

Abstract Submitted
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Continuous wave laser irradiation of explosives DAVID MOORE, SHAWN MCGRANE, Los Alamos National Laboratory — Quantitative measurements of the levels of continuous wave (CW) laser light that can be safely applied to bare explosives during contact operations were obtained at 532 nm, 785 nm, and 1550 nm wavelengths. A thermal camera was used to record the temperature of explosive pressed pellets and single crystals while they were irradiated using a measured laser power and laser spot size. No deflagration to detonation transitions were observed for the single crystals or pressed pellets in the unconfined geometry tested. Except for the photochemistry of DAAF, TATB and PBX 9502, all reactions appeared to be thermal using a 532 nm wavelength laser. The laser power thresholds for thermal damage in some of the materials at 1550 nm were significantly lower than for the 532 nm laser wavelength. No reactions were observed in any of the studied explosives using the available 300 mW laser at 785 nm wavelength. Laser damage and reaction thresholds are presented for pressed pellets of PBX9501, PBX9502, Composition B, HMX, TATB, RDX, DAAF, PETN, and TNT and single crystals of RDX, HMX, and PETN for each of the laser wavelengths.

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