

Abstract Submitted
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Response to Unloading and Reloading of Shock Compressed Polymethyl Methacrylate W.D. REINHART, L.C. CHHABILDAS, Sandia National Laboratories* — Shock properties of polymeric materials have been investigated at low stresses for use as windows for velocity interferometry, binder phases for polymer-bonded explosives, and as adhesives. The shock Hugoniot for many polymeric materials also exist. There are distinct advantages in using a low-impedance polymer for impactors on shock experiments, however the loading structure from reshock or release has not been determined. In this study polymethyl-methacrylate (PMMA) is shocked to 45 GPa and recompressed to nearly 100 GPa as well as unloaded from the shocked state. Reloading and unloading wave speeds have been determined from these stress levels. The results from these tests not only will characterize PMMA at these stress states, but will be valuable when PMMA is used to study strength and phase transformation behavior in other materials. *Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy National Nuclear Security Administration under contract DE-AC04-94AL8500.

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