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Rice-Walsh equation of state for unreacted high explosives based on isothermal compression data KUNIHITO NAGAYAMA¹, Retired, SHIRO KUBOTA, National Institute of Advanced Industrial Science and Technology — Equation of state (EOS) for unreacted explosives, PETN has been formulated thermodynamically aiming at using with numerical code of shock to detonation transition processes. In this paper, a generalized procedure of providing *pressure-volume-enthalpy* EOS is proposed based on the available static isothermal high-pressure compression curve. The present procedure can be used to formulate the Rice-Walsh type EOS by using the specific heat at constant pressure as a function of entropy, $C_p(S)$, and pressure-dependent Wu-Jing parameter with the material parameter β introduced by the author. Birch-Murnaghan functional form is adopted as an isothermal compression curve. Specific heat function was derived from the measured temperature dependence at atmospheric pressure. In order to estimate the parameter β in the Wu-Jing parameter, shock Hugoniot curve for PETN were calculated varying the value, β as a parameter. Both values of β determined to reproduce the shock Hugoniot for TMD and porous samples were found to be very similar and were very small compared with those estimated for various metals.

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