Tabular Multiphase Equations of State for Metals and Their Applications PAVEL LEVASHOV, KONSTANTIN KHISHCHENKO, JIHT RAS, Moscow, Russia — In this work we use multiphase equations of state in tabular form for numerical simulation of different problems of shock-wave physics. These equations of state take into account melting, evaporation and sublimation phase transitions and can be applied in metastable regions including those under negative pressure. We use two interpolation techniques for calculation of thermodynamic properties: (i) adaptation of a rectangular grid to phase and metastable boundaries and (ii) triangular grid in every region of phase diagram. Both techniques allow one to unambiguously determine the phase state of a given point of phase diagram. For very fast processes different temperatures for ions and electrons can be used. Several applications of multiphase equations of state will be presented: simulation of the initial stage of electrical explosion of metal wires and foils, hypervelocity impact, interaction of intense laser pulses with matter etc. Information about phase state in every point of the flux allows us to study phase transition waves, apply different destruction criteria and analyse processes in metastable regions. The work is done under RFBR financial support, grant 06-02-17464.

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