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Multiphase Equation of State of Carbon at Extreme Conditions LORIN X. BENEDICT, ALFREDO A. CORREA, ERIC R. SCHWEGLER, DAVID A. YOUNG, Lawrence Livermore National Lab — We describe our scheme to construct a multiphase EOS model for carbon at high pressures and temperatures. Three phases are considered: diamond, BC8, and liquid. Ab initio calculations of cold curves and phonon densities of states, as well as direct QMD computations of EOS are used to constrain simple analytic models for the free energies of the individual phases. Special care was taken to extract the anharmonic terms in the solid phases, and to compute their effect on the Hugoniot and phase lines. We discuss the challenges associated with using this information, together with experimental results, to produce an EOS table for use in hydro-code applications.

> Lorin X. Benedict Lawrence Livermore National Lab

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