OPTICAL PROPERTIES OF WIDEBAND METAL OXIDE – ENERGETIC MATERIAL INTERFACES

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Using laser irradiation for direct initiation of high density energy materials opens up new opportunities in design safe optical detonators by removing primary explosive from the devices. Precise tuning of sensitivity to initiation of detonation via photo-excitation appears challenging because all secondary explosives are insulators with the band gap of 4–8 eV. We report here results of our combined experimental and theoretical study, and propose feasible mechanisms of photocatalytic decomposition of explosives triggered by the laser excitation with the energy of 1.17–2.3 eV and the wavelength of 1064–532 nm. Our approach considers tuning the optical absorption via the controlled modification of the electronic structure of the explosive-metal oxide interfaces.

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