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Effect of local void morphology on the reaction initiation mechanism in the case of pressed HMX SIDHARTHA ROY, NIRMAL RAI, H.S. UDAYKUMAR, University of Iowa — The microstructural characteristics of pressed HMX has a significant effect on its sensitivity under shock loading. The microstructure of pressed HMX contains voids of various orientation and aspect ratio. Subject to shock loading, these voids can collapse forming hotspots and initiate chemical reaction. This work shows how the ignition and growth of chemical reaction is dependent on the local microstructural features of the voids. Morphological quantities like size, aspect ratio and orientations are extracted from the real microstructural images of Class III and Class V pressed HMX. These morphological quantities are correlated with the ignition and growth rates of the chemical reaction. The dependency of the sensitivity of a given HMX sample on the local morphological features shows that these local features can create a mocroscale physical response.

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