Deriving Solute Activity Coefficients *via* Calorimetric Measurement of Solubility

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The objective of this work is to examine advantages and limitations of deriving solute activity coefficients from solubility data obtained by calorimetric methods. The integral heats of solution were measured for three different systems and the solubilities derived via the standard van't Hoff method. This technique is shown to accurately predict the solubility of the non-ideal solutions. Therefore, solute activity coefficients are readily calculated as a function of temperature. One major limitation of this approach is that the experimental activity coefficient data are obtained only at saturated conditions in contrast to VLE measurements where data is usually measured across the entire phase diagram. However, the data obtained calometrically can be used in a variety of Excess Gibbs Free Energy models in literature to model the entire phase diagram. In spite of this limitation, the speed and versatility make these measurements attractive. The experimental approach and theory of measuring solubility via calorimetry will be discussed, as well as the extent to which thermodynamic information may be derived from such measurements.