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Digital Education for the 21st Century CRC Press
SOLID STATE CHEMISTRY AND ITS APPLICATIONS A comprehensive treatment of solid state chemistry complete with supplementary material and full colour illustrations from a leading expert in the field. Solid State Chemistry and its Applications, Second Edition delivers an advanced version of West's classic text in solid state chemistry, expanding on the undergraduate Student Edition to present a comprehensive treatment of solid state chemistry suitable for advanced students and researchers. The book provides the reader with an up-to-date account of essential topics in solid state chemistry and recent developments in this rapidly developing field of inorganic chemistry. Significant updates and new content in this second edition include: A more extensive overview of important families of inorganic solids including spinels, perovskites, pyrochlores, garnets, Ruddlesden-Popper phases and many more New methods to synthesise inorganic solids, including sol-gel methods, combustion synthesis, atomic layer deposition, spray pyrolysis and microwave techniques Advances in electron microscopy, X-ray and electron spectroscopies New developments in electrical properties of materials, including high Tc superconductivity, lithium batteries, solid oxide fuel cells and smart windows Recent developments in optical properties, including fibre optics, solar cells and transparent conducting oxides Advances in magnetic properties including magnetoresistance and multiferroic materials Homogeneous and heterogeneous ceramics, characterization using impedance spectroscopy Thermoelectric materials, MXenes, low dimensional structures, memristors and many other functional materials Expanded coverage of glass, including metallic and fluoride glasses, cement and concrete, geopolymers, refractories and structural ceramics Overview of binary oxides of all the elements, their structures, properties and applications Featuring full color illustrations throughout, readers will also benefit from online supplementary materials including access to CrystalMaker® software and over 100 interactive crystal structure models. Perfect for advanced students seeking a detailed treatment of solid state chemistry, this new edition of Solid State Chemistry and its Applications will also earn a place as a desk reference in the libraries of experienced researchers in chemistry, crystallography, physics, and materials science.
Physical Chemistry of Metallurgical Processes CRC Press
This updated edition of Gesser's classic textbook has undergone a full revision and now has the latest material, including new chapters on semiconductors and nanotechnology. It includes a supplementary laboratory section with stepwise experimental protocols.
Computational Chemistry John Wiley & Sons
* The present work is designed to provide a practical introduction to aqueous equilibrium phenomena for both students and research workers in chemistry, biochemistry, geochemistry, and interdisciplin ary environmental fields. The pedagogical strategy I have adopted makes heavy use of detailed examples of problem solving from real cases arising both in laboratory research and in the study of systems occurring in nature. The procedure starts with mathematically complete equations that will provide valid solutions of equilibrium problems, instead of the traditional approach through approximate concentrations and idealized, infinite-dilution assumptions. There is repeated emphasis on the use of corrected, conditional equilibrium constants and on the checking of numerical results by substitution in complete equations and/or against graphs of species distributions. Graphical methods of calculation and display are used extensively because of their value in clarifying equilibria and in leading one quickly to valid numerical approximations. The coverage of solution equilibrium phenomena is not, however, exhaustively comprehensive. Rather, I have chosen to offer funda mental and rigorous examinations of homogeneous step-equilibria and their interactions with solubility and redox equilibria. Many examples are worked out in detail to demonstrate the use of equi librium calculations and diagrams in various fields of investigation.
Forensic Chemistry Royal Society of Chemistry
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.
Crime Scene Chemistry for the Armchair Sleuth Springer
Written for those less comfortable with science and mathematics, this text introduces the major chemical engineering topics for non-chemical engineers. With a focus on the practical rather than the theoretical, the reader will obtain a foundation in chemical engineering that can be applied directly to the workplace. By the end of this book, the user will be aware of the major considerations required to safely and efficiently design and operate a chemical processing facility. Simplified accounts of traditional chemical engineering topics are covered in the first two-thirds of the book, and include: materials and energy balances, heat and mass transport, fluid mechanics, reaction engineering, separation processes, process control and process equipment design. The latter part details modern topics, such as biochemical engineering and sustainable development, plus practical topics of safety and process economics, providing the reader with a complete guide. Case studies are included throughout, building a real-world connection. These case studies form a common thread throughout the book, motivating the reader and offering enhanced understanding. Further reading directs those wishing for a deeper appreciation of certain topics. This book is ideal for professionals working with chemical engineers, and decision makers in chemical engineering industries. It will also be suitable for chemical engineering courses where a simplified introductory text is desired.
Kent ' s Technology of Cereals Springer Science & Business Media
