Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Dynamic failure of high energy materials under compression and periodic excitation[1] MARISOL KOSLOWSKI, NICOLO GRILLI, BOGDAN TANASOIU, CAMILO DUARTE CORDON, Purdue Univ — Polymer bonded explosives consist of high energetic particles in a polymeric binder. When these composites are subjected to heat, impact, friction, shock, or other initiation stimulus, they undergo a rapid chemical change. The sensitivity to initiation depends not only on the amount of energy available in the system but also on the rate at which available energy is released. Therefore, it is of extreme importance to predict the dissipated energy and its rate due to mechanical insults from accurate predictions of the deformation fields including localization, fracture and plasticity. The focus of this work is to study energy dissipation due to fracture and plasticity in high energy particles embeded in a polymer binder using finite elements. Numerical simulations of crack propagation under compressive load and dynamic excitation are performed with a phase field damage model. A systematic study of the energy release rate and initial microstructure is performed to analyze their repercussion on the dissipated energy and initiation.

[1]MURI-ONR

Marisol Koslowski
Purdue Univ

Date submitted: 24 Feb 2017 Electronic form version 1.4