Abstract Submitted
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Diameter effects on the directional anisotropic detonation behavior of strand structured additively manufactured explosives. ALEXANDER MUELLER, ANDREW SCHMALZER, PATRICK BOWDEN, BRYCE TAPPAN, ALEXANDER WHITE, RALPH MENIKOFF, Los Alamos National Laboratory — UV-curing direct ink write (DIW) techniques have recently been used to introduce ordered linear porosity that demonstrate directional anisotropic detonation behavior in structured explosives. This exerted control over the detonation behavior of high explosives (HE) through structure by additive manufacturing relies on the unimpeded passage of a fast precursor wave escaping the detonation front, causing desensitization of the upstream HE material. We have shown that for a single strand diameter, ˜600 m, exceeding a critical value for dimension of the interstitial space between these printed HE strands results in detonation failure. Here we will present a parametric study of the dependence of this critical interstitial spacing value on the diameter of the printed HE strands, and the resulting control over the detonation propagation and failure gained through this additional parameter. Overall critical dimensions at which detonation failure occurs will also be discussed. Experiments will be compared with calibrated simulations using the Scaled Uniform Reactive Front model. LA-UR-19-21617

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