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Photocatalysis for the Destruction of Aqueous TNT, RDX, and HMX

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Abstract

The photo-destruction of the high explosives HMX, RDX and TNT was investigated using two systems (ozone versus titanium dioxide), two reactors (pot vs annular reactor), and two types of lamps (1000 Watt Hg-Xe vs 25 Watt LP Hg). A mass balance was performed on reactions executed under pseudo-solar conditions, and relative reaction rates and products were compared for ozone and titanium dioxide based processes. The ratios of relative product formation is also discussed. Results show that there was little difference in the reactions performed in the annular reactor when either ozone or titanium oxide were used. The chemistry of RDX and HMX are very similar, as expected. Future work involving the mechanism is also discussed.

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