Azeotropic and Heats of Mixing Data for Binary Organic Systems Containing 1-Methoxy-2-Propanol and 2-Butoxy Ethanol

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The knowledge of azeotropic points offers the most important information for the synthesis and design of distillation processes. However, the immense amount of data stored in Dortmund Data Bank (more than 45,000 entries on azeotropic and zeotropic behavior) cannot only be used for process synthesis, e.g. design of distillation columns, selection of the most suitable solvent for azeotropic distillation, but also for the further development of group contribution methods and for fitting reliable GE models parameters.

In the case of GE models, a precondition for a good description of phase equilibria of multicomponent systems is the determination of reliable binary interaction parameters. In chemical industry, mainly vapor–liquid equilibria (VLE) data are used to fit the required binary parameters. However, as mentioned in previous papers, it is recommended to fit the required interaction parameters simultaneously to all available reliable experimental data (VLE, azeotropic data, activity coefficients at infinite dilution, HE, solid–liquid equilibria (SLE) of eutectic systems, etc.), since the parameters obtained by a simultaneous fit allow an improved representation of the real behavior across the whole composition and a large temperature range.

In the Modified UNIFAC method, different types of phase equilibria and excess properties are used for fitting simultaneously the required temperature-dependent group interaction parameters.

This paper presents azeotropic data for the binary systems 1-methoxy-2-propanol - toluene, 1-methoxy-2-propanol - cyclohexane and 2-butoxy ethanol – decane, measured by means of a wire band column. Additionally, excess enthalpies for binary mixtures of 1-methoxy-2-propanol and 2-butoxy ethanol with benzene and cyclohexane were measured at 313.15 K using an isothermal flow calorimeter. The azeotropic data were compared with predicted data by Modified UNIFAC (Dortmund). The HE data measured are in good agreement with the predicted results using Modified UNIFAC (Dortmund).