

Study on Isochoric Specific Heat Capacity of Hydrofluoroolefins in the Liquid Phase

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Recently, refrigerants which have less impact on the environment, have attracted attention to use for refrigerators and heat pumps. Among them, hydrofluoroolefins (HFOs) and their mixtures are considered to be leading candidates for alternative refrigerants because they have a zero ozone depletion potential (ODP) value and a very low global warming potential (GWP) value. Reliable equations of state for refrigerants are necessary to evaluate the cycle performance of refrigeration systems. In order to develop a reliable equation of state for a fluid, various thermodynamic property measurements of the fluid are required. Among them, isochoric heat capacity (c_v) measurements in the liquid phase provide a very useful check for calculations of the second derivative of the pressure with respect to temperature, which is essential information to develop equations of state. In this work, measured c_v for R 1234ze(E), R 1234yf, and R 1234ze(Z) are examined. The measurements are carried out in a temperature range from 270 K to 400 K, and at pressures up to 30 MPa. The measurements for HFOs are carefully compared with each other, also they are compared with published equations of state.