M.FULEM (ICT Prague[1]), K. RUŽICKA (ICT Prague), V. RUŽICKA (ICT Prague)

HEAT CAPACITIES OF 1-ALKANOLS (C_2, C_6, C_7, C_8, C_{10}) AT ELEVATED TEMPERATURES AND PRESSURES

Reliable liquid heat capacities are available in a wide temperature range for 1-alkanols from methanol up to 1-pentanol. For higher 1-alkanols, however, new data are needed, in particular at higher temperatures. New measurements should, in addition to providing data at temperatures above normal boiling point, either confirm or refute a peculiar dependence of the saturated heat capacity on temperature, which was not observed for other compounds. Measurements were carried out with some 1-alkanols, which are liquid at room temperature (ethanol, 1-hexanol, 1-heptanol, 1-octanol and 1-decanol) in the temperature range from 323 to 573 K and at pressures of 2 MPa, 10 MPa and 30 MPa using a commercial heat conduction calorimeter Setaram C80. Additional measurement was carried out for all studied compounds at a pressure close to the vapour pressure of the measured compound.

Newly obtained data were compared with previously published values. Sets of recommended saturation heat capacity data, which substantially extended the range of data so far available in the literature, were produced by a critical assessment and correlation of selected data. An untypical dependence of saturation heat capacity of 1-alkanols was proved.

Liquid density as a function of temperature and of pressure is needed for calculating heat capacity from results of measurement and for converting heat capacity at pressure of measurement to that at saturation pressure. Densities of some studied 1-alkanols (1-hexanol, 1-heptanol, 1-octanol and 1-decanol) were measured using a vibration tube densimeter. The data obtained in this work covering the range 373 to 573 K and 2 to 30 MPa considerably extended the range of data available in the literature. New data also lead to improvement of the reliability of the available data as corroborated by their critical evaluation.

[1] Department of Physical Chemistry, Institute of Chemical Technology, 166 28 Prague 6, Czech Republic,
Phone: +420 2 2435 4116, Fax: +420 2 2431 0273, E-mail: michal.fulem@vscht.cz, kvetoslav.ruzicka@vscht.cz