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Introduction to Software for Chemical Engineers, Second Edition Chemistry 2e Chemical Oceanography, Second Edition Organic Chemistry Physical Chemistry Aquatic Chemistry Concepts, Second Edition Epoxy Resins Soil and Water Chemistry Chemical Engineering Design Chemical Reaction Engineering and Reactor Technology, Second Edition Introduction to Chemical Structure Thermodynamics and Chemistry \ Industrial Chemical Process Design, 2nd Edition Applied Mathematical Methods for Chemical Engineers Chemical Process Technology Physics and Chemistry of Graphene Chemical Kinetics Introduction to Chemical Engineering Computing Chemical Process Design and Integration Chemical Oceanography Chemistry 2e Chemical Calculations Aquatic Chemistry Concepts Problems in Chemistry, Second Edition Process Safety Calculations Chemical Engineering Design Project Fluid Mechanics for Chemical Engineers A Numerical Primer for the Chemical Engineer, Second Edition Introduction to Chemicals from Biomass Rubber Compounding Guidelines for Chemical Process Quantitative Risk Analysis Comprehensive Chemometrics Multiple Chemical Sensitivity Introduction to Materials Chemistry Experimental Methods and

Instrumentation for Chemical Engineers Industrial Hygiene Control of Airborne Chemical Hazards,
Second Edition The Chemical Components of Tobacco and Tobacco Smoke Wood Chemistry The
Chemistry of Food Essential Chemistry for Aromatherapy E-Book

This book describes the production, processing, and characteristics of a wide range of materials utilized in the modern tire and rubber industry. Containing contributions from leading specialists in the field, the text investigates the chemistry and modification of raw materials, elastomers, and material compounds for the optima The second edition of a bestseller, Soil and Water Chemistry: An Integrative Approach maintains the balanced perspective that made the first edition a hugely popular textbook. The second edition includes new figures and tables, new chapters, and expanded exercises in each chapter. It covers topics including soil chemical environment, soil minerals, Designed for a two-semester introductory course sequence in physical chemistry, Physical Chemistry: A Modern Introduction, Second Edition offers a streamlined introduction to the subject. Focusing on core concepts, the text stresses fundamental issues and includes basic examples rather than the myriad of applications often presented in other, more encyclopedic books. Physical chemistry need not appear as a large assortment of different, disconnected, and sometimes intimidating topics. Instead, students should see that physical chemistry provides a coherent framework for chemical knowledge, from the molecular to the macroscopic level. The book offers: Novel organization to foster student understanding, giving students the strongest sophistication in the least amount of time and preparing them to tackle more challenging topics Strong problem-solving emphasis, with numerous end-of-chapter practice exercises, over two dozen in-text worked examples, and a number of clearly identified spreadsheet exercises A quick review in calculus, via an

appendix providing the necessary mathematical background for the study of physical chemistry
Powerful streamlined development of group theory and advanced topics in quantum mechanics, via
appendices covering molecular symmetry and special quantum mechanical approaches
The field of Chemical Engineering and its link to computer science is in constant evolution and new engineers
have a variety of tools at their disposal to tackle their everyday problems. Introduction to Software
for Chemical Engineers, Second Edition provides a quick guide to the use of various computer
packages for chemical engineering applications. It covers a range of software applications from
Excel and general mathematical packages such as MATLAB and MathCAD to process simulators,
CHEMCAD and ASPEN, equation-based modeling languages, gProms, optimization software such as
GAMS and AIMS, and specialized software like CFD or DEM codes. The different packages are
introduced and applied to solve typical problems in fluid mechanics, heat and mass transfer, mass
and energy balances, unit operations, reactor engineering, process and equipment design and
control. This new edition offers a wider view of packages including open source software such as R,
Python and Julia. It also includes complete examples in ASPEN Plus, adds ANSYS Fluent to CFD
codes, Lingo to the optimization packages, and discusses Engineering Equation Solver. It offers a
global idea of the capabilities of the software used in the chemical engineering field and provides
examples for solving real-world problems. Written by leading experts, this book is a must-have
reference for chemical engineers looking to grow in their careers through the use of new and
improving computer software. Its user-friendly approach to simulation and optimization as well as its
example-based presentation of the software, makes it a perfect teaching tool for both undergraduate
and master levels. Many undergraduate students enter into chemistry courses from a wide range of
backgrounds, often possessing various levels of experience with the mathematical concepts

