Thermal Conductivity of Pure Noble Gases at Low Density from *Ab Initio* Prandtl Number

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Nowadays, the most accurate data on thermal conductivity are measured by the transient hot-wire technique (THW). Very recently, in a historical review by Assael et al. of the THW method, however, they concluded that measurements by this technique in the dilute gas region seem to deviate systematically from expectations. Due to the fact that the uncertainty of measurements of thermal conductivity is inferior to that of viscosity, May et al. used the experimental viscosity data and the values of the Prandtl number calculated by *ab initio* potentials to compute thermal conductivity of argon with an uncertainty of only 0.08 %. In this paper, we used the approach proposed by May et al. to calculate thermal conductivity of pure noble gases at low density from accurate experimental viscosity values and a series of good *ab initio* potential. The systems studied here are ^{4}He, Ne, Ar, Kr and Xe, which are all industrially relevant fluid. Finally, we try to: (1) Evaluate the accuracy of the calculated values to find weather the theoretical predictions of thermal conductivity are more reliable by an extensive comparison of the best experimental data; (2) Provide accurate data or correlations of thermal conductivity of pure noble gases at low density in the considered temperature range; (3) Demonstrate that thermal conductivity can be determined with an uncertainty, which is an order of magnitude lower than the widely recommended values measured by THW instruments in the low pressure gas region, at least for monatomic gases.

Acknowledgements

This work has been supported by the National Natural Science Foundation of China (Grant 51006083; 50836004) and the Fundamental Research Funds for the Central Universities.