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Improved EOS for describing high-temperature off-hugoniot states in epoxy R.N. MULFORD, N.E. LANIER, D. SWIFT, J. WORKMAN, Los Alamos National Laboratory, PETER GRAHAM, ALASTAIR MOORE, Atomic Weapons Establishment, UK — Modeling of off-hugoniot states in an expanding interface subjected to a shock reveals the importance of a chemically complete description of the materials. Hydrodynamic experiments typically rely on pre-shot target characterization to predict how initial perturbations will affect the late-time hydrodynamic mixing. However, it is the condition of these perturbations at the time of shock arrival that dominates their eventual late-time evolution. In some cases these perturbations are heated prior to the arrival of the main shock. Correctly modeling how temperature and density gradients will develop in the pre-heated material requires an understanding of the equation-of-state. In the experiment modelled, an epoxy/foam layered package was subjected to tin L-shell radiation, producing an expanding assembly at a well-defined temperature. This assembly was then subjected to a controlled shock, and the evolution of the epoxy-foam interface imaged with x-ray radiography. Modeling of the data with the hydrodynamics code RAGE is unsuccessful under certain shock conditions, unless condensation of chemical species from the plasma is explicitly included. The EOS code CHEETAH was used to prepare suitable EOS for input into the hydrodynamics modeling.

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