necessary for carrying out practical calculations in chemistry. *Chemical Calculations: Mathematics for Chemistry, Second Edition* provides a unified, student-friendly reference of mathematical concepts and techniques incorporated into the context of familiar chemical topics. Uniquely organized by chemical—rather than mathematical—topics, this book relates each mathematical technique to the chemical concepts where it applies. The new edition features additional, revised, and updated material in every chapter. It achieves greater clarity with newly improved organization of topics and cross-referencing where mathematical techniques occur more than once. The text also contains numerous worked examples along with end-of-chapter exercises and detailed solution—giving students the opportunity to apply previously introduced techniques to chemically related problems. An ideal course companion for chemistry courses throughout the length of a degree, the second edition of *Chemical Calculations: Mathematics for Chemistry* may also extend its utility as a concise and practical reference for professionals in a wide array of scientific disciplines involving chemistry. Are you a practicing occupational hygienist wondering how to find a substitute organic solvent that is safer to use than the hazardous one your company is using? Chapter 6 is your resource. Are you a new hygienist looking for an alternative technology as a nonventilation substitute for an existing hazard? Chapter 8 is your resource. Are you looking for an overview of ventilation? Chapters 10 and 11 are your resource? Are you an industrial hygiene student wanting to learn about local exhaust ventilation? Chapters 13 through 16 are your resource. Are you needing to learn about personal protective equipment and respirators? Chapters 21 and 22 are your resources. This new edition brings all of these topics and more right up-to-date with new material in each chapter, including new governmental regulations. While many of the controls of airborne hazards have their origins in engineering, this author has been diligent in explaining concepts, writing

equations in understandable terms, and covering the topics of non-ventilation controls, both local exhaust and general ventilation, and receiver controls at the level needed by most IHs without getting too advanced. Taken as a whole, this book provides a unique, comprehensive tool to learn the challenging yet rewarding role that industrial hygiene can play in controlling airborne chemical hazards at work. Most chapters contain a set of practice problems with the solutions available to instructors. Features

- Written for the novice industrial hygienist but useful to prepare for ABIH certification
- Explains engineering concepts but requires no prior engineering background
- Includes specific learning goals that differentiate the depth of learning appropriate to each topic within the fuller information and explanations provided for each chapter
- Contains updated governmental regulations and abundant references
- Presents a consistent teaching philosophy and approach throughout the book
- Deals with both ventilation and non-ventilation controls

Fluid Mechanics for Chemical Engineers, third edition retains the characteristics that made this introductory text a success in prior editions. It is still a book that emphasizes material and energy balances and maintains a practical orientation throughout. No more math is included than is required to understand the concepts presented. To meet the demands of today's market, the author has included many problems suitable for solution by computer. Two brand new chapters are included. The first, on mixing, augments the book's coverage of practical issues encountered in this field. The second, on computational fluid dynamics (CFD), shows students the connection between hand and computational fluid dynamics. This new edition of **ESSENTIAL CHEMISTRY FOR SAFE AROMATHERAPY** provides an accessible account of the key theoretical aspects of chemistry and their application into the safe practice of aromatherapy. For readers with a limited science background, this book offers a clear and concisely written guide to essential information in

