

Chapter 17 Assessment Chemistry

Over the past 50 years, triazines have made a great impact on agriculture and world hunger by assisting in the development of new farming methods, providing greater farming and land use capabilities, and increasing crop yields. Triazines are registered in over 80 countries and save billions of dollars a year. The Triazine Herbicides is the one book that presents a comprehensive view of the total science and agriculture of these chemicals. With emphasis on how the chemicals are studied and developed, reviewed, and used at the agricultural level this book provides valuable insight into the benefits of triazine herbicides for sustainable agriculture. * Presents previously unpublished information on the discovery, development and marketing of herbicides * Includes a vital section on the origin, use, economics and fate of triazine herbicides * Covers benefits of triazines in corn and sorghum, sugarcane, citrus, fruit and nut crops * Establishes best management practice and environmental benefits of use in conservation tillage

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The demand for coal use (for electricity generation) and coal products, particularly liquid fuels and chemical feedstocks, is increasing throughout the world. Traditional markets such as North America and Europe are experiencing a steady increase in demand whereas emerging Asian markets, such as India and China, are witnessing a rapid surge in demand.

Prentice Hall Physical Science: Concepts in Action helps students make the important connection between the science they read and what they experience every day. Relevant content, lively explorations, and a wealth of hands-on activities take students' understanding of science beyond the page and into the world around them. Now includes even more technology, tools and activities to support differentiated instruction!

The Opuntia fruits, commonly known as cactus pears or prickly pears, have been suggested by the Food and Agriculture Organization to be a promising and strategic crop in regions suffering from lack of water. In Mexico, India, South Africa, and the Mediterranean, the Opuntia fruits have become popular due to their nutritive value and health-promoting benefits, including antioxidant, antiulcerogenic and antiatherogenic traits and protective effects against LDL oxidation. Additionally, readily absorbable sugars, high vitamin C and mineral content, and a pleasant flavour make Opuntia tailor-made for novel foods. Due to their ecological advantages, high functional value, and health-related traits, Opuntia fruits can be highly exploited in different food processing applications. For instance, Opuntia cactus fruits are used for the preparation of juices and marmalades; Opuntia cactus plants are used to feed animals in African and Latin American countries; Peruvian farmers cultivate Opuntia cactus for growing the cochineal (*Dactylopius coccus*) insect and producing the natural dye carmine; and the commercial production of food and non-food products from Opuntia has been established in Mexico, USA and several Mediterranean countries. Opuntia spp.: Chemistry, Bioactivity and Industrial Applications creates a multidisciplinary forum of discussion on Opuntia cactus with

special emphasis on its horticulture, post-harvest, marketability, chemistry, functionality, health-promoting properties, technology and processing. The text includes detailed discussion of the impact of traditional and innovative processing on the recovery of high-added value compounds from *Opuntia* spp. by-products. Later chapters explore the potential applications of *Opuntia* spp. in food, cosmetics and pharmaceutical products.

However, our knowledge of this "chemical network" is still negligible.

There have been significant developments in the use of knowledge-based expert systems in chemistry since the first edition of this book was published in 2009. This new edition has been thoroughly revised and updated to reflect the advances. The underlying theme of the book is still the need for computer systems that work with uncertain or qualitative data to support decision-making based on reasoned judgements. With the continuing evolution of regulations for the assessment of chemical hazards, and changes in thinking about how scientific decisions should be made, that need is ever greater. Knowledge-based expert systems are well established in chemistry, especially in relation to toxicology, and they are used routinely to support regulatory submissions. The effectiveness and continued acceptance of computer prediction depends on our ability to assess the trustworthiness of predictions and the validity of the models on which they are based. Written by a pioneer in the field, this book provides an essential reference for anyone interested in the uses of artificial intelligence for decision making in chemistry.

