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**Morphological effects on sensitivity of heterogeneous energetic materials** SIDHARTHA ROY, NIRMAL RAI, OISHIK SEN, H.S. UDAYKUMAR, University of Iowa — The mesoscale physical response under shock loading in heterogeneous energetics is inherently linked to the microstructural characteristics. The current work demonstrates the connection between the microstructural features of porous energetic material and its sensitivity. A unified levelset based framework is developed to characterize the microstructures of a given sample. Several morphological metrics describing the mesoscale geometry of the materials are extracted using the current tool including anisotropy, tortuosity, surface to volume, nearest neighbors, size and curvature distributions. The relevant metrics among the ones extracted are identified and correlated to the mesoscale response of the energetic materials under shock loading. Two classes of problems are considered here: (a) field of idealized voids embedded in the HMX material and (b) real samples of pressed HMX. The effects of stochasticity associated with void arrangements on the sensitivity of the energetic material samples are shown. In summary, this work demonstrates the relationship between the mesoscale morphology and shock response of heterogeneous energetic materials using a levelset based framework.

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