

Chapter 6 Aqueous Thermodynamics Oli Systems

It is a pleasure to be asked to write the foreword to this interesting new book. When Professor Bedrikovetsky first accepted my invitation to spend an extended sabbatical period in the Department of Mineral Resources Engineering at Imperial College of Science, Technology and Medicine, I hoped it would be a period of fruitful collaboration. This book, a short course and a variety of technical papers are tangible evidence of a successful stay in the UK. I am also pleased that Professor Bedrikovetsky acted on my suggestion to publish this book with Kluever as part of the petroleum publications for which I am Series Editor. The book derives much of its origin from the unpublished Doctor of Science thesis which Professor Bedrikovetsky prepared in Russian while at the Gubkin Institute. The original DSc contained a number of discrete publications unified by an analytical mathematics approach to fluid flow in petroleum reservoirs. During his sabbatical stay at Imperial College, Professor Bedrikovetsky has refined and extended many of the chapters and has discussed each one with internationally recognised experts in the field. He received great encouragement and editorial advice from Dr Gren Rowan, who pioneered analytical methods in reservoir modelling at BP for many years.

A guide to the development and manufacturing of pharmaceutical products written for professionals in the industry, revised second edition The revised and updated second edition of Chemical Engineering in the Pharmaceutical Industry is a practical book that highlights chemistry and chemical engineering. The book's regulatory quality strategies target the development and manufacturing of pharmaceutically active ingredients of pharmaceutical products. The expanded second edition contains revised content with many new case studies and additional example calculations that are of interest to chemical engineers. The 2nd Edition is divided into two separate books: 1) Active Pharmaceutical Ingredients (APIs) and 2) Drug Product Design, Development and Modeling. The active pharmaceutical ingredients book puts the focus on the chemistry, chemical engineering, and unit operations specific to development and manufacturing of the active ingredients of the pharmaceutical product. The drug substance operations section includes information on chemical reactions, mixing, distillations, extractions, crystallizations, filtration, drying, and wet and dry milling. In addition, the book includes many applications of process modeling and modern software tools that are geared toward batch-scale and continuous drug substance pharmaceutical operations. This updated second edition:
• Contains 30new chapters or revised chapters specific to API, covering topics including: manufacturing quality by design, computational approaches, continuous manufacturing, crystallization and final form, process safety
• Expanded topics of scale-up, continuous processing, applications of thermodynamics and thermodynamic modeling, filtration and drying
• Presents updated and expanded example calculations
• Includes contributions from noted experts in the field Written for pharmaceutical engineers, chemical engineers, undergraduate and graduate students, and professionals in the field of pharmaceutical sciences and manufacturing, the second edition of Chemical Engineering in the Pharmaceutical Industry focuses on the development and chemical engineering as well as operations specific to the design, formulation, and manufacture of drug substance and products.

This book is intended for engineers and related professionals in the oil and gas production industries. It is intended for use by personnel with limited backgrounds in chemistry, metallurgy, and corrosion and will give them a general understanding of how and why corrosion occurs and the practical approaches to how the effects of corrosion can be mitigated. It is also an asset to the entry-level corrosion control professional who may have a theoretical background in metallurgy, chemistry, or a related field, but who needs to understand the practical limitations of large-scale industrial operations associated with oil and gas production. While the may use by technicians and others with limited formal technical training, it will be written on a level intended for use by engineers having had some exposure to college-level chemistry and some familiarity with materials and engineering design.

The field of food colloids is concerned with the physical chemistry of food systems viewed as assemblies of particles and macromolecules in various stages of supramolecular and microscopic organization. Butter, cheese, ice cream, margarine mayonnaise and yogurt are all examples of food colloids. This book describes experimental and theoretical developments in the field over the past 10-15 years. The authors have tried to strike a reasonable balance between theory and experiment, between principles and applications, and between molecular and physical approaches to the subject.