In the nearly 10 years since the publication of the bestselling first edition of *Introduction to Green Chemistry*, interest in green chemistry and clean processes has grown so much that topics, such as fluorinated biphasic catalysis, metal organic frameworks, and process intensification, barely mentioned in the first edition, have become major areas of research. In addition, government funding has ramped up the development of fuel cells and biofuels. It reflects the evolving focus from pollution remediation to pollution prevention. Copiously illustrated with over 800 figures, this second edition provides an update from the frontiers of the field. New and expanded research topics: Metal-organic frameworks Solid acids for alkylation of isobutene by butanes Carbon molecular sieves Mixed micro- and mesoporous solids Organocatalysis Process intensification and gas phase enzymatic reactions Hydrogen storage for fuel cells Reactive distillation Catalysts in action on an atomic scale Updated and expanded current events topics: Industry resistance to inherently safer chemistry Nuclear power Removal of mercury from vaccines Removal of mercury and lead from primary explosives Biofuels Uses for surplus glycerol New hard materials to reduce wear Electronic waste Smart growth The book covers traditional green chemistry topics, including catalysis, benign solvents, and alternative feedstocks. It also discusses relevant but less frequently covered topics with chapters such as *Chemistry of Longer Wear and Population and the Environment*. This coverage highlights the importance of chemistry to everyday life and demonstrates the benefits the expanded exploitation of green chemistry can have for society.

This book discusses the scope of science education research and practice in Asia. It is divided into five sections: the first consists of nine chapters providing overviews of science education in Asia (China, Lebanon, Macau, Malaysia, Mongolia, Oman, Singapore, Taiwan, and Thailand). The second section offers chapters on content analysis of research articles, while the third includes three chapters on assessment and curriculum. The fourth section includes four chapters on innovative technology in science education; and the fifth section consists of four chapters on professional development, and informal learning. Each section also has additional chapters providing specific comments on the content. This collection of works provides readers with a starting point to better understand the current state of science education in Asia.

Study more effectively and improve your performance at exam time with this comprehensive guide. Updated to reflect all changes to the core text, the Eighth Edition tests you on the learning objectives in each chapter and provides answers to all the even-numbered end-of-

chapter exercises. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Reprint of a reference book first published in 1987. Lavishly illustrated, it contains detailed descriptions of all the important weeds of Australia. Suitable for primary producers, students, agricultural advisers and research workers.

This text is divided into three parts. The first part describes basic toxicological concepts and methodologies used in aquatic toxicity testing, including the philosophies underlying testing strategies now required to meet and support regulatory standards. The second part of the book discusses various factors that affect transport, transformation, ultimate distribution, and accumulation of chemicals in the aquatic environment, along with the use of modelling to predict fate.; The final section of the book reviews types of effects or endpoints evaluated in field studies and the use of structure-activity relationships in aquatic toxicology to predict biological activity and physio-chemical properties of a chemical. This section also contains an extensive background of environmental legislation in the USA and within the European Community, and an introduction to hazard/risk assessment with case studies.

This readable and user-friendly textbook presents the most essential material from Barbara Kuhn Timby's market-leading textbook, *Introductory Medical-Surgical Nursing, Eighth Edition*. *Essentials of Nursing* contains essential medical-surgical content and also includes two units on maternity nursing and pediatric nursing. More than 250 full-color illustrations complement the text. *Essentials of Nursing* offers LPN/LVN students an easy-to-digest overview of medical-surgical nursing, and is an excellent supplement to Timby's *Fundamental Nursing Skills and Concepts*.

Specialist Periodical Reports provide systematic and detailed review coverage of progress in the major areas of chemical research. Written by experts in their specialist fields the series creates a unique service for the active research chemist, supplying regular critical in-depth accounts of progress in particular areas of chemistry. For over 80 years the Royal Society of Chemistry and its predecessor, the Chemical Society, have been publishing reports charting developments in chemistry, which originally took the form of Annual Reports. However, by 1967 the whole spectrum of chemistry could no longer be contained within one volume and the series Specialist Periodical Reports was born. The Annual Reports themselves still existed but were divided into two, and subsequently three, volumes covering Inorganic, Organic and Physical Chemistry. For more general coverage of the highlights in chemistry they remain a 'must'. Since that time the SPR series has altered according to the fluctuating degree of activity in various fields of chemistry. Some titles have remained unchanged, while others have altered their emphasis along with their titles; some have been combined under a new name whereas others have had to be discontinued. The current list of Specialist Periodical Reports can be seen on the inside flap of this volume.

