

## **The Effects of Dielectric Constant in Perturbation Theory; For Prediction of Amino Acid Activity Coefficient in Water-Electrolyte-Amino Acid System**

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In this work, a new thermodynamics model based on the perturbation theory and a new hard spheres equation of state as a reference term is applied to the prediction of the activity coefficient of amino acids and electrolytes in some water-electrolyte-amino acid systems. The new hard sphere equation of state has been proposed recently by Dehghani and Modarress and has been applied for different theories and shown excellent capability. In this model dispersion forces, dipole-dipole, dipole-induced dipole and charge-dipole interactions are considered as perturbation terms. In our model, the effect of ions on the dielectric constant is illustrated. The presence of electrolytes cause an important effect on the dielectric constant, this behavior is very well reproduced by the model, which is in good agreement with experimental results. The activity coefficients of more than 240 data points for aqueous amino acid-electrolyte solution are modeled by few adjustable parameters which are set on dielectric constants. Calculated dielectrics constants appear to be in good agreement with experimental data. The results are compared with numerous and similar models and it is shown that application of the new hard spheres equation of state and consideration of the variation of dielectric constant with electrolyte concentration have caused an improvement in our model.