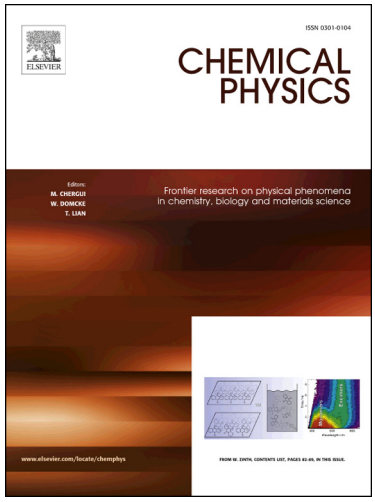

Thermodynamic and transport properties of nitrogen fluid: Molecular theory and computer simulations

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Thermodynamic and transport properties of nitrogen fluid: Molecular theory and computer simulations

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Abstract

Computer simulations and various theories are applied to compute the thermodynamic and transport properties of nitrogen fluid. To model the nitrogen interaction, an existing potential in the literature is modified to obtain a close agreement between the simulation results and experimental data for the orthobaric densities. We use the Generic van der Waals theory to calculate the mean free volume and apply the results within the modified Cohen-Turnbull relation to obtain the self-diffusion coefficient. Compared to experimental data, excellent results are obtained via computer simulations for the orthobaric densities, the vapor pressure, the equation of state, and the shear viscosity. We analyze the results of the theory and computer simulations for the various thermophysical properties.

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