This book provides a comprehensive review of the application of ^{17}O NMR spectroscopy to organic chemistry. Topics include the theoretical aspects of chemical shift, quadrupolar and J coupling; ^{17}O enrichment; the effect of steric interactions on ^{17}O chemical shifts of functional groups in flexible and rigid systems; the application of ^{17}O NMR spectroscopy to hydrogen bonding investigations; mechanistic problems in organic and bioorganic chemistry; and ^{17}O NMR spectroscopy of oxygen monocoordinated to carbon in alcohols, ethers, and derivatives. Recent results that show correlations between molecular geometry, determined by X-ray studies and estimated by molecular mechanics calculations, and ^{17}O chemical shifts are also covered. *^{17}O Spectroscopy in Organic Chemistry* provides important reference information for organic chemists and other scientists interested in ^{17}O NMR spectroscopy as a tool for obtaining new structural and chemical data about organic molecules.

Renowned for its clear writing style, logical organization, level and depth of content, and excellent color illustrations, *Fundamentals of Urine & Body Fluid Analysis, 3rd Edition* covers

the collection and analysis of urine, fecal specimens, vaginal secretions, and other body fluids such as cerebrospinal, synovial, seminal, amniotic, pleural, pericardial, and peritoneal fluids. Expert author Nancy Brunzel shares her extensive knowledge and expertise in the field, presenting key information and essential techniques and procedures, as well as easy-to-grasp explanations of how to correlate data with basic anatomy and physiology to understand pathological processes. Vaginal Fluid Analysis chapter covers vaginal wet preps, a topic not found in many other references. Case studies help you understand how key concepts apply to real-world practice. Full-color images and photomicrographs show you what you should see under the microscope. An image glossary presents 94 additional images to help you identify rare and common cells. Multiple-choice questions at the end of every chapter allow you to test your understanding of the material. A glossary at the end of the book offers quick access to key terms and definitions. NEW! Automation of Urine and Body Fluid Analysis chapter helps you understand the automated procedures being used in more and more labs. NEW! Body Fluid Analysis: Manual Hemacytometer Counts and Differential Slide Preparation chapter ensures you know how to perform manual analysis methods. UPDATED! Coverage of the latest instrumentation keeps you up to date with the technology used in today's laboratories. Green Chemistry for Sustainable Textiles: Modern Design and Approaches provides a comprehensive survey of the latest methods in green chemistry for the reduction of the textile industry's environmental impact. In recent years industrial R&D has been exploring more sustainable chemicals as well as eco-friendly technologies in the textile wet processing chain, leading to a range of new techniques for sustainable textile manufacture. This book discusses and explores basic principles of green chemistry and their implementation along with other aspects of cleaner production strategies, as well as new and emerging textile technologies, providing a comprehensive reference for readers at all levels. Potential benefits to industry from the techniques covered in this book include: Savings in water, energy and chemical consumption, waste minimization as well as disposal cost reduction, and production of high added value sustainable textile products to satisfy consumer demands for comfort, safety, aesthetic, and multi-functional performance properties. Innovative emerging methods are covered as well as popular current technologies, creating a comprehensive reference that facilitates comparisons between methods Evaluates the fundamental green chemistry principles as drivers for textile sustainability Explains how and why to use renewable green chemicals in the textile wet processing chain

The life and chemical sciences are in the midst of a period of rapid and revolutionary transformation that will undoubtedly bring societal benefits but also have potentially malign applications, notably in the development of chemical weapons. Such concerns are exacerbated by the unstable international security environment and the changing nature of armed conflict, which could fuel a desire by certain States to retain and use existing chemical weapons, as well as increase State interest in creating new weapons; whilst a broader range of actors may seek to employ diverse toxic chemicals as improvised weapons. Stark indications of the multi-faceted dangers we face can be seen in the chemical weapons attacks against civilians and combatants in Iraq and Syria, and also in more targeted chemical assassination operations in Malaysia and the UK. Using a multi-disciplinary approach, and drawing upon an international group of experts, this book analyses current and likely near-future advances in relevant science and technology, assessing the risks of their misuse. The book examines the current capabilities, limitations and failures of the existing international arms control and

