Thermodynamic properties by Equation of state of liquid sodium under pressure.[1] HUAMING LI, Georgia Inst of Tech, YONGLI SUN, XIAOXIAO ZHANG, Taiyuan University of Technology, China, MO LI, Georgia Inst of Tech — Isothermal bulk modulus, molar volume and speed of sound of molten sodium are calculated through an equation of state of a power law form within good precision as compared with the experimental data. The calculated internal energy data show the minimum along the isothermal lines as the previous result but with slightly larger values. The calculated values of isobaric heat capacity show the unexpected minimum in the isothermal compression. The temperature and pressure derivative of various thermodynamic quantities in liquid Sodium are derived. It is discussed about the contribution from entropy to the temperature and pressure derivative of isothermal bulk modulus. The expressions for acoustical parameter and nonlinearity parameter are obtained based on thermodynamic relations from the equation of state. Both parameters for liquid Sodium are calculated under high pressure along the isothermal lines by using the available thermodynamic data and numeric derivations. By comparison with the results from experimental measurements and quasi-thermodynamic theory, the calculated values are found to be very close at melting point at ambient condition. Furthermore, several other thermodynamic quantities are also presented.

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