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Shock Compression of Highly Oriented Pyrolytic Graphite: Role of Microstructure on the Phase Transformation[1] TRAVIS VOLZ, Y. M. GUPTA, Washington State University — Past experiments on shock-compressed highly oriented pyrolytic graphite (HOPG) have shown that HOPG samples with different orientational orders respond differently above and below the ˜20 GPa phase transition. The objectives of the present study are to examine and compare the high pressure response of the ZYH-grade HOPG and ZYB-grade HOPG above the phase change stress, to determine the structure of the high pressure phase for the two types of HOPG samples, and to understand the role of the orientational order on the phase change mechanisms in shocked HOPG. Three types of plane shock wave experiments, utilizing time-resolved measurements, are being conducted to address these objectives. Transmission experiments to measure the propagating wave profiles, front-surface impact experiments to accurately characterize the peak shocked state and to determine the longitudinal sound speeds in the peak state, and XRD measurements to determine the microstructure of shocked ZYB and ZYH-grade HOPG samples above the transition. All three types of experiments have provided good initial data and analysis of the experimental results is currently underway. Our initial findings suggest that the shock response of the two HOPG grades, above the phase change stress, is more similar than previously reported. Further experiments and detailed analyses are underway.

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