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Determination of experimental excess molar properties for mixtures of carboxylic acids

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In separation design, mixture enthalpy data are important not only for determination of heat loads, but also for the design of distillation units. For fitting interaction parameters of g^E , applicable for a larger temperature range, enthalpy of mixing data directly provide the temperature dependence of the activity coefficients. Therefore, a combination of vapor-liquid equilibrium and mostly excess enthalpy measurements is a good solution to cover a broad range of temperature.

In this work, measurement of excess enthalpy for two interesting industrial binary systems {acetic acid-acrylic acid} and {acetic acid-propanoic acid} is carried. A standard Calvet calorimeter (C80) was employed to determine the excess molar enthalpies at 298.15 K and atmospheric pressure of two binary systems. As far as we know, in the literature, no study on experimental data is carried out especially for {acetic acid-acrylic acid} mixtures.

Experimental data were correlated with NRTL-HOC [1, 2] and UNIQUAC-HOC [2, 3] activity coefficient models to obtain the binary interaction parameters. The results lead to a good agreement with the experimental points. Results obtained using excess enthalpies confirm the reliability of the model determined using vapour-liquid [3-5] equilibrium data.

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