Measuring and Modeling Activity Coefficients of Water in Aqueous Solutions

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 For the accurate description of the thermodynamic behavior of aqueous solutions, correlation between the experimental results and the thermodynamic models is essential to validate available data. Since the use of reliable parameter estimation techniques is highly recommended for the thermodynamic modeling, in this work, the unknown binary interaction parameters have been calculated by fitting the activity coefficients to the NRTL and UNIQUAC models.

 Osmotic coefficients in aqueous solutions containing (Lactose monohydrate, Trimethylamine N-Oxide, N,N-Dimethylglycine, L-Citruline) were measured by vapor pressure osmometry and the experimental results were correlated with the NRTL and UNIQUAC models. Using the adjustable parameters, which have been calculated from regression between the experimental osmotic coefficient and the results of these models, the activity coefficients of water in aqueous solutions were calculated. The obtained results showed that the NRTL and UNIQUAC models are suitable for representing the osmotic coefficients and the activity coefficients of water in aqueous solutions.