THE FUNDAMENTAL EQUATION OF STATE FOR ARGON SATISFYING THE SCALE HYPOTHESIS FOR THE REGION OF HIGH TEMPERATURES AND PRESSURES

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In this report, the fundamental equation of state of matter (FEoS) is considered that satisfies the scale hypothesis of the critical point. When constructing FEoS, the method of pseudocritical points (PCP) is used [1–3]. The PCP method is based on the Benedek hypothesis [4]. At present, the PCP method has been physically justified on the basis of Migdal phenomenological theory of the critical point [5, 6] and a new representation of the scale hypothesis of the critical point [7]. We have shown that, based on the PCP method, it is possible to construct FEoS of argon, which has the following characteristics: (i) in the region of small densities, it is transformed into the virial equation of state; (ii) in the region of the critical point FEoS is transformed into the Widom equation; (iii) the working area of FEoS is according to pressure ($0 \le p/p_c \le 740$), density ($0 \le \rho/\rho_c \le 3.2$) and ($83.8058 \le T \le 2300$ K) in temperature. We have compared FEOS with some known equations of argon state and discussed the results.

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