

Vapor Pressures, Enthalpies of Vaporization and Heat Capacities of C1 to C5 Alkanols at Ambient and Subambient Temperatures
- IACT Doctorate Award Presentation -

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Thermodynamic properties of alkanols are interesting for both technological and scientific reasons. Alkanols are used in numerous chemical and biochemical processes; hydrogen bonding, which strongly influences behavior of alkanols, is not fully described and understood. Prediction methods used for estimating missing data usually fail in the case of alkanols; therefore new reliable experimental data are needed. Vapor pressures of alkanols were previously studied mainly by ebulliometry at superambient temperatures. Vapor pressures at ambient and subambient temperatures are not known with reasonable accuracy. Aim of this work was to measure vapor pressures of branched pentanols from 240 K to 310 K and to compare the experimental data with values obtained by controlled extrapolation. In controlled extrapolation reliable ebulliometric vapor pressures were correlated simultaneously with thermal data (enthalpies of vaporization and heat capacities) reported at ambient and subambient temperatures. The mutual agreement of vapor pressure and thermal data was very good. The same procedure (based solely on literature data) was therefore used to establish vapor pressures of alkanols C1 to C4 down to their melting points. New experimental data reported in this work include vapor pressures determined by static and ebulliometric methods, calorimetric liquid heat capacities, and perfect gas heat capacities calculated from spectral data.

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