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Properties of Aqueous Solutions of Electrolytes Physical Chemistry of Electrolyte Solutions *Electrolyte Solutions* Equilibrium Properties of Aqueous Solutions of Single Strong Electrolytes Adsorption from Solutions of Non-Electrolytes *Electrolyte Solutions* Handbook of Aqueous Electrolyte Solutions An Introduction to Aqueous Electrolyte Solutions Activity Coefficients in Electrolyte Solutions *Molecular Thermodynamics of Electrolyte Solutions Electrical Double Layer at a Metal-dilute Electrolyte Solution Interface* Electrolytes at Interfaces Electrolytes The Measurement of the Conductivity of Electrolytes in Very Dilute Solutions Viscosity of Electrolytes and Related Properties The Modern Theory of Electrolytes Solutions of Electrolytes Aqueous Solutions of Simple Electrolytes Electrolyte Solutions Electrolytes Electrolyte Data Collection: Viscosity of nonaqueous solutions. I. Alcohol solutions The Organic Chemistry of Electrolyte Solutions *Aqueous Solutions of Simple Electrolytes* Activity Coefficients in Electrolyte Solutions Biopolymer Electrolytes Electrolyte Data Collection Physical Chemistry for the Biosciences Journal of the Chinese Chemical Society Solution Chemistry Research Progress Ions in Water and Biophysical Implications The Heats of Mixing of Aqueous Solutions of Non-reacting Strong Electrolytes Encyclopedia of Geochemistry The Diffusion of Electrolytes and Macromolecules in Solution *Aqueous Solutions of Simple Electrolytes* Handbook of Electrolyte Solutions Ceramic and Specialty Electrolytes for Energy Storage Devices Novelties in Enhanced Oil and Gas Recovery *Electrolytes for Lithium and Lithium-Ion Batteries* Structure of Aqueous Electrolyte Solutions and the Hydration of Ions Joint General Session: Batteries and Energy Storage -and- Fuel Cells, Electrolytes, and Energy Conversion

New York : Wiley, [1975]. An Introduction to Aqueous Electrolyte Solutions is a comprehensive coverage of the subject including the development of key concepts and theory that focus on the physical rather than the mathematical aspects. Important links are made between the study of electrolyte solutions and other branches of chemistry, biology, and biochemistry, making it a useful cross-reference tool for students studying this important area of electrochemistry. Carefully developed throughout, each chapter includes intended learning outcomes and worked problems and examples to encourage student understanding of this multidisciplinary subject. * a comprehensive introduction to aqueous electrolyte solutions including the development of key concepts and theories * emphasises the connection between observable macroscopic experimental properties and interpretations made at the molecular level * key developments in concepts and theory explained in a descriptive manner to encourage student understanding * includes worked problems and examples throughout An invaluable text for students taking courses in chemistry and chemical engineering, this book will also be useful for biology, biochemistry and biophysics students required to study electrochemistry. The aim and purpose of this book is a survey of our actual basic knowledge of electrolyte solutions. It is meant for chemical engineers looking for an introduction to this field of increasing interest for various technologies, and for scientists wishing to have access to the broad field of modern electrolyte chemistry. Properties of Aqueous Solutions of Electrolytes is a handbook that systematizes the information on physico-chemical parameters of multicomponent aqueous electrolyte solutions. This important data collection will be invaluable for developing new methods for more efficient chemical technologies, choosing optimal solutions for more effective methods of using raw materials and energy resources, and other such activities. This edition, the first available in English, has been substantially revised and augmented. Many new tables

have been added because of a significantly larger list of electrolytes and their properties (electrical conductivity, boiling and freezing points, pressure of saturated vapors, activity and diffusion coefficients). The book is divided into two sections. The first section provides tables that list the properties of binary aqueous solutions of electrolytes, while the second section deals with the methods for calculating their properties in multicomponent systems. All values are given in PSI units or fractional and multiple units. Metrological characteristics of the experimental methods used for the determination of physico-chemical parameters are indicated as a relative error and those of the computational methods as a relative error or a root-mean square deviation. Classic text deals primarily with measurement, interpretation of conductance, chemical potential, and diffusion in electrolyte solutions. Detailed theoretical interpretations, plus extensive tables of thermodynamic and transport properties. 