chemistry. For practitioners, the book applies chemistry to the practical and therapeutic use of essential oils, and leads to a better understanding of composition, properties and technical data related to essential oils. Takes the fear and mystery out of chemistry for aromatherapy students! Presents crucial information in a clear and easily-digestible format, highlighting key points all along. Allows professional aromatherapists to practice with greater confidence, safety and skill, and to extend the range of their practice through a clearer understanding of chemical properties of essential oils. Covers the scope of what is taught at major aromatherapy teaching centres, and structures the material to make sure each chapter provides the reader with a rounded understanding of the topic covered. A glossary is included for easy reference. Fully-updated throughout Chapter 5, Analytical Techniques completely brought up to date Chapter 6 Oil Profiles updated to include those used in current training New section entitled 'In perspectives' covers risks and benefits, interpretation of clinical trials and experimental data, use of essential oils in aromatherapy and functional groups in relation to therapeutic properties With a focus on actual industrial processes, e.g. the production of light alkenes, synthesis gas, fine chemicals, polyethene, it encourages the reader to think "out of the box" and invent and develop novel unit operations and processes. Reflecting today's emphasis on sustainability, this edition contains new coverage of biomass as an alternative to fossil fuels, and process intensification. The second edition includes: New chapters on Process Intensification and Processes for the Conversion of Biomass Updated and expanded chapters throughout with 35% new material overall Text boxes containing case studies and examples from various different industries, e.g. synthesis loop designs, Sasol I Plant, Kaminsky catalysts, production of Ibuprofen, click chemistry, ammonia synthesis, fluid catalytic cracking Questions throughout to stimulate debate and keep students awake! Richly illustrated chapters with

improved figures and flowdiagrams Chemical Process Technology, Second Edition is a comprehensive introduction, linking the fundamental theory and concepts to the applied nature of the subject. It will be invaluable to students of chemical engineering, biotechnology and industrial chemistry, as well as practising chemical engineers. From reviews of the first edition: "The authors have blended process technology, chemistry and thermodynamics in an elegant manner... Overall this is a welcome addition to books on chemical technology." - The Chemist "Impressively wide-ranging and comprehensive... an excellent textbook for students, with a combination of fundamental knowledge and technology." - Chemistry in Britain (now Chemistry World) This book's mechanistic approach constructs organic chemistry from the ground up; by focusing on the points of reactivities in organic, this text allows students to approach more and more complex molecules with enhanced understanding. Chemical process quantitative risk analysis (CPQRA) as applied to the CPI was first fully described in the first edition of this CCPS Guidelines book. This second edition is packed with information reflecting advances in this evolving methodology, and includes worked examples on a CD-ROM. CPQRA is used to identify incident scenarios and evaluate their risk by defining the probability of failure, the various consequences and the potential impact of those consequences. It is an invaluable methodology to evaluate these when qualitative analysis cannot provide adequate understanding and when more information is needed for risk management. This technique provides a means to evaluate acute hazards and alternative risk reduction strategies, and identify areas for cost-effective risk reduction. There are no simple answers when complex issues are concerned, but CPQRA2 offers a cogent, well-illustrated guide to applying these risk-analysis techniques, particularly to risk control studies. Special Details: Includes CD-ROM with example problems worked using Excel and Quattro Pro. For use with Windows 95, 98, and NT. Over the past

ten years, a number of new large-scale oceanographic programs have been initiated. These include the Climate Variability Program (CLIVAR) and the recent initiation of the Geochemical Trace Metal Program (GEOTRACES). These studies and future projects will produce a wealth of information on the biogeochemistry of the world's oceans. *Aut Chemical Kinetics* bridges the gap between beginner and specialist with a path that leads the reader from the phenomenological approach to the rates of chemical reactions to the state-of-the-art calculation of the rate constants of the most prevalent reactions: atom transfers, catalysis, proton transfers, substitution reactions, energy transfers and electron transfers. For the beginner provides the basics: the simplest concepts, the fundamental experiments, and the underlying theories. For the specialist shows where sophisticated experimental and theoretical methods combine to offer a panorama of time-dependent molecular phenomena connected by a new rational. *Chemical Kinetics* goes far beyond the qualitative description: with the guidance of theory, the path becomes a reaction path that can actually be inspected and calculated. But *Chemical Kinetics* is more about structure and reactivity than numbers and calculations. A great emphasis in the clarity of the concepts is achieved by illustrating all the theories and mechanisms with recent examples, some of them described with sufficient detail and simplicity to be used in general chemistry and lab courses. * Looking at atoms and molecules, and how molecular structures change with time. * Providing practical examples and detailed theoretical calculations * Of special interest to Industrial Chemistry and Biochemistry *Introduction to Chemicals from Biomass, Second Edition* presents an overview of the use of biorenewable resources in the 21st century for the manufacture of chemical products, materials and energy. The book demonstrates that biomass is essentially a rich mixture of chemicals and materials and, as such, has a tremendous potential as feedstock for making a wide range of chemicals and materials with applications in industries from

