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Compressible Heating in the Condense Phase due to Pore Collapse in HMX[1] JU ZHANG, Florida Institute of Technology, THOMAS JACKSON, University of Florida — Axisymmetric pore collapse in HMX is studied numerically by solving multi-phase reactive Euler equations. The generation of hot spots in the condense phase due to compressible heating is examined. The motivation is to improve the understanding of the role of embedded cavities in the initiation of reaction in explosives, and to investigate the effect of hot spots in the condense phase due to compressible heating alone, complementing previous study on hot spots due to the reaction in the gas phase and at the interface. It is found that the shock-cavity interaction results in pressures and thus temperatures that are substantially higher than the post-shock values in the condense phase. However, these hot spots in the condense phase due to compressible heating alone do not seem to be sufficiently hot to lead to ignition at shock pressures of 1-3 GPa. Thus, compressible heating in the condense phase may be excluded as a mechanism for initiation of explosives. It should be pointed out that the ignition threshold for the temperature, the so-called "switch-on" temperature, of hot spots depend on chemistry kinetics parameters. Switch-on temperature is lower for faster reaction rate. The current chemistry kinetics parameters are based on previous experimental work.

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