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Solubility of Salts in Mixed Solvents: Experimental Data and Modeling

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Phase equilibria in electrolyte systems has been receiving much attention from different research groups. Much of the experimental and theoretical work has been carried out on aqueous systems or in the study of salt effect in vapor-liquid equilibria. However, the design and simulation of unit operations such as, the recently developed extractive crystallization, requires experimental solubility data as well as the ability to correlate and predict electrolyte activity coefficients in mixed-solvents. Moreover, this kind of data can give many relevant indications about ion-solvent interactions and allows the calculation of other thermodynamic properties.

Thus, in this work, the solubilities of the salts NaBr and KBr were measured, by an analytical isothermal method, in water, methanol, ethanol and their binary mixed-solvent mixtures, water/methanol, water/ethanol and methanol/ethanol, at temperatures from ambient up to 80 °C.

The obtained data, were used, together with osmotic and mean ionic molal activity coefficients data available in the literature, to test the capabilities of UNIQUAC-based models for the representation of the thermodynamics properties of these systems. Results are shown and comparisons with other approaches are given.