to 200 μm . Experiments were designed such that the insensitive explosive is driven reproducibly by the small-scale detonation of the sensitive explosive in a booster-like geometry. More than one hundred individual shots can be taken on a single array. We use a tabletop laser-launched flyer plate apparatus to drive the initial reaction in the PETN-based PBX and measure the temperature with 32-channel pyrometry and the output shock wave using photon-Doppler velocimetry (PDV) with high time and space resolution as the reaction progresses through the booster and into the insensitive PBX. Two distinct emission bursts were observed on the ns and μs time scale and hot spot temperatures were calculated using the graybody model.

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