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Characterization and use of a CO₂ infrared laser for ignition of explosives JEREMY MONAT, NSWC Indian Head, EDWARD TERSINE, BRENT MORGAN, NSWC Indian Head, PETER OSTROWSKI, Energetic Materials Technology — This abstract reports on the characterization and use of a 200W, 10.6 μm CO₂ laser for nonresonant ignition of explosives. To characterize the laser, we measured its risetime with a detector whose response time is approximately 125 ns. We also measured the beam's spatial profile with a scanning pinhole setup. Next, we used the laser for testing of explosives for fundamental research and CAD/PAD (cartridge-actuated devices/propellant actuated devices) applications. Specifically, we determined energy-to-ignition values for TNT (2,4,6-trinitrotoluene) and the novel primary KDNP (4,6-dinitro-7-hydroxybenzofuroxan). Ignition was judged to begin at first light, which occurs when the laser-induced reaction first emits light as detected by a visible photodiode. To determine the energy to ignition accurately, we corrected the laser power for reflections. We used a high-speed camera to monitor the reaction progress from ignition to explosive consumption.

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