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Polystyrene Foam EOS as a Function of Porosity and Fill Gas

ROBERTA MULFORD, Los Alamos National Laboratory, DAMIAN SWIFT, Lawrence Livermore National Laboratory — An accurate EOS for polystyrene foam is necessary for analysis of numerous experiments in shock compression, inertial confinement fusion, and astrophysics. Plastic to gas ratios vary between various samples of foam, according to the density and cell-size of the foam. A matrix of compositions has been investigated, allowing prediction of foam response as a function of the plastic-to-air ratio. The EOS code CHEETAH allows participation of the air in the decomposition reaction of the foam. Differences between air-filled, nitrogen-blown, and CO₂-blown foams are investigated, to estimate the importance of allowing air to react with plastic products during decomposition. Results differ somewhat from the conventional EOS, which are generated from values for plastic extrapolated to low densities.

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