1970 edition. The chapters making up this volume had originally been planned to form part of a single volume covering solid hydrates and aqueous solutions of simple molecules and ions. However, during the preparation of the manu scripts it became apparent that such a volume would turn out to be very unwieldy and I reluctantly decided to recommend the publication of sepa rate volumes. The most sensible way of dividing the subject matter seemed to lie in the separation of simple ionic solutions. The emphasis in the present volume is placed on ion-solvent effects, since a number of excellent texts cover the more general aspects of electrolyte solutions, based on the classical theories of Debye, Huckel, On sager, and Fuoss. It is interesting to speculate as to when a theory becomes "classical." Perhaps this occurs when it has become well known, well liked, and much adapted. The above-mentioned theories of ionic equilibria and transport certainly fulfill these criteria. There comes a time when the refinements and modifications can no longer be related to physical significance and can no longer hide the fact that certain fundamental assumptions made in the development of the theory are untenable, especially in the light of information obtained from the application of sophisticated molecular and thermodynamic techniques. Electrolyte solutions play a key role in traditional chemical industry processes as well as other sciences such as hydrometallurgy, geochemistry, and crystal chemistry. Knowledge of electrolyte solutions is also key in oil and gas exploration and production, as well as many other environmental engineering endeavors. Until recently, a gap existed be Adsorption from Solutions of Non-Electrolytes provides a general discussion of the subject, which has so far been given little or no attention in current textbooks of physical chemistry. A general view of the subject is particularly needed at a time when we wish to see how far it will be possible to use theories of solutions to explain the phenomena of adsorption. The book opens with an introductory chapter on the types of interface, aspects of adsorption from solution, types of adsorption, and classification of systems. This is followed by separate chapters on experimental methods, adsorption at the liquid-solid interface, adsorption from completely miscible and partially liquids, adsorption of gases and solids from solution, adsorption of polymers, and adsorption in multicomponent systems. Subsequent chapters deal with factors influencing competitive adsorption at the liquid-solid interface. adsorption at the liquid-vapor and liquid-liquid interface, kinetics and thermodynamics of adsorption from the liquid phase, the use of columns in adsorption, and use of adsorption from solution to measure surface area. Ceramic and Specialty Electrolytes for Energy Storage Devices, Volume II, investigates recent progress and challenges in a wide range of ceramic solid and quasi-solid electrolytes and specialty electrolytes for energy storage devices. The influence of these electrolyte properties on the performance of different energy storage devices is discussed in detail. Features: • Offers a detailed outlook on the performance requirements and ion transportation mechanism in solid polymer electrolytes • Covers solid-state electrolytes based on oxides (perovskite, anti-perovskite) and sulfide-type ion conductor electrolytes for lithium-ion batteries followed by solid-state electrolytes based on NASICON and garnet-type ionic conductors • Discusses electrolytes employed for high-temperature lithium-ion batteries, low-temperature lithium-ion batteries, and magnesium-ion batteries • Describes sodium-ion batteries, transparent electrolytes for energy storage devices, non-platinum-based cathode electrocatalyst for direct methanol fuel cells, non-platinum-based anode electrocatalyst for direct methanol fuel cells, and ionic liquid-based electrolytes for supercapacitor applications • Suitable for readers with experience in batteries as well as newcomers to the field This book will be invaluable to researchers and engineers working on the development of next-generation energy storage devices, including materials and chemical engineers, as well as those involved in related disciplines. The aim of this book is to provide the reader with a modern presentation of ionic solutions at interfaces, for physical chemists, chemists and theoretically oriented experimentalists in this field. The discussion is mainly on the structural and thermodynamic properties, in relation to presently available statistical mechanical models. Some dynamic properties are also presented, at a more phenomenological level. The initial chapters are devoted to the presentation of some basic concepts for bulk properties: hydrodynamic interactions, electrostatics, van der Waals forces and thermodynamics of ionic solutions in the framework of a particular model: the mean spherical approximation (MSA). Specific features of interfaces are then discussed: experimental techniques such as in-situ X-ray diffraction, STM and AFM microscopy are described. Ions at liquid/air, liquid/metal and liquid/liquid interfaces are considered from the experimental and theoretical viewpoint. Lastly some dynamic (transport) properties are included, namely the self-diffusion and conductance of small colloids (polyelectrolytes and micelles) and the kinetics of solute transfer at free liquid/liquid interfaces. Biopolymer Electrolytes: Fundamentals and Applications in Energy Storage provides the core fundamentals and applications for polyelectrolytes and their properties with a focus on biopolymer electrolytes. Increasing global energy and environmental challenges demand clean and sustainable energy sources to support the modern society. One of the feasible technologies is to use green energy and green materials in devices. Biopolymer electrolytes are one such green material and, hence, have enormous application potential in devices such as electrochemical cells and fuel cells. Features a stable of case studies throughout the book that underscore key concepts and applications Provides the core fundamentals and applications for polyelectrolytes and their properties Weaves the subject of biopolymer electrolytes across a broad range of disciplines, including chemistry, chemical engineering, materials science, environmental science, and pharmaceutical science Most of the properties of a metal-electrolyte interface, even the spe cific nature of an electrode reaction, proneness of a metal to cor rosion, etc., are primarily determined by the electrical double layer (EDL) at this boundary. It is therefore no surprise that for the last, at least, one hundred years intent attention should have been centered on EDL. So much of material has been gathered to date that we are easi ly lost in this maze of information. A substantial part of the attempts to systematize these facts is made at present within the framework of thermodynamics. Such a confined approach is undoubtedly inadequate. The Gouy-Chapman theory and the Stern-Grahame model of the dense part of EDL developed 40-70 years ago, tailored appropriately to suit the occasion, inevitably underlie any description of EDL. This route is rather too narrow to explain all the facts at our disposal. A dire necessity has thus arisen for widening the principles of the micros copic theory. This is precisely the objective of our monograph. Fur thermore, we shall dwell at length on the comparison of the theory with experiment: without such a comparative analysis, any theory, however elegant it may be, is just an empty drum. Physical Chemistry for the Biosciences has been optimized for a one-semester introductory course in physical chemistry for students of biosciences. Over the past decade, numerous books have attempted to explain ions in aqueous solutions in relation to biophysical phenomena. Ions in Water and Biophysical Implications, from Chaos to Cosmos offers a physicochemical point of view of the spread of this matter and suggests innovative solutions that will challenge the biophysics research establishment. Starting with a throughout discussion of the properties of liquid water, in particular as a structured liquid with an extensive hydrogen bonded structure, the book examines water as a solvent for gases, non-electrolytes, and electrolytes and reviews the properties, sizes and thermodynamics of isolated and aqueous ions, as well as their interactions, including those of polyelectrolytes. The effects of ions on water structure, including those on solvent dynamics and certain thermodynamic quantities, are presented. This volume investigates water surfaces with its vapour, with another liquid, and with a solid, as well as the effects of solutes, including simple ions and the water-miscible non-electrolytes. Surfaces are relevant to biomolecular and colloidal systems and the book discusses briefly surfactants, micelles and vesicles. Finally, the book concludes with a review of the various biophysical implications involving chaotropic and kosmotropic ions in homogeneous solutions and the Hofmeister series for ions concerning biomolecular and colloidal systems and some aspects of protein hydration and K+/Na+ selectivity in ion channels. Ions in Water and Biophysical Implications, from Chaos to Cosmos will appeal to physical chemists, biophysicists, biochemists, as well as to all students and researchers involved in the study of aqueous solutions. Electrolyte solutions play a key role in traditional chemical industry processes as well as other sciences such as hydrometallurgy, geochemistry, and crystal chemistry. Knowledge of electrolyte solutions is also key in oil and gas exploration and production, as well as many other environmental engineering endeavors. Until recently, a gap existed between the electrolyte solution theory dedicated to diluted solutions, and the theory, practice, and technology involving concentrated solutions. Electrolytes: Supramolecular Interactions and Non-Equilibrium Phenomena in Concentrated Solutions addresses