Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

Shock Compression of Graphite: Role of Orientational Order on the Graphite to Diamond Transformation[1] TRAVIS VOLZ, Y. M. GUPTA, Washington State University — Past experiments on shock-compressed pyrolytic graphites - having different orientational orders - have shown very different responses below and above the reported transformation stresses. Well-defined two-wave structures, indicative of a rapid phase transformation, were reported for ZYB-grade highly oriented pyrolytic graphite (HOPG) samples. However, two-wave structures were not reported for the less oriented HOPG samples (ZYH-grade) and for as-deposited pyrolytic graphite (PG). The objectives of the present study are to determine if well-defined rapid phase transformation waves are possible in less oriented pyrolytic graphite samples and to better understand the role of orientational order on the phase change mechanisms. To address these objectives, plane shock wave experiments were performed on ZYB-grade HOPG, ZYH-grade HOPG, and PG samples. Using laser interferometry, transmitted wave profiles were measured at the graphite/LiF interface for the different samples. Our results show that rapid, well-defined phase change waves occur in each graphite type examined, regardless of orientational order. In contrast to previous reports, both HOPG grades have similar shock responses above the transformation. However, the PG response is different from both HOPG grades.

[1]Work supported by DOE/NNSA

Michael Winey
Washington State University

Date submitted: 27 Feb 2019 Electronic form version 1.4