Measurements of Thermal Conductivity of Alternative Refrigerant HFC161

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Nowadays, many alternative refrigerants are studied for protecting the ozonosphere. HFC161 is one of these refrigerants which are friendly to environment, because its ODP (Ozone Depleting Potentials) is zero. And it has a very low global warming potential, a high cooling capacity and excellent energy efficiency. However, through literature review, the thermal conductivity of HFC161, as one of the important thermophysical properties, is not reported over any wide range. The lack of properties data restricts the development of related science research and engineering application. And as a result of difficulties of modeling, one cannot accurately calculate the thermal conductivity from theory. This paper presents the experimental data for thermal conductivity of HFC161 via transient hot wire method. The thermal conductivity in the liquid and gaseous phases over temperature range from 223 K to 373 K and at pressures up to 30MPa was directly measured by a new instrument which was designed according to the transient measurement principle. One emphasis of this paper is to reappraise the impact of the error of time measurement. In the error analysis section, the viewpoint, that there is no impact on the accuracy of thermal conductivity from time error, was revised. In the end of this paper, the experimental results were correlated by a polynomial as a function of temperature and pressure for potential users.