disarmament architecture – notably the Chemical Weapons Convention – in preventing the development and use of chemical weapons. Through the employment of a novel Holistic Arms Control methodology, the authors also look beyond the bounds of such treaties, to explore the full range of international law, international agreements and regulatory mechanisms potentially applicable to weapons employing toxic chemical agents, in order to develop recommendations for more effective routes to combat their proliferation and misuse. A particular emphasis is given to the roles that chemical and life scientists, health professionals and wider informed activist civil society can play in protecting the prohibition against poison and chemical weapons; and in working with States to build effective and responsive measures to ensure that the rapid scientific and technological advances are safeguarded from hostile use and are instead employed for the benefit of us all.

Blei and Odian's text gives students the tools they need to develop a working understanding of chemical principles—rather than just asking them to memorize facts. Now available in a new media-enhanced version, complete with its on own online course space, learning environment ChemPortal, Blei/Odian is better suited than ever to meet the needs of the students taking this course. The Media Update version of Blei/Odian includes references to dynamic, interactive tutorials, which provide a step-by-step walkthrough of concepts and problem-solving skills, as well as answer-specific feedback and practice problems. We recognize that all introductory courses are not alike. For that reason, we offer this text in three versions, so you can choose the option that's right for you: General, Organic, and Biochemistry (cloth: 0-7167-4375-2, paper: 1-4292-0994-1) – the comprehensive 26-chapter text. An Introduction to General Chemistry (0-7167-7073-3) – 10 chapters that cover the core concepts in general chemistry. Organic and Biochemistry (0-7167-7072-5) – 16 chapters that cover organic and biochemistry plus two introductory chapters that review general chemistry.

The first of its kind, this new book takes a unique look at hazardous wastes. Designed in a compact form, it is an easy-to-understand book on the chemistry and toxicology of hazardous substances and wastes. It begins with a basic coverage of chemistry and biochemistry, environmental chemical processes, and toxicology. Detailed chapters discuss the chemistry and toxicology of inorganic and organic hazardous substances and biohazards. The fully documented text explains procedures for eliminating, detoxifying, and disposing of hazardous wastes with continual reference to their basic chemistry and toxicology. Hazardous Waste Chemistry, Toxicology, and Treatment is an indispensable reference guide for everyone involved with hazardous substances, wastes, toxicology, and basic chemistry, organic chemistry, and biochemistry. This title is an ideal textbook for senior and graduate level courses studying hazardous substances, hazardous wastes, and industrial hygiene.

Conceptual and technological advances in chemistry and biology have transformed the drug discovery process. Evolutionary pressure among the diverse scientific and engineering disciplines that contribute to the identification of biologically active compounds has resulted in synergistic improvements at every step in the process. Exploiting Chemical Diversity for Drug Discovery encompasses the many components of this transformation and presents the current state-of-the-art of this critical endeavour. From the theoretical and operational considerations in generating a collection of compounds to screen, to the design and implementation of high-capacity and high-

quality assays that provide the most useful biological information, this book provides a comprehensive overview of modern approaches to lead identification. Beginning with an introductory overview, subsequent chapters address topics that include the design of chemical libraries and methods for optimizing their diversity; automated and accelerated chemistry; high throughput assay design and detection techniques; and strategies for data analysis and property optimization. Written by experts in the field, both academic and industrial, and illustrated in full colour, this book provides an excellent overview for current practitioners and will also serve as a stimulating resource for future generations. Researchers in organic and medicinal chemistry, the biological and pharmacological sciences, as well as those interested in allied computational and engineering disciplines will value the comprehensive and up-to-date coverage.