Water

Conversion into Fuels, Chemicals and Power

Handbook of Aqueous Electrolyte Thermodynamics

Issues in Global Environment: Pollution and Waste Management: 2011 Edition

Geofluids

Formulation, Solvency, and Physical Properties

Expertise in electrolyte systems has become increasingly important in traditional CPI operations, as well as in oil/gas exploration and production. This book is the source for predicting electrolyte systems behavior, an indispensable "do-it-yourself" guide, with a blueprint for formulating predictive mathematical electrolyte models, recommended tabular values to use in these models, and annotated bibliographies. The final chapter is a general recipe for formulating complete predictive models for electrolytes, along with a series of worked illustrative examples. It can serve as a useful research and application tool for the practicing process engineer, and as a textbook for the chemical engineering student.

Surface tension provides a thermodynamic avenue for analyzing systems in equilibrium and formulating phenomenological explanations for the behavior of constituent molecules in the surface region. While there are extensive experimental observations and established ideas regarding desorption of ions from the surfaces of aqueous salt solutions, a more

An updated and fresh perspective of the subject based on the concepts that the thermodynamic properties of a system are independent whether composition is specified in terms of formal components or molecular species and that the laws of thermodynamics are independent of the observational time-scale. By applying these concepts, the author has derived approximately 20 general theorems concerned with the thermodynamic properties of molecular species and their relationships to those of the formal components. Grunwald defines molecular species to include all participants in reaction mechanisms. Proved theories are supplemented with verbal explanations and explicit examples. Applications chapters include environmental isomers in liquids and thermodynamic properties of water and aqueous systems. Extra thermodynamic chapters feature interionic attraction theory and structure-energy correlation.

This practical work summarizes the development of organophosphorus chemistry in topical areas and details the discipline's current state - providing applications and experimental procedures throughout..Written by 18 leading authorities in the field, the Handbook of Organophosphorus Chemistry: examines advances in the mechanistic understanding of the Perkow and related organophosphorus reactions; describes methods for the reduction of quinquevalent to trivalent phosphorus and their applications to standard synthetic procedures; emphasizes the preparation of phosphonates bearing hydroxy, amino, and thiol functions at the alpha-position relative to the phosphoryl group; reviews the basis of NMR as it applies to the 31P nucleus, considering the use of the latest measurement techniques in solving structural and mechanistic problems; compares the characteristics of polymer-based and monomeric materials; and presents recent progress in the design of insecticides and covers their chemical and biological characteristics..Generously referenced with close to 3000 bibliographic citations, the Handbook of Organophosphorus Chemistry is an important volume for organic, medicinal, and agricultural chemists and biochemists; pharmacists; chemical engineers; and graduate-level students in these disciplines.

Corrosion Control in the Oil and Gas Industry

Enhanced Oil Recovery

Encapsulations

Food Emulsions

Advances In Food Colloids

Synthesis, Interfacial and Solution-Phase Behavior, and Applications

Microencapsulation and Microspheres for Food Applications is a solid reflection on the latest developments, challenges, and opportunities in this highly expanding field. This reference examines the various types of microspheres and microcapsules essential to those who need to develop stable and impermeable products at high acidic conditions. It's also important for the novel design of slow releasing active compound capsules. Each chapter provides an in-depth account of controlled release technologies, evidence based abstracts, descriptions of chemical and physical principals, and key relevant facts relating to food applications. Written in an accessible manner, the book is a must have resource for scientists, researchers, and engineers. Discusses the most current encapsulation technology applied in the food industry, including radiography, computed tomography, magnetic resonance imaging, and dynamic NMR microscopy Presents the use of microsphere immunoassay for mycotoxins detection Covers a broad range of applications of microcapsules and microspheres, including food shelf-life, pesticides for crop protection, and nanoencapsulated bacteriophage for food safety

Metallurgical Thermodynamics, as well as its modified version, **Thermodynamics of Materials**, forms a core course in metallurgical and materials engineering, constituting one of the principal foundations in these disciplines. Designed as an undergraduate textbook, this concise and systematically organized text deals primarily with the thermodynamics of systems involving physico-chemical processes and chemical reactions, such as calculations of enthalpy, entropy and free energy changes of processes; thermodynamic properties of solutions; chemical and phase equilibria; and thermodynamics of surfaces, interfacial and defects. The major emphasis is on high-temperature systems and processes involving metals and inorganic compounds. The many worked examples, diagrams, and tables that illustrate the concepts discussed, and chapter-end problems that stimulate self-study should enable the students to study the subject with enhanced interest.

