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Microstructural Characterization of Pressed HMX Material Sets With Implications on Initiation Behavior CHRISTOPHER MOLEK, ERIC WELLE, YUKI HORIE, Air Force Research Laboratory, RYAN WIXOM, BARRY RITCHEY, Sandia National Laboratories, PHILIP SAMUELS, Army Research Development and Engineering Center — The detonation physics community has embraced the idea that initiation of high explosives proceeds from an ignition event through subsequent growth to steady detonation. A weakness of all the commonly used ignition and growth models is that microstructural characteristics are not explicitly incorporated in their ignition and terms. This is the case in spite of a demonstrated, but not well-understood, empirical link between morphology and initiation of energetic materials. Morphological effects have been parametrically studied in many ways, with the majority of efforts focused on establishing a tie between bulk powder metrics and initiation of the pressed beds. More recently, there has been a shift toward characterizing the microstructure of pressed beds in order to understand the underlying mechanisms governing behavior. We have characterized the microstructures of several HMX materials using ion bombardment techniques that expose the microstructure of pellets studied in initiation experiments. We discuss our attempt to quantify microstructure and the impacts on continuum level initiation behavior.

Christopher Molek
Air Force Research Laboratory

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