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Shock Wave Structure in Particulate Composites MICHAEL RAULS, GURUSWAMI RAVICHANDRAN, California Institute of Technology — Shock wave experiments are conducted on a particulate composite consisting of a polymethyl methacrylate (PMMA) matrix reinforced by glass beads. Such a composite with an impedance mismatch of 4.3 closely mimics heterogeneous solids of interest such as concrete and energetic materials. The composite samples are prepared using a compression molding process. The structure and particle velocity rise times of the shocks are examined using forward ballistic experiments. Reverse ballistic experiments are used to track how the interface density influences velocity overshoot above the steady state particle velocity. The effects of particle size (0.1 to 1 mm) and volume fraction of glass beads (30-40%) on the structure of the leading shock wave are investigated. It is observed that the rise time increases with increasing particle size and scales linearly for the range of particle sizes considered here. Results from numerical simulations using CTH are compared with experimental results to gain insights into wave propagation in heterogeneous particulate composites.

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