



Modeling of Thermodynamic Properties in Biological Solutions

By Luca Cameretti

Cuvillier Verlag Jan 2009, 2009. Taschenbuch. Condition: Neu. Neuware - More than 90% of the production costs for amino acids, peptides, and proteins are attributed to their purification. Therefore, reliable information about phase behavior of biological systems is of essential financial importance for the design of separation units. In general, bioproducts are obtained by fermentation in aqueous solutions that may also contain electrolytes. The phase behavior of such solutions is particularly dependent on salt type, ionic strength, and pH. In this thesis a model based on the PC-SAFT equation of state is developed for the description of thermodynamic properties of aqueous electrolyte solutions. This model is also applied for aqueous amino acid and peptide systems. The aim is to simultaneously describe various system properties - densities, vapor pressures, activity coefficients, and solubilities - with a minimum number of adjustable model parameters. After successful modeling of the binary systems, ternary water/electrolyte/amino acid systems are investigated. Additionally, the meta-stable liquid-liquid coacervation in protein solutions as well as the second osmotic virial coefficients, system densities, and solubilities of proteins are scrutinized based on aqueous hen egg-white lysozyme/NaCl solutions. Both, the PC-SAFT model and a model based on potential of mean force (PMF) are...



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