Pseudocereals, belonging to the genus **Amaranthus**, have been cultivated for their grains for 8,000 years or more. The grain was a staple food of the Aztecs and was also considered an integral part of Aztec religious ceremonies. The book primarily focuses on the nutrient properties of amaranth and expresses its viewpoint in considering this crop as a remedy for many nutrient deficiencies and curbing food insecurity. The functional properties of the grain are immense and it is clear that the crop would be a valuable agricultural product around the world.

Emulsions, the third volume of the **Nanotechnology in the Food Industry** series, is an invaluable resource for anyone in the food industry who needs the most recent information about scientific advances in nanotechnology on this topic. This volume focuses on basic and advanced knowledge about nanoemulsion, and presents an overview of the production methods, materials (solvents, emulsifiers, and functional ingredients), and current analytical techniques that can be used for the characterization and analysis of nanoemulsions. The book also discusses the applications of nanoemulsion with special emphasis on systems suitable for utilization within the food industry. This book is useful to a wide audience of food science researchers and students who are doing research in this field, as well as others interested in recent nanotechnological progress worldwide. Presents fundamentals of nanoemulsions, methods of preparation (high-energy and low-energy techniques), and applications in the food industry Includes research studies of nanoemulsification technology to improve bioavailability of food ingredients and research analysis Offers benefits and methods of risk assessment to ensure food safety Presents cutting-edge encapsulating systems to improve the quality of functional compounds Provides a variety of methods, such as high-shear stirring, high-pressure homogenizers, self-emulsification, phase transitions and phase-inversion, to further research in this field

Nutritional Value of Amaranth

Environmental Organic Chemistry

Microencapsulation and Microspheres for Food Applications

Metallurgy and Corrosion Control in Oil and Gas Production

Sustainable Gold Mining Wastewater Treatment by Sorption Using Low-Cost Materials

Thermochemical Processing of Biomass

This course aims to correct the principles, concepts, and laws/postulates of classical and statistical thermodynamics to applications that require quantitative knowledge of thermodynamic properties from a macroscopic to a molecular level. It covers their basic postulates of classical thermodynamics and their application to transient open and closed systems, criteria of stability and equilibria, as well as constitutive property models of pure materials and mixtures emphasizing molecular-level effects using the formalism of statistical mechanics. Phase and chemical equilibria of multicomponent systems are covered. Applications are emphasized through extensive problem work relating to practical cases.

Geofluids: Developments in Microthermometry, Spectroscopy, Thermodynamics, and Stable Isotopes is the definitive source on paleofluids and the migration of hydrocarbons in sedimentary basins—ideal for researchers in oil and gas exploration. There’s been a rapid development of new non-destructive analytical methods and interdisciplinary research that makes it difficult to find a single source of content on the subject of geofluids. Geoscience researchers commonly use multiple tools to interpret geologic problems, particularly if the problems involve fluid-rock interaction. This book perfectly combines the techniques of fluid inclusion microthermometry, stable isotope analyses, and various types of spectroscopy, including Raman analysis, to contribute to a thorough approach to research. Through a practical and intuitive step-by-step approach, the authors explain sample preparation, measurements, and the interpretation and analysis of data related to thermodynamics and mineral-fluid equilibria. Features working examples in each chapter with step-by-step explanations and calculations Broad range of case studies aid the analytical and experimental data Includes appendices with equations of state, stable isotope fractionation equations, and Raman identification tables that aid in identification of fluid inclusion minerals Authored by a team of expert scientists who have more than 60 years of related experience in the field and classroom combined

Through the ages, water has been the inspiration of poets, painters, composers and philosophers. Today however, water is perceived as a commodity, with little thought for its role in influencing chemical reactions and shaping our terrestrial environment to make it fit for life. Water 2nd Edition is an update and extension of the RSC paperback first published in 1983. This book discusses current scientific knowledge of water: its remarkable properties, its influence on dissolved substances and its usually neglected but controlling role in the life sciences and ecology. With emphasis on developments over the last two decades, attention is drawn to important issues such as water quality, usage, economics and politics.

