Phase Diagram of the Aqueous Two-Phase Systems in Protein Recovery

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The application of the Aqueous Two-Phase Systems (ATPS) in protein recovery has received considerable attention. The ATPS offers low-cost, easily scalable, environmentally benign, and multifunctional operations. However, these applications are still limited due to the poor understanding of the mechanisms of the protein partitioning and the lack of reliable engineering models that can describe the phase behavior of the mixture. Thus, the quantitative modeling of protein partitioning is very important in order to optimize the extraction in ATPS. Of course, this is a challenging task since the protein partitioning is very complex and dependent on many factors. A logical stepping-stone toward modeling such systems is to accurately model an aqueous two phases in equilibrium such as a PEG-water-salt system. In this work, we use the SAFT equation of state to model this ternary system and provide a robust procedure to construct the ternary phase diagram.