

Study on Isochoric Specific Heat Capacity of Liquid R1234yf

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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 but is challenging to measure accurately. In this work, measured c_v for R 1234yf is examined. The measurements were carried out in a temperature range from 270 K to 400 K, and at pressures up to 30 MPa. The measured data for R 1234yf are carefully compared with published equations of state.