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Dissociation of silica at high pressure DAMIEN HICKS, JON EGGERT, PETER CELLIERS, CHUCK SORCE, GILBERT COLLINS, Lawrence Livermore National Laboratory, TOM BOEHLY, JOSH MILLER, ELENA VIANELLO, DAVID MEYERHOFER, LLE, Univ Rochester — Measurements of the temperature and optical reflectivity of quartz and fused silica under shock loading from 100 to 1000 GPa have revealed evidence for dissociation of silica between ∼150 and 400 GPa. Using attenuating laser-driven shock waves a continuous record of the temperature and reflectivity dependence on pressure has been obtained in both materials allowing the specific heat capacity and electronic conductivity to be deduced. Results show that between 150 and 400 GPa the specific heat rises significantly above that expected from the Dulong-Petit law, indicating the presence of a latent energy. Coincident with this anomalous specific heat is a rapid rise in electronic conductivity. Both these observables suggest that dissociation is occurring in the dense fluid. In addition temperature measurements near 5000 K detect a discontinuity at the melt transition, as measured earlier on gas gun experiments. This work was performed under the auspices of the US DOE by LLNL under Contract No. W-7405-ENG-48 and by the University of Rochester under Cooperative Agreement No. DE-FC03-92SF19460.

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