Green chemistry promotes improved syntheses as an intellectual endeavour that can have a great impact both on preserving and utilizing our planet ' s finite resources and the quality of human life. This masterful accomplishment provides an evaluation of environmental impact metrics according to life cycle assessment analysis based on the Mackay compartment environmental model and Guin é e environmental impact potentials formalism. Assumptions, limitations, and dealing with missing data are addressed. Best literature resources for finding key toxicological parameters are provided and applied to individual reactions as well as entire synthesis plans, in order to target molecules of interest. Key Features: Provides an evaluation of environmental impact metrics according to life cycle assessment analysis Summarises safety-hazard metrics according to the same model as life cycle assessment including occupational exposure limits, risk phrases, flammability, and other physical parameters The book will be useful in a range of chemistry courses, from undergraduate to advanced graduate courses, whether based in lectures, tutorials or laboratory experiments
Physical Chemistry of Electrolyte Solutions John Wiley & Sons
Introduction to Materials Chemistry will appeal to advanced undergraduates and graduate students in chemistry, materials science,and chemical engineering by leading them stepwise from the elementary chemistry on which materials science depends, through a discussion of the different classes of materials, and ending with a description of how materials are used in devices and general technology.
Applied Chemistry CRC Press
Reasoning about structure-reactivity and chemical processes is a key competence in chemistry. Especially in organic chemistry, students experience difficulty appropriately interpreting organic representations and reasoning about the underlying causality of organic mechanisms. As organic chemistry is often a bottleneck for students ' success in their career, compiling and distilling the insights from recent research in the field will help inform future instruction and the empowerment of chemistry students worldwide. This book brings together leading research groups to highlight recent advances in chemistry education research with a focus on the characterization of students ' reasoning and their representational competencies, as well as the impact of instructional and assessment practices in organic chemistry. Written by leaders in the field, Student Reasoning in Organic Chemistry is ideal for chemistry education researchers, instructors and practitioners, and graduate students in chemistry education.
Soil Chemical Analysis Waveland Press
FORENSIC CHEMISTRY FUNDAMENTALS strives to help scientists & lawyers, & students, understand how their two disciplines come together for forensic science, in the contexts of analytical chemistry & related science more generally, and the common law systems of Canada, USA, UK, the Commonwealth. In this book, forensics is considered more generally than as only for criminal law; workplace health & safety, and other areas are included. And, two issues of Canadian legal process are argued as essays in the fi nal two chapters.
Introduction to Instrumentation and Measurements Woodhead Publishing
Carbon-carbon bond forming reactions are arguably the most important processes in chemistry, as they represent key steps in the building of complex molecules from simple precursors. Among these reactions, metal-catalyzed cross-coupling reactions are extensively employed in a wide range of areas of preparative organic chemistry, ranging from the synthesis of complex natural products, to supramolecular chemistry, and materials science. In this work, a dozen internationally renowned experts and leaders in the field bring the reader up to date by documenting and critically analyzing current developments and uses of metal-catalyzed cross-coupling reactions. A particularly attractive and useful feature, that enhances the practical value of this monograph, is the inclusion of key synthetic protocols, in experimental format, chosen for broad utility and application. This practice-oriented book can offer the practitioner short cuts to ensure they remain up-to-date with the latest developments.
Toxicological Chemistry, Second Edition John Wiley & Sons
On the cover of this book is a Pacific yew tree, found in the ancient forests of the Pacific Northwest. The bark of the Pacific yew tree produces Taxol, found to be a highly effective drug against ovarian and breast cancer. Taxol blocks mitosis during eukaryotic cell division. The supply of Taxol from the Pacific yew tree is vanishingly small, however. A single 100-year-old tree provides only about one dose of the drug (roughly 300 mg). For this reason, as well as the spectacular molecular architecture of Taxol, synthetic organic chemists fiercely undertook efforts to synthesize it. Five total syntheses of Taxol have thus far been reported. Now, a combination of isolation of a related metabolite from European yew needles, and synthesis of Taxol from that intermediate, supply the clinical demand. This case clearly demonstrates the importance of synthesis and the use of organic chemistry. It's just one of the many examples used in the text that will spark the interest of students and get them involved in the study of organic chemistry!
Integrated Experimental Chemistry: Principles and techniques Springer Science & Business Media
Toxicological Chemistry, 2nd Edition provides an easy-to-understand general discussion of biological processes operating on environmental chemical species. It also focuses on the chemistry of toxic substances based on their interactions with biological tissue and living organisms. The book is designed to appeal to readers with diverse general backgrounds. It assumes only a minimal background in chemistry and none in biology or microbiology. Introductory material regarding these fields is presented in the first few chapters so that more sophisticated topics can be addressed throughout the remainder of the book. Detailed discussions about specific areas of research are avoided, although key references on major topics are provided for readers who require more in-depth information. Toxicological Chemistry, 2nd Edition is useful for anyone concerned with the biological fate and effects of chemicals. It is ideal as a general reference book, source of background material, or textbook for regulatory personnel, students, engineers with consulting firms, health and safety personnel, and others.
Solid State Chemistry and its Applications CRC Press
Fluorescence microscopy is used for studying the distribution of substances

