

Abstract Submitted
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Thermodynamic Formulation of Wu-Jing Equation of State for Condensed Substances KUNIHITO NAGAYAMA, kyushu University, SHIRO KUBOTA, National Institute of Advanced Industrial Science and Technology — Thermodynamic formulation has been made for the enthalpy-pressure-volume equation of state for condensed substances based on the assumptions proposed by Wu and Jing in the reference. [Q. Wu, and F. Jing, J. Appl. Phys., **80** (1996)4343-4349.] These state variables seem attractive for the numerical simulation of propagation of shock or detonation waves containing chemical reaction. We found a unique thermodynamic identity containing Wu-Jing parameter, i.e., the non-dimensional material parameter defined by them and the specific heat at constant pressure. This equation gives a constraint for these two parameters. Behavior of Wu-Jing parameter and constant pressure specific heat upon compression has been evaluated based on the calculation of the Grüneisen parameter by using three theoretical models. Comparison of Wu-Jing parameter along shock Hugoniot curve and along an isentrope centering uncompressed initial state revealed that Wu-Jing parameter does depend on entropy as well as pressure, but its entropy dependence is very small. This result strongly suggests that Wu-Jing parameter as a function of only pressure will give sufficient description of high-pressure behavior of solid materials within appropriate range of pressure.

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