

Equation of State for Stable and Metastable Argon

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A new equation of state is proposed for argon, which represents stable, metastable and labile states of the liquid and the vapor, the vapor-liquid coexistence properties, boundaries of essential instability (spinodals of the superheated or stretched liquid and the supersaturated vapor). As the initial information, experimental data for P, ρ, T -properties, heat capacity at constant volume, velocity of a sound are used in the region of mild metastability obtained in the Institute of Thermal Physics (Urals Branch of the Russian Academy of Sciences). In the region of high metastability, these parameters are calculated by molecular dynamics simulations. The equation of state has the physically justified asymptotes in the region of low temperatures and describes the supercooled liquid for which the boundary of thermodynamic stability (spinodal) is unknown.