Chemical contaminants are a major concern for the food industry. *Chemical contaminants and residues in food* provides an essential guide to the main chemical contaminants, their health implications, the processes by which they contaminate food products, and methods for their detection and control. Part one focuses on risk assessment and analytical methods. Gas chromatography and mass spectroscopy techniques for the detection of chemical contaminants and residues are discussed, as are applications of HPLC-MS techniques and cell-based bioassays. Major chemical contaminants are then discussed in part two, including dioxins and polychlorinated biphenyls, veterinary drug and pesticide residues, heat-generated and non-thermally-produced toxicants, D- and cross-linked amino acids, mycotoxins and phycotoxins, and plant-derived contaminants. Finally, part three goes on to explore the contamination of specific foods. Chemical contamination of cereals, red meat, poultry and eggs are explored, along with contamination of finfish and marine molluscs. With its distinguished editor and international team of expert contributors, *Chemical contaminants and residues in food* is an invaluable tool for all industrial and academic researchers involved with food safety, from industry professionals responsible for producing safe food, to chemical analysts involved in testing the final products. Provides an essential guide to the main chemical contaminants, their health implications, the processes by which they contaminate food products, and methods for their detection and control. Sections provide in-depth focus on risk assessment and analytical methods, major chemical contaminants, and the contamination of specific foods. Chemical contamination of cereals, red meat, poultry and eggs are explored, along with contamination of finfish and marine molluscs.

Experimental Chemical Thermodynamics, Volume 1: Combustion Calorimetry covers the advances in calorimetric study of combustion, with particular emphasis on the accuracy of the method. This book is composed of 18 chapters, and begins with a presentation of the units and physical constants with the basic units of measurements. The succeeding chapters deal with basic principles of combustion calorimetry, emphasizing the underlying basic principles of measurement. These topics are followed by discussions on calibration of combustion calorimeters, test and auxiliary substances in combustion calorimetry, strategies in the calculation of standard-state energies of combustion from the experimentally determined quantities, and assignment of uncertainties. The final chapter considers the history of combustion calorimetry. This book will prove useful to combustion chemists and engineers, as well as researchers in the allied fields.

Basic Concepts of Environmental Chemistry, Second Edition provides a theoretical basis for the behavior and biological effects of natural chemical entities and contaminants in natural systems, concluding with a practical focus on risk assessment and the environmental management of chemicals. The text uses molecular properties such as pola

Filling a longstanding gap for graduate courses in the field, Chemical Reaction Engineering: Beyond the Fundamentals covers basic concepts as well as complexities of chemical reaction engineering, including novel techniques for process intensification. The book is divided into three parts: Fundamentals Revisited, Building on Fundamentals, and Beyond the Fundamentals. Part I: Fundamentals Revisited reviews the salient features of an undergraduate course, introducing concepts essential to reactor design, such as mixing, unsteady-state operations, multiple steady states, and complex reactions. Part II: Building on Fundamentals is devoted to "skill building," particularly in the area of catalysis and catalytic reactions. It covers chemical thermodynamics, emphasizing the thermodynamics of adsorption and complex reactions; the fundamentals of chemical kinetics, with special emphasis on microkinetic analysis; and heat and mass transfer effects in catalysis, including transport between phases, transfer across interfaces, and effects of external heat and mass transfer. It also contains a chapter that provides readers with tools for making accurate kinetic measurements and analyzing the data obtained. Part III: Beyond the Fundamentals presents material not commonly covered in textbooks, addressing aspects of reactors involving more than one phase. It discusses solid catalyzed fluid-phase reactions in fixed-bed and fluidized-bed reactors, gas–solid noncatalytic reactions, reactions involving at least one liquid phase (gas–liquid and liquid–liquid), and multiphase reactions. This section also describes membrane-assisted reactor engineering, combo reactors, homogeneous catalysis, and phase-transfer catalysis. The final chapter provides a perspective on future trends in reaction engineering.

