

Abstract Submitted  
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**Tunable optical sensitivity of composite energetic materials<sup>1</sup>**

SERGEY RASHKEEV, Qatar Environment Energy Research Institute, FENG-GONG WANG, ROMAN TSYSHEVSKIY, MAIJA KUKLJA, University of Maryland College Park, UNIVERSITY OF MARYLAND COLLEGE PARK TEAM — Optical initiation to detonation of energetic materials is compelling because it opens up new ways for safe handling, storage, and use of high explosives. Despite this, laser irradiation has been mainly perceived as a source of heat for vibrational excitation rather than viable means of photo-stimulated initiation of energy release. Limitations of our knowledge on photo-stimulated energy release from high energy density materials hampers progress in design and manufacturing of efficient optical devices for energy storage and conversion. Here we show how electronic and optical properties of interfaces formed between nitro energetic materials and various metal oxides can be effectively tuned to achieve highly controllable surface chemistry. We discuss mechanisms of photo stimulated reactions triggered by defects on these interfaces. We demonstrate that the key in achieving tunable sensitivity is the proper alignment of the filled and vacant electronic states of oxide defects and energetic materials and provide guidelines for design composite energetic materials suitable for optical initiation.

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