Abstract Submitted for the SHOCK07 Meeting of The American Physical Society

Sound Velocity in Shock-Compressed Samples and Equation of State of Tin¹ K.V. KHISHCHENKO, V.E. FORTOV, I.V. LOMONOSOV, JIHT RAS, Moscow, Russia, M.V. ZHERNOKLETOV, A.E. KOVALEV, A.B. MEZHEVOV, M.A. MOCHALOV, M.G. NOVIKOV, A.N. SHUIKIN, RFNC-VNIIEF, Sarov, Russia — Equation of state for matter over a wide range of pressures and temperatures is required for simulations of processes in shock-compressed media. In the present study we have obtained data on the sound velocity behind the shock-wave front in tin at pressures $P \simeq 77 \div 138$ GPa. In measurements we have used a shock and rarefaction overtake method with CCl₄ and C₈F₁₆ as the analyzer liquids. We propose a semiempirical equation of state for tin with taking into account the polymorphs transformation, melting, and evaporation effects. Calculation results are compared with the newly acquired and available experimental data at high energy densities. The multi-phase equation of state obtained can be used efficiently in modeling of physical phenomena at high dynamic pressures.

¹This work was supported by RFBR, grant 06-02-17464

Konstantin Khishchenko JIHT RAS, Moscow

Date submitted: 23 Mar 2007

Electronic form version 1.4