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Recent research on stishovite: Hugoniot and partial release Z experiments and DFT EOS calculations[1] MICHAEL FURNISH, LUKE SHULENBURGER, MICHAEL DESJARLAIS, Sandia National Laboratories, YINGWEI FEI, Carnegie Institution of Washington — We have conducted a series of ride-along experiments on the Z facility to ascertain the Hugoniot of silica centered in the stishovite phase over a range 0.4 - 1.0 TPa, together with partial release states produced at the interface between the sample and a fused silica window. The stishovite samples were synthesized in a large-volume multi-anvil press at 15 GPa and 1773 K, with an initial density of 4.29 gm/cc. The new Z experiments on stishovite fill in a gap between gas gun experiments and NIF experiments. The states are compared with the Hugoniots of quartz and fused silica for inferences as to EOS. They are generally consistent with Sesame 7360 predictions. Sound speed constraints from these data are discussed. The new Hugoniot data cross over the melting curve of stishovite, providing insight into the properties of solid and liquid under extreme conditions in conjunction with predictions from density-functional theory modeling. These data are fundamentally important for understanding the interior of silicate-based super-Earths.

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