which are present in very small amounts, for example in living cells. This magnificent new work provides comprehensive cover of all aspects of fluorescence microscopy - including instrumentation, applications, and the history of the technique. The first volume deals with instrumentation and techniques for fluorescence microscopy, and includes a chapter on quantification and scanning. The second volume deals with the applications of fluorescence microscopy in many fields. It includes information on autofluorescence, and an invaluable appendix provides an alphabetical list of fluorochromes, giving information concerning chemical structure, fluorescence properties, applications and suitable filter combinations.

Introduction to Modern Inorganic Chemistry, 6th edition Elsevier

Computational chemistry has become extremely important in the last decade, being widely used in academic and industrial research. Yet there have been few books designed to teach the subject to nonspecialists. Computational Chemistry: Introduction to the Theory and Applications of Molecular and Quantum Mechanics is an invaluable tool for teaching and researchers alike. The book provides an overview of the field, explains the basic underlying theory at a meaningful level that is not beyond beginners, and it gives numerous comparisons of different methods with one another and with experiment. The following concepts are illustrated and their possibilities and limitations are given: - potential energy surfaces; - simple and extended H ü ckel methods; - ab initio, AM1 and related semiempirical methods; - density functional theory (DFT). Topics are placed in a historical context, adding interest to them and removing much of their apparently arbitrary aspect. The large number of references, to all significant topics mentioned, should make this book useful not only to undergraduates but also to graduate students and academic and industrial researchers.

Introductory Raman Spectroscopy Springer Science & Business Media

Kent ' s Technology of Cereals: An Introduction for Students of Food Science and Agriculture, Fifth Edition, is a classic and well-established book that continues to provide students, researchers and practitioners with an authoritative and comprehensive study of cereal technology. This new edition has been thoroughly updated with new sections, including extrusion cooking and the use of cereals for animal feed. In addition, it offers information on statistics, new products, the impact of climate changes and genetics, new economic trends, nutrition regulations and new technologies. The book is useful for students, researchers, and industrial practitioners alike, covering the full spectrum of cereal grain production, processing, and use for foods, feeds, fuels, industrial materials, and other uses. Provides readers with a leader in cereal science literature Includes new sections on extrusion cooking and the use of cereals for animal feed, along with information on statistics, new products, impact of climate changes and genetics, new economic trends, new nutrition regulations and new technologies Useful for students, researchers and industrial practitioners alike

Quantum Chemistry UW-Madison Libraries Parallel Press

Presents a novel approach to the statistical design of experiments, offering a simple way to specify and evaluate all possible designs without restrictions to classes of named designs. The work also presents a scientific design method from the recognition stage to implementation and summarization.

