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Electrolyte Solutions and Specific Ion Effects on Interfaces

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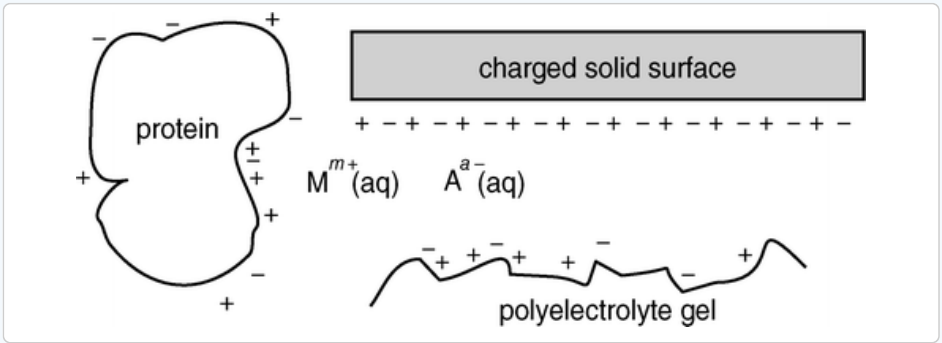
Abstract



Introductory general and physical chemistry courses often deal with colligative properties of solutions and do not discuss nonideal solutions in detail. Yet, a growing body of evidence reveals that even at physiological concentrations electrolyte solutions cannot be treated as ideal when a charged or partially charged solute (such as a protein) is present in the solution. In such cases, the interactions between the salt ions and the solute depend on the specific ions that constitute the electrolyte solution (specific ion effects). For example, the catalytic efficiency of an enzyme may be different in NaCl and KCl solutions. In this article, specific ion effects are reviewed from a historical perspective, and then the current state of knowledge is presented at a qualitative level that is appropriate for second-year or advanced undergraduate science students. Finally, the related nomenclature (Bjerrum ion pairs,

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Hofmeister series, lyotropic series, and specific ion effects) is analyzed, and some suggestions are made with respect to the terminology, to make it more accessible to students. The material is appropriate for courses where solution chemistry is discussed, for example, in physical chemistry. In addition, it may be included in the chemistry curriculum for life or pharmaceutical sciences.

Keywords: **General Public**; **Upper-Division Undergraduate**; **Second-Year Undergraduate**; **Physical Chemistry**; **History/Philosophy**; **Textbooks/Reference Books**; **Biophysical Chemistry**; **Water/Water Chemistry**

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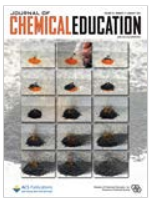

Ion Association versus Ion Interaction Models in Examining Electrolyte Solutions: Application to Calcium Hydroxide Solubility Equilibrium
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