Sorption technique was employed to remove heavy metals from gold mining effluent using natural and plant materials for sustainability. An assessment of the effluent quality of a gold mining company in Ghana indicated that arsenic, copper and cyanide were the major pollutants in the process effluent. Arsenic and copper were successfully removed from the effluent by the studied materials. The research showed that the down-flow fixed-bed treatment configuration is an ideal system for the simultaneous removal of copper and arsenic from low concentration gold mining effluent, in addition to other heavy metals present in very low concentrations.

Nanoparticle- and Microparticle-based Delivery Systems

The Role of Thermodynamics in Biochemical Engineering

Molecular Thermodynamics Of Electrolyte Solutions (Second Edition)

Thermodynamics of Molecular Species

Chemical Engineering Thermodynamics II

TEXTBOOK OF MATERIALS AND METALLURGICAL THERMODYNAMICS

This book covers the fundamentals of the rapidly growing field of biothermodynamics, showing how thermodynamics can best be applied to applications and processes in biochemical engineering. It describes the rigorous application of thermodynamics in biochemical engineering to rationalize bioprocess development and obviate a substantial fraction of this need for tedious experimental work. As such, this book will appeal to a diverse group of readers, ranging from students and professors in biochemical engineering, to scientists and engineers, for whom it will be a valuable reference.

Electrolytes and salt solutions are ubiquitous in chemical industry, biology and nature. This unique compendium introduces the elements of the solution properties of ionic mixtures. In addition, it also serves as a bridge to the modern researches into the molecular aspects of uniform and non-uniform charged systems. Notable subjects include the Debye-Hückel limit, Pitzer's formulation, Setchenov salting-out, and McMillan-Mayer scale. Two new chapters on industrial applications — natural gas treating, and absorption refrigeration, are added to make the book current and relevant. This textbook is eminently suitable for undergraduate and graduate students. For practicing engineers without a background in salt solutions, this introductory volume can also be used as a self-study.

To the biochemist, the only solvent worth considering is water. To the polymer scientist, however, the polymer is the solvent. Probably because of these remarkable properties, biochemists do not tend to regard proteins, nucleotides and polysaccharides as polymers in the way that real polymer scientists regard methyl methacrylate and polyethylene. The laws of polymer statistics hardly apply to native biopolymers. Between these two powerful camps, lies the No-man's land of water soluble synthetic polymers: here, we must also include natural polymers which have been chemically modified. The scientific literature of these compounds is characterized by a large number of patents, which is usually a sign of little basic understanding, of 'know-how' rather than of 'know-why'. Many of the physical properties of such aqueous solutions are intriguing: the polymer may be completely miscible with water, and yet water is a 'poor' solvent, in terms of polymer parlance. ~king of the polymers form thermorever sible gels on heating or cooling. The phenomena of exothermic mixing and salting-in are common features of such systems: neither can be fully explained by the available theories. Finally, the eccentric behaviour of polyelectrolytes is well documented. Despite the lack of a sound physico-chemical foundation there is a general awareness of the importance of water soluble vinyl, acrylic, polyether, starch and cellulose derivatives, as witnessed again by –he vast patent literature.

