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Multi–Phase Equation of State for Aluminum I.V. LOMONOSOV, Inst. Probl. Chem. Phys. RAS — New experimental researches on shock [1] and isentropic [2] compression of aluminum at high pressures up to 500 GPa have demonstrated smooth monotonic dependencies without any anomalies. It results in more "stiff" compression curve and shock adiabat for aluminum that it was figured in previously. Adiabatic–expansion measurements of shocked aluminum [3] have brought new accurate data for the region of hot expanded liquid. Theoretical "ab initio" Quantum Molecular Dynamics calculations [4] in the region in the vicinity of the critical point established the reference domain of thermodynamic data. This complex of data serves as a fundament for a new multi–phase EOS for aluminum. It accounts for available to beginning of 2007 high pressure, high temperature experimental and theoretical data. Calculated thermodynamic functions describe the complete set of this information with high accuracy and reliability. The compression curve and the principal Hugoniot in developed EOS are fitted to new data [1-4], as well as the critical point. According to EOS, shocked aluminum melts at 113 GPa, the parameters of the critical point are: Pc=0.197 GPa, Tc=6250 K, Vc=1.423 g/cc. [1] M.D. Knudson et al., J. Appl. Phys., 94, 4420 (2003) [2] J.-P. Davis, J. Appl. Phys., 99, 103512 (2006) [3] M.D. Knudson, J.R. Asay, C. Deeney, J. Appl. Phys., 97, 073514 (2005) [4] M. P. Desjarlais, personal communication (2006).

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