Fluid Phase Equilibria
Volume 64 , 1991, Pages 173-184

doi:10.1016/0378-3812(91)90012-V Cite or Link Using DOI

Application of the VdW-711 equation of state to polar mixtures: correlation of binary and prediction of multicomponent vapour—liquid equilibria

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Received 6 December 1989; accepted 5 November 1990. Available online 6 August 2001.

Abstract

The VdW-711 equation of state for polar compounds of Androulakis et al. (1989) is combined with the UNIQUAC model for the excess Gibbs free energy to establish the mixing rule in the attractive term of the equation of state. The obtained model, applicable thus to both vapour and liquid phases, eliminates the uncertainty in estimating the vapour phase non-ideality, a serious problem in using the gamma—phi approach, especially at higher pressures. Application of the model: (i) the correlation of binary vapour—liquid equilibria (VLE) data of polar systems and (ii) the prediction of multicomponent VLE behaviour from binary data, gives very good results, comparable to those with the gamma—phi approach, in both cases. In addition, successful prediction of saturated liquid volumes is obtained. Prediction of liquid volumes of mixing is also discussed.

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