Written over a period of 17 years, the Handbook of Chemical Risk Assessment exhaustively examines and analyzes the world literature on chemicals entering the environment from human activities. The three volumes cover chemicals recommended by environmental specialists of the U.S. Fish and Wildlife Service and other resource managers. The choices were based on the real or potential impact of each contaminant and on the knowledge available about their mitigation. The information for each chemical includes source and use; physical, chemical, and metabolic properties; concentrations in field collections of abiotic materials and living organisms; deficiency effects; lethal and sublethal effects; and proposed regulatory criteria for the protection of human health and sensitive natural resources. Each chapter selectively reviews and synthesizes the technical literature on a specific priority contaminant and its effects on the environment. Successful risk assessment relies heavily on extensive and well-documented databases. They often include too much - or too little - information

about too many chemicals. Of the hundreds of thousands of chemicals discharged into the environment, only a small number have sufficient information to attempt preliminary risk assessment. Sold only as a three volume set, the Handbook of Chemical Risk Assessment provides you with the exact amount of information you need in a single resource.

The new Pearson Chemistry program combines our proven content with cutting-edge digital support to help students connect chemistry to their daily lives. With a fresh approach to problem-solving, a variety of hands-on learning opportunities, and more math support than ever before, Pearson Chemistry will ensure success in your chemistry classroom. Our program provides features and resources unique to Pearson--including the Understanding by Design Framework and powerful online resources to engage and motivate your students, while offering support for all types of learners in your classroom.

Wine chemistry inspires and challenges with its complexity, and while this is intriguing, it can also be a barrier to further understanding. The topic is demystified in *Understanding Wine Chemistry*, which explains the important chemistry of wine at the level of university education, and provides an accessible reference text for scientists and scientifically trained winemakers alike.

Understanding Wine Chemistry: Summarizes the compounds found in wine, their basic chemical properties and their contribution to wine stability and sensory properties
Focuses on chemical and biochemical reaction mechanisms that are critical to wine production processes such as fermentation, aging, physiochemical separations and additions
Includes case studies showing how chemistry can be harnessed to enhance wine color, aroma, flavor, balance, stability and quality.
This descriptive text provides an overview of wine components and explains the key chemical reactions they undergo, such as those controlling the transformation of grape components, those that arise during fermentation, and the evolution of wine flavor and color. The book aims to guide the reader, who perhaps only has a basic knowledge of chemistry, to rationally explain or predict the outcomes of chemical reactions that contribute to the diversity observed among wines. This will help students, winemakers and other interested individuals to anticipate the effects of wine treatments and processes, or interpret experimental results based on an understanding of the major chemical reactions that can occur in wine.

Covering the whole area of process chemistry in the pharmaceutical industry, this monograph provides the essential knowledge on the basic chemistry needed for future development and key industrial techniques, as well as morphology, engineering and regulatory compliances. Application-oriented and well structured, the authors include recent examples of excellent industrial production of active pharmaceutical ingredients.

QCA is the bestselling textbook of choice for analytical chemistry. It offers a modern portrait of the techniques of chemical analysis, backed by a wealth of real world applications. This edition features new coverage of spectroscopy and

statistics, new pedagogy and enhanced lecturer support.

Retaining the concise, to-the-point presentation that has already helped thousands of students move beyond memorization to a true understanding of the beauty and logic of organic chemistry, this Seventh Edition of John McMurry's **FUNDAMENTALS OF ORGANIC CHEMISTRY** brings in new, focused content that shows students how organic chemistry applies to their everyday lives. In addition, redrawn chemical structures and artwork help students visualize important chemical concepts, a greater emphasis on biologically-related chemistry (including new problems) helps them grasp the enormous importance of organic chemistry in understanding the reactions that occur in living organisms, and new End of Chapter problems keyed to OWL allow them to work text-specific problems online. Lastly, , for this edition, John McMurry reevaluated and revised his writing at the sentence level to ensure that the book's explanations, applications, and examples are more student-friendly, relevant, and motivating than ever before. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Planet Earth : rocks, life, and history -- The Earth's atmosphere -- Global warming and climate change -- Chemistry of the troposphere -- Chemistry of the stratosphere -- Analysis of air and air pollutants -- Water resources -- Water pollution and water treatment -- Analysis of water and wastewater -- Fossil fuels : our major source of energy -- Nuclear power -- Energy sources for the future -- Inorganic metals in the environment -- Organic chemicals in the environment -- Insecticides, herbicides, and insect control -- Toxicology -- Asbestos -- The disposal of dangerous wastes.

