Abstract Submitted
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Mechanical and chemical responses of low-velocity impacted RDX and HMX explosive powders.[1] YANQING WU, HONGFU GUO, FENGLEI HUANG, XIAOWEI BAO, State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology, EXPLOSION AND DAMAGE TEAM — The experimental analyses of mechanical and chemical responses of RDX and HMX particles were performed based on the optimized drop-weight experimental system equipped with the High-Speed Camera (HSC). It has been found that Jetting phenomenon observed by HSC is the result of the energy released by gaseous products, which push the pulverized or melted explosives to splash radially. Jetting is the only and the most obvious difference between reactive and inert particles prior to combustion so that jetting can be regarded as the sign of ignition. Area expansion velocity, jetting velocity, and flame propagation velocity have been estimated via image processing, making it possible to characterize mechanical deformation and violence of reaction of each stage. Hot-spots coalescence promotes flame propagation whose velocity reflects the violence of deflagration reaction. Jetting appearance time can be used to determine time-to-ignition more accurately than other ways. For RDX, molten phase plays an important role to the formation of the hot-spots. Multiple particles experienced more severe burning reactions than an individual particle.

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