Preface

Electrolyte solutions are ubiquitous in both nature and industry, and a deep comprehension of their properties is fundamental to understanding and controlling processes in a wide range of biological and physical systems. Such systems, which are at the forefront of much contemporary research, are extremely important in crucial areas such as healthcare, energy systems and the environment. The special physical and chemical properties exhibited by electrolyte systems are a manifestation not only of the presence of charged particles *per se* but also of the long-range forces that exist between these particles and the complex interplay between charged and uncharged species, such as solvents, present in the system. As a consequence, the thermodynamic and transport properties of electrolyte systems are less well understood than those of non-electrolytes, and a rich diversity of theory and modelling approaches have been developed to address different aspects of the problem. At the same time, experimental studies are often much more challenging than in uncharged systems.

Clearly, electrolyte systems present many research challenges and, in this Special Issue of Fluid Phase Equilibria, we bring together a collection of 14 papers focusing on key physical-property aspects. This Special Issue covers a wide-range of systems and includes papers on the theory and modelling of aqueous-, organic- and mixed-solvent electrolyte systems, including a review of the state of knowledge of modelling approaches based on equations of state that incorporate the classic Debye-Hückel term. Reflecting the importance of electrolytes in environmental systems, several papers address the solubility of acid gases, especially CO₂, in electrolyte solutions, and we have a contribution addressing the impact of the presence of charged species on gas clathrate phase equilibria.

We are thankful to all the authors for their contributions and enthusiasm in answering our invitation to share their work and hope you enjoy reading it.

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