Beginning with P.A. Winsor's fundamental hypothesis on a natural interfacial curvature depending on the values of the formulation variables, this unique book shows scientists how to understand the intrinsic structure of these complex systems and their corresponding physical properties... predict how a change in one formulation variable (surfactant structure, oil structure, aqueous phase composition, temperature, etc.) will modify the microemulsion... and systematically formulate microemulsions for individual applications. This book provides a thermodynamic analysis supporting the existence of natural interfacial curvature... compares the behavior of commercial surfactant mixtures and pure isomeric surfactant molecules in order to point out differences and similarities highly significant for various uses... explains how micelles can evolve smoothly and continuously toward solutions containing large quantities of oil and water... gives procedures for fixing quantitative relationships among formulation variables... plus much more.Illustrated with more than 200 diagrams, tables, and photographs, and completely referenced, this superb volume is essential reading for surfactant, colloid, and physical chemists in both academe and industry, as well as chemical engineers, biotechnologists, and petroleum engineers.Contents: 1. The R-Ratio. 2. Aqueous solutions containing amphiphiles. 3. Nonpolar solutions containing amphiphiles. 4. The phase behavior and properties of solutions containing amphiphiles, organic liquids, and water: micellar solutions. 5. Methods for promoting phase changes. 6. Compensating changes between formulation variables. 7. Solubilization. 8. Thermodynamics of solubilized systems.

Principles, Practices, and Techniques, Third Edition

Revue de L'Institut Français Du Pétrole

UNESCO-IHE PhD Thesis

A Matrix of Life

Energy Research Abstracts

Encapsulation, Protection and Release of Active Compounds

The phenomenon of amyloidosis has attracted the attention of numerous researchers for two main reasons: (1) it involves unexpected changes in protein conformation (without chemical intervention) and (2) has practical implications, such as elucidating the mechanisms which drive neurodegenerative diseases carries. In particular, understanding the process of amyloidosis is a fundamental prerequisite in the search for new, effective drugs and therapies targeting the key area of neurodegenerative diseases. The book proposes a model and a mechanism which explain protein misfolding. The concepts presented are based on a model originally intended to show how proteins attain their native conformations. The model is quantitative in nature and founded upon arguments derived from information theory. It facilitates prediction and simulation of the amyloid fibrillation process. It also identifies progressive changes which occur in native proteins, leading to the emergence of amyloid aggregations.

The effect of corrosion in the oil industry leads to the failure of parts. This failure results in shutting down the plant to clean the facility. The annual cost of corrosion to the oil and gas industry in the United States alone is estimated at \$27 billion (According to NACE International)—leading some to estimate the global annual cost to the oil and gas industry as exceeding \$60 billion. In addition, corrosion commonly causes serious environmental problems such as acid rain and acid seas. An essential resource for all those who are involved in the corrosion management of oil and gas infrastructure, Corrosion Control in the Oil and Gas Industry provides engineers and designers with the tools and methods to design and implement comprehensive corrosion–management programs for oil and gas infrastructure. The book addresses all segments of the industry, including production, transmission, storage, refining and distribution. Selects cost-effective methods to control corrosion Quantitatively measures and estimates corrosion rates Treats oil and gas infrastructures as systems in order to avoid the impacts that changes to one segment if a corrosion management program may have on others Provides a gateway to more than 1,000 industry best practices and international standards

Handbook of Aqueous Electrolyte ThermodynamicsTheory & ApplicationJohn Wiley & Sons

Designed as an undergraduate-level textbook in Chemical Engineering, this student-friendly, thoroughly class-room tested book, now in its second edition, continues to provide an in-depth analysis of chemical engineering thermodynamics. The book has been so organized that it gives comprehensive coverage of basic concepts and applications of the laws of thermodynamics in the initial chapters, while the later chapters focus at length on important areas of study falling under the realm of chemical thermodynamics. The reader is thus introduced to a thorough analysis of the fundamental laws of thermodynamics as well as their applications to practical situations. This is followed by a detailed discussion on relationships among thermodynamic properties and an exhaustive treatment on the thermodynamic properties of solutions. The role of phase equilibrium thermodynamics in design, analysis, and operation of chemical separation methods is also deftly dealt with. Finally, the chemical reaction equilibria are skillfully explained. Besides numerous illustrations, the book contains over 200 worked examples, over 400 exercise problems (all with answers) and several objective-type questions, which enable students to gain an in-depth understanding of the concepts and theory discussed. The book will also be a useful text for students pursuing courses in chemical engineering branches such as polymer engineering, petroleum engineering, and safety and environmental engineering. New to This Edition
• More Example Problems and Exercise Questions in each chapter
• Updated section on Vapour-Liquid Equilibrium in Chapter 8 to highlight the significance of equations of state approach
• Q&E Questions up to 2012 with answers

