Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Dynamic Shearing Resistance of Constituents of an Active Material Simulant.[1] PINKESH MALHOTRA, TONG JIAO, RODNEY CLIFTON, PRADEEP GUDURU, Brown University, SCHOOL OF ENGINEERING, BROWN UNIVERSITY TEAM — Pressure-shear plate impact (PSPI) experiments have been conducted to provide an experimental foundation for developing constitutive models for the mechanical response of polymer-bonded sucrose (PBS) simulants of polymer-bonded explosives (PBXs). PSPI experiments on HTPB, an elastomer commonly used as a binder in PBXs, show a shearing resistance of 470 MPa at a pressure of 9.1 GPa and a shearing rate of 0.4×10^6 s^{-1}. At similar pressures and shearing rates, PSPI experiments on sucrose- a mechanical simulant for energetic crystals-show a shearing resistance of 510 MPa followed by pronounced strain softening. Preliminary modeling of the response has been done using a quasi-linear viscoelasticity model for HTPB.

[1]This work is supported by Air Force Office of Scientific Research.

Pinkesh Malhotra
Brown University

Date submitted: 21 Feb 2017 Electronic form version 1.4