Authored by Paul Hewitt, the pioneer of the enormously successful "concepts before computation" approach, *Conceptual Physics* boosts student success by first building a solid conceptual understanding of physics. The Three Step Learning Approach makes physics accessible to today's students. Exploration - Ignite interest with meaningful examples and hands-on activities. Concept Development - Expand understanding with engaging narrative and visuals, multimedia presentations, and a wide range of concept-development questions and exercises. Application - Reinforce and apply key concepts with hands-on laboratory work, critical thinking, and problem solving.

Understanding radionuclide behaviour in the natural environment is essential to the sustainable development of the nuclear industry and key to assessing potential environmental risks reliably. Minimising those risks is essential to enhancing public confidence in nuclear technology. Scientific knowledge in this field has developed greatly over the last decade. Radionuclide behaviour in the natural environment provides a comprehensive overview of the key processes and parameters affecting radionuclide mobility and migration. After an introductory chapter, part one explores radionuclide chemistry in the natural environment, including aquatic chemistry and the impact of natural organic matter and microorganisms. Part two discusses the migration and radioecological behavior of radionuclides. Topics include hydrogeology, sorption and colloidal reactions as well as in-situ investigations. Principles of modelling coupled geochemical, transport and radioecological properties are also discussed. Part three covers application issues: assessment of radionuclide behaviour in contaminated sites, taking Chernobyl as an example, estimation of radiological exposure to the population,

performance assessment considerations related to deep geological repositories, and remediation concepts for contaminated sites. With its distinguished editors and international team of expert contributors, Radionuclide behaviour in the natural environment is an essential tool for all those interested or involved in nuclear energy, from researchers, designers and industrial operators to environmental scientists. It also provides a comprehensive guide for academics of all levels in this field. Provides a comprehensive overview of the key processes and parameters affecting radionuclide mobility and migration Explores radionuclide chemistry in the natural environment Discusses the migration and radioecological behaviour of radionuclides

Our world is widely contaminated with damaging chemicals, and companies create thousands of new, potentially dangerous chemicals each year. Due to the difficulty and expense of obtaining accurate measurements and the unreliability of reported values, we know surprisingly little about the properties of these contaminants. Determining the properties of chemicals is critical to judging their impact on environmental quality and in making decisions about emission rates, clean-up, and other important public health issues. Chemical Property Estimation describes modern methods of estimating chemical properties, methods which cost much less than traditional laboratory techniques and are sufficiently accurate for most environmental applications. Estimation methods are used to screen chemicals for testing, design monitoring and analysis methods, design clean-up procedures, and verify experimental measurements. The book discusses key methods for estimating chemical properties and considers their relative strengths and weaknesses. Several chapters are devoted to the partitioning of chemicals between air, water, soil, and biota; and properties such as solubility, vapor pressure, and chemical transport. Each chapter begins with a review of relevant theory and background information explaining the applications and limitations of each method. Sample calculations and practical advice on how and when to use each method are included as well. Each method is evaluated for accuracy and reliability. Computer software, databases, and internet resources are evaluated, as well as other supplementary material, such as fundamental constants, units of measure, and more.

Progress in the application of machine learning (ML) to the physical and life sciences has been rapid. A decade ago, the method was mainly of interest to those in computer science departments, but more recently ML tools have been developed that show significant potential across wide areas of science. There is a growing consensus that ML software, and related areas of artificial intelligence, may, in due course, become as fundamental to scientific research as computers themselves. Yet a perception remains that ML is obscure or esoteric, that only computer scientists can really understand it, and that few meaningful applications in scientific research exist. This book challenges that view. With contributions from leading research groups, it presents in-depth examples to illustrate how ML can be applied to real chemical problems. Through these examples, the reader can both gain a feel for what ML can and cannot (so far) achieve, and also identify characteristics that might make a problem in physical science amenable to a ML approach. This text is a valuable resource for scientists who are intrigued by the power of machine learning and want to learn more about how it can be applied in their own field.

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