Handbook of Organophosphorus Chemistry

Molecular Thermodynamics of Some Highly Asymmetric Liquid Mixtures

Developments in Microthermometry, Spectroscopy, Thermodynamics, and Stable Isotopes

With Charts

Mathematical Theory of Oil and Gas Recovery

Recent developments in nanoparticle and microparticle delivery systems are revolutionizing delivery systems in the food industry. This developments have the potential to solve many of the technical challenges involved in creating encapsulation, protection, and delivery of active ingredients, such as colors, flavors, preservatives, vitamins, minerals, and nutraceuticals. Nanoparticle- and Microparticle-based Delivery Systems: Encapsulation, Protection and Release of Active Compounds explores various types of colloidal delivery systems available for encapsulating active ingredients, highlighting their relative advantages and limitations and their use. Written by an international authority known for his clear and rigorous technical writing style, this book discusses the numerous kinds of active ingredients available and the issues associated with their encapsulation, protection, and delivery. The author takes a traditional colloid science approach and emphasizes the practical aspects of formulation of particulate- and emulsion-based delivery systems with food applications. He then covers the physicochemical and mechanical methods available for manufacturing colloidal particles, highlighting the importance of designing particles for specific applications. The book includes chapters devoted specifically to the three major types of colloidal delivery systems available for encapsulating active ingredients in the food industry: surfactant-based, emulsion-based, and biopolymer-based. It then reviews the analytical tools available for characterizing the properties of colloidal delivery systems, presents the mathematical models for describing their properties, and highlights the factors to consider when selecting an appropriate delivery system for a particular application backed up by specific case studies. Based on insight from the author's own experience, the book describes why delivery systems are needed, the important factors to consider when designing them, methods of characterizing them, and specific examples of the range of food-grade delivery systems available. It gives you the necessary knowledge, understanding, and appreciation of developments within the current research literature in this rapidly growing field and the confidence to perform reliable experimental investigations according to modern international standards.

Progress in International Research on Thermodynamic and Transport Properties covers the proceedings of the 1962 Second Symposium by the same title, held at Purdue University and the Thermophysical Properties Research Center. This symposium brings together theoretical and experimental research work on the thermodynamic and transport properties of gases, liquids, and solids. This text is organized into nine parts encompassing 68 chapters that cover topics from thixotropy to molecular orbital calculations. The first three parts review papers on theoretical, experimental, and computational studies of the various aspects of thermodynamic properties. These papers discuss theoretical, volumetric behavior, enthalpy, and density. The subsequent part highlights the theoretical evaluations of transport properties, such as viscosity, diffusion, and conductivity, as well as the transport processes. These topics are followed by surveys of the theories in intermolecular forces and their applications. Other parts consider the measurement of thermal conductivity, viscosity, and radiation. The final parts examine the properties of ionized gases and non-Newtonian fluids. This book will prove useful to mechanical and chemical engineers.

The emergence of the discipline of encapsulation and controlled release has had a great impact on the food and dietary supplement sectors; principally around fortifying food systems with nutrients and health-promoting ingredients. The successful incorporation of these actives in food formulations depends on preserving their stability and bioavailability as well as masking undesirable flavors throughout processing, shelf life and consumption. This second edition of Encapsulation and Controlled Release Technologies in Food Systems serves as an improvement and a complement companion to the first. However, it differentiates itself in two main aspects. Firstly, it introduces the reader to novel encapsulation and controlled release technologies which have not yet been addressed by any existing book on this matter, and secondly, it offers an in-depth discussion on the impact of encapsulation and controlled release technologies on the bioavailability of health ingredients and other actives. In common with the first edition the book includes chapters written by distinguished authors and researchers in their respective areas of specialization. This book is designed as a reference for scientists and formulators in the food, nutraceuticals and consumer products industries who are looking to formulate new or existing products using microencapsulated ingredients. It is also a post-graduate text designed to provide students with an introduction to encapsulation and controlled release along with detailed coverage of various encapsulation technologies and their adaptability to specific applications.

