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Optical and Mechanical Characteristics of PETN Single Crystal
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— Pentaerythritol tetranitrate (PETN) is an extensively used crystalline high explosive. A good understanding of the laser-induced chemical decomposition and growth to detonation of PETN is important. This work on PETN single crystals focused primarily on its mechanical and optical properties under laser pulse interaction. Laser pulse ($E < 2 J$, $\tau = 150 ps$, $\lambda = 1.06 \mu m$) was focused on the single crystal surface to focal point size $80 \dots 800 \mu m$. The goal of this work was to study the early stages of laser-induced explosion decomposition. Crystal response to the laser radiation was determined by the luminescence and conductivity of crystals. Explosion decomposition of PETN single crystals failed to occur within the studied range of initiation energies. Experiments measured the threshold of the optical breakdown for PETN and determined energies when its mechanical destruction begins. Analysis of experiments allowed a new scheme to be proposed for experiments when the laser radiation energy is injected inside the crystal.

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