



Determination of experimental excess molar properties for mixtures of carboxylic acids

Afef Attia, Fabrice Mutelet, Roland Solimando, M. Jeday, Serge Tretjak

► To cite this version:

Afef Attia, Fabrice Mutelet, Roland Solimando, M. Jeday, Serge Tretjak. Determination of experimental excess molar properties for mixtures of carboxylic acids. XXXIX JEEP - 39TH EDITION OF THE JOINT EUROPEAN DAYS ON EQUILIBRIUM BETWEEN PHASES, 2013, Nancy, France. 10.1051/matecconf/20130301058 . hal-01292161

HAL Id: hal-01292161

<https://hal.univ-lorraine.fr/hal-01292161>

Submitted on 10 May 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Determination of experimental excess molar properties for mixtures of carboxylic acids

A. Attia^{1,2}, F. Mutelet¹, R. Solimando¹, M. Jeday², and S. Tretjak³

¹Laboratoire Réactions et Génie des Procédés LRGP UPR CNRS 3349, Equipe « Thermodynamique et Energie » INPL – ENSIC, 1 rue Grandville, BP 20459, Nancy Cedex, France

²Unité de Recherche Energétique et Environnement UR/99, Ecole nationale d'Ingénieurs de Gabes, rue d'Omar El KHattab 6029, Gabès, Tunisie

³ARKEMA, CRDE 57501 BP1005 St Avold Cedex, France

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.

References

1. H. Renon, J.M. Prausnitz AIChE J. **14** 135 (1968)
2. J.G. Hayden, J.P. O'Connell, Ind. Eng. Chem. Process Des. DeV. **14** 209 (1975)
3. D.S. Abrams, J.M Prausnitz. AIChE J. **21** 116 (1975)
4. J. Linek, I. Wichterle, Collect. Czech. Commun. **38**(7) 1853 (1973)
5. S. Trybula, J. Bandrowski, Inz. Chem. **49**(6) 1857 (1976)