

Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Shock-induced formation of a disordered solid from a dense particle suspension ANDREW HIGGINS, OREN PETEL, DAVID FROST, McGill University, SIMON OUELLET, Defence R&D Canada-Valcartier — Shock wave propagation in multiphase media is dominated by the relative compressibility of the mixture components. If these components are chosen such that the suspended solid is incompressible in the loading range of interest, then the wave dynamics are dominated by the compressibility of the liquid. Furthermore, the relative compressibility of the components can result in shock-induced variations in the volume fraction of the suspension. As the shock wave strength is increased, the post-shock volume fraction of a dense suspension can tend towards the random close packing limit for the system and a disordered solid can take form. The present study investigates the formation of disordered structures within dense suspensions as well as the effect that such structures have on wave propagation. Shock Hugoniot data will be presented for dense suspensions of silicon carbide in ethylene glycol. Analytical models will be used to illustrate the shock-induced variations of the mesostructure within the suspensions.

Andrew Higgins
McGill University

Date submitted: 22 Feb 2011

Electronic form version 1.4