Measurement of Transport Properties of R1336mzz(E)

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The present study measures the transport properties, especially thermal conductivity and viscosity, of environmentally safe refrigerant trans-1,1,1,4,4,4-hexafluoro-2-butene (R1336mzz(E)). This refrigerant belongs to the HFO family and has suitable properties such as non-flammability, high thermal stability, low global warming potential value, zero ozone depletion potential value, and low toxicity. Due to its attractive characteristics, R1336mzz(E) is considered an excellent substitution of conventional working fluids, which is expected to use in high-temperature heat pumps and organic Rankine cycle to recover heat from various wasted sources. The experimental measurement of thermal conductivity of R1336mzz(E) is carried out by the transient hot-wire method where two platinum wires are connected in parallel to avoid the effects due to axial heat conduction. On the other hand, the viscosity is measured by the tandem capillary tube method, where two capillary tubes are set horizontally in series connection to eliminate the end effects. Both systems have been developed in our laboratory. The experimentally measured data are reported at a temperature from 40 ℃ to 180 ℃ and pressure up to 4 MPa for both liquid and vapor phases. The estimated uncertainties of the measurement are less than ±2.0% for the thermal conductivity and ±3.0% for the viscosity measurement.