

Solid-Liquid Equilibrium of Salts in Mixed Solvents

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The study of the solubilities of salts in mixed solvent systems is of fundamental importance for the design and operation of many industrial processes like, among others, crystallization, absorption and extractive distillation. Moreover, this kind of data permits theoretical studies about the effects of electrolytes on the liquid phase, such as the evaluation of the Gibbs energy of transfer from a reference pure solvent to the mixed solvent.

However, few studies have been carried out on this subject and there is a great lack of data in solvent mixtures mainly at temperatures other than 25 °C. Thus, in this work a systematic investigation on solubilities in mixed solvents was started, focusing the following:

- (i) Experimental Work: A simple and accurate apparatus was designed to determine, using an analytical method, the solubilities of NaCl and KCl in methanol/water; ethanol/water and methanol/ethanol solvent mixtures at temperatures up to 75 °C.
- (ii) Thermodynamics Analysis: The obtained data, which allows an accurate calculation of the ionic activity coefficients in the mixture, have been used, together with osmotic coefficient and binary data, to test the capabilities of the UNIQUAC/Debye-Huckel model.

Results are shown and a comparison with other approaches is given.