concentrated electrolyte solutions and the theory of structure formation, super and supramolecular interactions, and other physical processes with these solutions—now feasible due to new precision measurement techniques and experimental data that have become available. The first part of the book covers the electrolyte solution in its stationary state—electrostatic, and various ion-dipole, dipole-dipole, and mutual repulsion interactions. The second part covers the electrolyte solution in its nonstationary status, in the case of forced movement between two plates—electrical conductivity, viscosity, and diffusion. This theoretical framework allows for the determination of activity coefficients of concentrated electrolyte solutions, which play a key role in many aspects of electrochemistry and for developing novel advanced processes in inorganic chemical plants. The chapters making up this volume had originally been planned to form part of a single volume covering solid hydrates and aqueous solutions of simple molecules and ions. However, during the preparation of the manu scripts it became apparent that such a volume would turn out to be very unwieldy and I reluctantly decided to recommend the publication of sepa rate volumes. The most sensible way of dividing the subject matter seemed to lie in the separation of simple ionic solutions. The emphasis in the present volume is placed on ion-solvent effects, since a number of excellent texts cover the more general aspects of electrolyte solutions, based on the classical theories of Debye, Huckel, On sager, and Fuoss. It is interesting to speculate as to when a theory becomes "classical." Perhaps this occurs when it has become well known, well liked, and much adapted. The above-mentioned theories of ionic equilibria and transport certainly fulfill these criteria. There comes a time when the refinements and modifications can no longer be related to physical significance and can no longer hide the fact that certain fundamental assumptions made in the development of the theory are untenable, especially in the light of information obtained from the application of sophisticated molecular and thermodynamic techniques. Solution chemistry deals with liquid solutions in such fields as physical chemistry, chemical physics, molecular biology, statistical mechanics, biochemistry, and biophysics. This book includes experimental investigations of the dielectric, spectroscopic, thermodynamic, transport, or relaxation properties of both electrolytes and non-electrolytes in liquid solutions. The latest research in the world has been selected, gathered and presented here. This book was first published in 1991. It considers the concepts and theories relating to mostly aqueous systems of activity coefficients. Electrolytes for Lithium and Lithium-ion Batteries provides a comprehensive overview of the scientific understanding and technological development of electrolyte materials in the last several years. This book covers key electrolytes such as LiPF6 salt in mixed-carbonate solvents with additives for the state-of-the-art Li-ion batteries as well as new electrolyte materials developed recently that lay the foundation for future advances. This book also reviews the characterization of electrolyte materials for their transport properties, structures, phase relationships, stabilities, and impurities. The book discusses in-depth the electrode-electrolyte interactions and interphasial chemistries that are key for the successful use of the electrolyte in practical devices. The Quantum Mechanical and Molecular Dynamical calculations that has proved to be so powerful in understanding and predicating behavior and properties of materials is also reviewed in this book. Electrolytes for Lithium and Lithium-ion Batteries is ideal for electrochemists, engineers, researchers interested in energy science and technology, material scientists, and physicists working on energy. V.4 Aqueous solutions of amphiphiles and macromolecules. Author, subject and compound indexes. Classic text deals primarily with measurement, interpretation of conductance, chemical potential, and diffusion in electrolyte solutions. Detailed theoretical interpretations, plus extensive tables of thermodynamic and transport properties. 1970 edition. This is a complete and authoritative reference text on an evolving field. Over 200 international scientists have written over 340 separate topics on different aspects of geochemistry including organics, trace elements, isotopes, high and low temperature geochemistry, and ore deposits, to name just a few. The introductory textbook provides an update on electrolyte thermodynamics with a molecular perspective. It is eminently suited as an introduction to the solution thermodynamics of ionic mixtures at the undergraduate and graduate level. It is also invaluable for the understanding and design in the engineering of natural gas treating and adsorption refrigeration with electrolytes.

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