

Abstract Submitted  
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**Characterization of the release response of alpha-quartz in the multi-Mbar regime for use as an impedance match standard**<sup>1</sup> MARCUS KNUDSON, MICHAEL DESJARLIAS, Sandia National Laboratories — Alpha-quartz has been used prolifically in recent years as an impedance match standard in the multi-Mbar regime. This is due to the fact that above about 90 GPa quartz becomes reflective, and thus shock velocities can be measured to high precision using velocity interferometry. This property allows for high precision measurements, however, the accuracy of such measurements depends upon the knowledge of both the Hugoniot and the release or re-shock response of alpha-quartz. In previous work, we accurately determined the Hugoniot response of alpha-quartz through numerous plate-impact Hugoniot experiments on the Sandia Z machine. Here we present the results of several adiabatic release measurements of alpha-quartz over the range of 2-10 Mbar using 110 and 200 mg/cc silica aerogels, and full density polymethylpentene (commonly known as TPX). These data were used to determine a simple method to perform impedance matching calculations without the need to appeal to any tabular equation of state for quartz. The method also allows for propagation of all uncertainty, including the random measurement uncertainty and the uncertainty of the Hugoniot and release response of alpha-quartz. This model and several examples of its use will be discussed.

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