

Abstract Submitted
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Adiabatic release of alpha-quartz from multi-Mbar states on the principal Hugoniot¹ MARCUS KNUDSON, MICHAEL DESJARLAIS, Sandia National Labs — Quartz melts near 100 GPa on the Hugoniot into a conductive fluid with appreciable reflectivity, enabling interferometric methods to be used to directly measure the shock velocity. This property of quartz has recently been exploited to significantly improve the precision for impedance matching experiments at high pressure. However, the accuracy of measurements with quartz as a standard relies on knowledge of the off-Hugoniot response. To this end, the flyer plate capability at the Sandia Z machine was used to obtain release data for quartz using a low density aerogel. Direct impact of the aerogel provided a very precise determination of the Hugoniot for the aerogel. Measurements were then made for shock waves transmitted from quartz into aerogel, thereby enabling a measurement of the release adiabat from 300-800 GPa states on the quartz Hugoniot to 50-125 GPa states on the aerogel Hugoniot. Comparisons of the experimental measurements and Quantum Molecular Dynamics calculations of quartz release adiabats will also be presented.

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