

Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

Pore collapse in single-crystal TATB under shock compression¹

MATT NELMS, MATTHEW KROONBLAWD, RYAN AUSTIN, Lawrence Livermore Natl Lab — High explosive crystals often contain many defects, such as pores, cracks, and interfaces. When shock-compressed to sub-detonative pressures, the hot spots formed in the vicinity of these defects are responsible for triggering chemical reactions. In this work, we study thermal localization resulting from the collapse of a single pore in TATB crystal. A continuum-based crystal model is employed, which accounts for anisotropic elastic/plastic responses and melting in regions of sufficient dissipation. The mechanical description is informed, in part, by atomistic calculations as experimental data are lacking for many of the properties needed for simulation. A parametric study is performed to assess the sensitivity of the predicted thermal localization to model parameters and assumptions. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 (LLNL-ABS-768217).

¹This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 (LLNL-ABS-768217)

Matt Nelms
Lawrence Livermore Natl Lab

Date submitted: 26 Feb 2019

Electronic form version 1.4