Issues in Global Environment: Pollution and Waste Management: 2011 Edition is a ScholarlyEditions™ Book that delivers timely, authoritative, and comprehensive information about Global Environment—Pollution and Waste Management: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Global Environment—Pollution and Waste Management in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Global Environment: Pollution and Waste Management: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com.

Gemini Surfactants

Noticeance for the Conservation of Works of Art

A TEXTBOOK OF CHEMICAL ENGINEERING THERMODYNAMICS

With Applications to ex-USSR Oil and Gas Fields

Surface Tension and Related Thermodynamic Quantities of Aqueous Electrolyte Solutions

Chemistry and Technology of Water-Soluble Polymers

A comprehensive examination of the large number of possible pathways for converting biomass into fuels and power through thermochemical processes Bringing together a widely scattered body of information into a single volume, this book provides complete coverage of the many ways that thermochemical processes are used to transform biomass into fuels, chemicals and power. Fully revised and updated, this new edition highlights the substantial progress and recent developments that have been made in this rapidly growing field since publication of the first edition and incorporates up-to-date information in each chapter. Thermochemical Processing of Biomass: Conversion into Fuels, Chemicals and Power, 2nd Edition incorporates two new chapters covering: condensed phase reactions of thermal deconstruction of biomass and life cycle analysis of thermochemical processing systems. It offers a new introductory chapter that provides a more comprehensive overview of thermochemical technologies. The book also features fresh perspectives from new authors covering such evolving areas as solvent liquefaction and hybrid processing. Other chapters cover combustion, gasification, fast pyrolysis, upgrading of syngas and bio-oil to liquid transportation fuels, and the economics of thermochemically producing fuels and power, and more. Features contributions by a distinguished group of European and American researchers offering a broad and unified description of thermochemical processing options for biomass Combines an overview of the current status of thermochemical biomass conversion as well as engineering aspects to appeal to the broadest audience Edited by one of Biofuels Digest's "Top 100 People" in bioenergy for six consecutive years Thermochemical Processing of Biomass: Conversion into Fuels, Chemicals and Power, 2nd Edition will appeal to all academic researchers, process chemists, and engineers working in the field of biomass conversion to fuels and chemicals. It is also an excellent book for graduate and advanced undergraduate students studying biomass, biofuels, renewable resources, and energy and power generation.

Continuing the mission of the first two editions, **Food Emulsions: Principles, Practices, and Techniques**, Third Edition covers the fundamentals of emulsion science and demonstrates how this knowledge can be applied to control the appearance, stability, and texture of emulsion-based foods. Initially developed to fill the need for a single resource co

The subject matter of this book is not entirely new in that much has been written about the state of the interfacial chemistry in other textbooks. However, the authors have found that there is really a need for a book which can lead an investigator, a student, or a beginn er through the in-depth understanding and descriptions involved in the derivations and usage of the adsorption equations based on the unified concept of the Gibbs surface excess. The derivation of the original Gibbs equation for the liquid interface has been amplified with reformulations and criticisms. Attempts have been frequently made to relate the surface excess quantities with the thermodynamic properties of the physically defined interfacial phase. In the last two decades, useful applications of the Gibbs equations have been made for the study of adsorption at solid-liquid as well as liquid-gas interfaces formed in the presence of the multicomponent solutions in the bulk. These recent treatments become useful for the experimental studies of the adsorption of electrolytes and interfacial properties related to neutral and charged monolayers. The consistency of the experimental results with those to be expected from the theories of the electrical double layer needs careful examination. An attempt has been made to present in a single volume all these developments based on the unified concept of the Gibbs surface excess. The study of the adsorption from solution is of considerable importance in the field of biology and in many other branches of applied science.

