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Shock Compression of MgO: The Melt Transition DAWN G. FLICKER, SETH ROOT, LUKE SHULENBURGER, THOMAS R. MATTSSON, Sandia National Laboratories — Magnesium Oxide (MgO) is a highly stable material that melts at temperatures above 3000 K at ambient pressure. It is abundantly found in the Earth's mantle and is likely to be an important constituent of exoplanets, including "super earths" with higher inner pressures. However, little data exist at extreme pressures and temperatures and the current phase diagram is not well defined. To further examine the MgO phase diagram, we performed shock compression experiments using Sandia's Z – accelerator to measure the Hugoniot to stresses greater than 10 Mbar and gain insight on the melt transition. In addition, we performed Density Functional Theory (DFT) simulations to examine the behavior of MgO under shock compression, calculating the Hugoniot with particular emphasis on the transition from solid to liquid. Sandia National Laboratories is a multi-program laboratory operated by Sandia Corporation, a wholly owned subsidiary of the Lockheed Martin Company, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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