Abstract Submitted
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Integrated Experiment and Modeling of Insensitive High Explosives[1] D. SCOTT STEWART[2], University of Illinois, Urbana, IL, DAVID E. LAMBERT, Air Force Research Laboratory, Eglin AFB, FL, SUNHEE YOO, M. LIEBER, STEVEN HOLMAN, University of Illinois, Urbana, IL — New design paradigms for insensitive high explosives are being sought for use in munitions applications that require enhanced, safety, reliability and performance. We describe recent work of our group that uses an integrated approach to develop predictive models, guided by experiments. Insensitive explosive can have relatively longer detonation reaction zones and slower reaction rates than their sensitive counterparts. We employ reactive flow models that are constrained by detonation shock dynamics to pose candidate predictive models. We discuss variation of the pressure dependent reaction rate exponent and reaction order, on the length of the supporting reaction zone, the detonation velocity curvature relation, computed critical energy required for initiation, the relation between the diameter effect curve and the corresponding normal detonation velocity curvature relation. We discuss representative characterization experiments carried out at Eglin, AFB and the constraints imposed on models by a standardized experimental characterization sequence.

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