SOU 2004:067 Nuclear Waste state-of-the-art reports 2004 Elsevier

Aimed at advanced undergraduate and graduate students and researchers working with natural products, Professors Sunil and Bani Talapatra provide a highly accessible compilation describing all aspects of plant natural products. Beginning with a general introduction to set the context, the authors then go on to carefully detail nomenclature, occurrence, isolation, detection, structure elucidation (by both degradation and spectroscopic techniques) stereochemistry, conformation, synthesis, biosynthesis, biological activity and commercial applications of the most important natural products of plant origin. Each chapter also includes detailed references (with titles) and a list of recommended books for additional study making this outstanding treatise a useful resource for teachers of chemistry and researchers working in universities, research institutes and industry.

Synthesis Green Metrics John Wiley & Sons

Chemists and science authors Cathy Cobb and Monty L. Fetterolf have teamed up with Jack G. Goldsmith, fellow chemist and reserve police officer, to create another intriguing trek through the science of chemistry, this time using the fascinating field of forensic chemistry as their framework. All new hands-on demonstrations and fictional minute mysteries illustrate chemical concepts as the authors present the science-and the realities-of forensic chemistry in a narrative style that makes this timely topic accessible to the nonchemist. The authors lead you through actual and simulated forensic techniques such as · presumptive and confirmative drug testing · body fluid identification including luminol testing · DNA analysis · trace fiber and gun shot residue analysis · latent fingerprint development and collection · forensic soil analysisThrough more than twenty-five demonstrations, using ordinary household products and items, you can become familiar with the basics of forensic chemistry and gain insights into the painstaking work that goes into criminal investigations that is rarely seen on TV.If you're a fan of true-crime stories or mystery fiction, or interested in the science behind dramas like CSI, this informative and entertaining book is a must-have addition to your library.Cathy Cobb, Ph.D. (Aiken, SC), is the highly acclaimed author of The Joy of Chemistry, Creations of Fire, and Magick, Mayhem, and Mavericks. She is currently an instructor of chemistry, calculus, and physics at Aiken Preparatory School and adjunct professor of chemistry at the University of South Carolina at Aiken.Monty L. Fetterolf, Ph.D. (Aiken, SC), is the co-author of Joy of Chemistry and professor of chemistry at the University of South Carolina at Aiken.Jack G. Goldsmith, Ph.D. (Lexington, SC), is a reserve officer and information management officer for the Town of Lexington Police Department and former associate professor of chemistry at the University of South Carolina at Aiken.

Chemistry of Plant Natural Products Elsevier

he history of chemistry is a story of human endeavor-and as er T ratic as human nature itself. Progress has been made in fits and starts, and it has come from all parts of the globe. Because the scope of this history is considerable (some 100,000 years), it is necessary to impose some order, and we have organized the text around three dis cemible-albeit gross--divisions of time: Part 1 (Chaps. 1-7) covers 100,000 BeE (Before Common Era) to the late 1700s and presents the background of the Chemical Revolution; Part 2 (Chaps. 8-14) covers the late 1700s to World War land presents the Chemical Revolution and its consequences; Part 3 (Chaps. 15-20) covers World War I to 1950 and presents the Quantum Revolution and its consequences and hints at revolutions to come. There have always been two tributaries to the chemical stream: experiment and theory. But systematic experimental methods were not routinely employed until the 1600s-and quantitative theories did not evolve until the 1700s-and it can be argued that modem chernistry as a science did not begin until the Chemical Revolution in the 1700s. xi xii PREFACE We argue however that the first experiments were performed by arti sans and the first theories proposed by philosophers-and that a rev olution can be understood only in terms of what is being revolted against.

Solutions Manual, Inorganic Chemistry, Third Ed Norstedts Juridik AB

This book covers various metallurgical topics, viz. roasting of sulfide minerals, matte smelting, slag, reduction of oxides and reduction smelting, interfacial phenomena, steelmaking, secondary steelmaking, role of halides in extraction of metals, refining, hydrometallurgy and electrometallurgy. Each chapter is illustrated with appropriate examples of applications of the technique in extraction of some common, reactive, rare or refractory metal together with worked out problems explaining the principle of the operation.