Understanding the chemistry behind works of art and heritage materials presents an opportunity to apply scientific techniques to their conservation and restoration. Manipulation of materials at the nanoscale affords greater accuracy and minimal disturbance to the original work, while efficiently combating the affects of time and environment. This book meets the growing demand for an all-encompassing handbook to instruct on the use of today's science on mankind's cultural heritage. The editors have pioneered modern techniques in art conservation over the last four decades, and have brought together expertise from across the globe. Each chapter presents the theoretical background to the topic in question, followed by practical information on its application and relevant case studies. Introductory chapters present the science behind the physical composition of art materials. Four chapters explore various cleaning techniques now, followed by four chapters describing the application of inorganic nanomaterials. Each chapter is fully referenced to the primary literature and offers suggestions for further reading. Professional conservators and scientists alike will find this essential reading, as will postgraduate students in the fields of materials and colloid science, art restoration and nanoscience.

Emulsions

Theory & Application

Encapsulation and Controlled Release Technologies in Food Systems

Biothermodynamics

Microemulsions and Related Systems

Adsorption and the Gibbs Surface Excess

Encapsulations, a volume in the **Nanotechnology in the Agri-Food Industry** series,presents key elements in establishing food quality through the improvement of food flavor and aroma. The major benefits of nanoencapsulation for food ingredients include improvement in bioavailability of flavor and aroma ingredients, improvement in solubility of poor water-soluble ingredients, higher ingredient retention during production process, higher activity levels of encapsulated ingredients, improved shelf life, and controlled release of flavor and aroma. This volume discusses main nanoencapsulation processes such as spray drying, melt injection, extrusion, coacervation, and emulsification. The materials used in nanoencapsulation include lipids, proteins, carbohydrates, cellulose, gums, and food grade polymers. Applications and benefits of nanoencapsulation such as controlled release, protections, and taste masking will be explained in detail. Includes the most up-to-date information on nanoencapsulation and nanocointainer-based delivery of antimicrobials Presents nanomaterials for innovation based on scientific advancements in the field Provides control release strategies to enhance bioactivity, including methods and techniques for research and innovation Provides useful tools to improve the delivery of bioactive molecules and living cells into foods

Generating much interest in both academic and scientific circles, Gemini Surfactants gathers the most up-to-date research in gemini surfactantproduction and demonstrates how their propertiesand performance can revolutionize the current industrial application of these surfactants. It surveys the state of special gemini surfactants, including nonionic, zwitterionic, fluorinated, and amino-acid-based surfactants. Gemini Surfactants considers the synthesis, phase behavior, and rheology of gemini and related surfactants and clarifies the adsorption and surface tension behavior of gemini surfactants at air/water, oil/water, and solid/water interfaces. The book also details the physicochemical properties and microstructure of aqueous micellar solutions of gemini surfactants and compares mixed micellization between gemini surfactants and conventional surfactants. Environmental Organic Chemistry focuses on environmental factors that govern the processes that determine the fate of organic chemicals in natural and engineered systems. The information discovered is then applied to quantitatively assessing the environmental behaviour of organic chemicals. Now in its 2nd edition this book takes a more holistic view on physical-chemical properties of organic compounds. It includes new topics that address aspects of gas/solid partitioning, bioaccumulation, and transformations in the atmosphere. Structures chapters into basic and

sophisticated sections Contains illustrative examples, problems and case studies Examines the fundamental aspects of organic, physical and inorganic chemistry - applied to environmentally relevant problems Addresses problems and case studies in one volume

Nuclear Science Abstracts

Phase Behavior, Thermodynamic Modeling, and Fluid Microstructure in Amphiphile-oil-water Mixtures

Chemical Engineering in the Pharmaceutical Industry, Active Pharmaceutical Ingredients

Abridged Thermodynamic and Thermochemical Tables

Oil & Gas Science and Technology