pharmaceuticals to furniture. Completely revised and updated to reflect recent developments, this new edition begins with an introduction to the biorefinery concept, followed by chapters addressing the various types of available biomass feedstocks, including waste, and the different pre-treatment and processing technologies being developed to turn these feedstocks into platform chemicals, polymers, materials and energy. The book concludes with a discussion on the policies and strategies being put in place for delivering the so-called Bioeconomy. Introduction to Chemicals from Biomass is a valuable resource for academics, industrial scientists and policy-makers working in the areas of industrial biotechnology, biorenewables, chemical engineering, fine and bulk chemical production, agriculture technologies, plant science, and energy and power generation. We need to reduce our dependence on fossil resources and increasingly derive all the chemicals we take for granted and use in our daily life from biomass - and we must make sure that we do this using green chemistry and sustainable technologies! For more information on the Wiley Series in Renewable Resources, visit www.wiley.com/go/rrs Topics covered include:

- The biorefinery concept
- Biomass feedstocks
- Pre-treatment technologies
- Platform molecules from renewable resources
- Polymers from bio-based monomers
- Biomaterials
- Bio-based energy production

Praise for the 1st edition: "Drawing on the expertise of the authors the book involves a degree of plant biology and chemical engineering, which illustrates the multidisciplinary nature of the topic beautifully" - Chemistry World

Wiley's landmark food chemistry textbook that provides an all-in-one reference book, revised and updated

The revised second edition of *The Chemistry of Food* provides a comprehensive overview of important compounds constituting of food and raw materials for food production. The authors highlight food's structural features, chemical reactions, organoleptic properties, nutritional, and toxicological importance. The updated second edition reflects the thousands of new scientific

papers concerning food chemistry and related disciplines that have been published since 2012. Recent discoveries deal with existing as well as new food constituents, their origin, reactivity, degradation, reactions with other compounds, organoleptic, biological, and other important properties. The second edition extends and supplements the current knowledge and presents new facts about chemistry, legislation, nutrition, and food safety. The main chapters of the book explore the chemical structure of substances and subchapters examine the properties or uses. This important resource:

- Offers in a single volume an updated text dealing with food chemistry
- Contains complete and fully up-to-date information on food chemistry, from structural features to applications
- Features several visual aids including reaction schemes, diagrams and tables, and nearly 2,000 chemical structures
- Written by internationally recognized authors on food chemistry

Written for upper-level students, lecturers, researchers and the food industry, the revised second edition of *The Chemistry of Food* is a quick reference for almost anything food-related as pertains to its chemical properties and applications. Authored by two longtime researchers in tobacco science, *The Chemical Components of Tobacco and Tobacco Smoke, Second Edition* chronicles the progress made from late 2008 through 2011 by scientists in the field of tobacco science. The book examines the isolation and characterization of each component. It explores developments in pertinent analytical

Process Safety Calculations is an essential guide for process safety engineers involved in calculating and predicting risks and consequences. The book focuses on calculation procedures based on basic chemistry, thermodynamics, fluid dynamics, conservation equations, kinetics and practical models. This book provides helpful calculations to demonstrate compliance with regulations and standards. Standards such as Seveso directive(s)/COMAH, CLP regulation, ATEX directives, PED directives, REACH regulation, OSHA/NIOSH and UK ALARP are covered, along with

risk and consequence assessment, stoichiometry, thermodynamics, stress analysis and fluid-dynamics. Includes realistic engineering models with validation from CFD modeling and/or industry testing Provides an introduction into basic principles that govern process relationships in modern industry Helps the reader find and apply the right principles to the specific problem being solved, mitigated or validated Aquatic Chemistry Concepts, Second Edition, is a fully revised and updated textbook that fills the need for a comprehensive treatment of aquatic chemistry and covers the many complicated equations and principles of aquatic chemistry. It presents the established science of equilibrium water chemistry using the uniquely recognizable, step-by-step Pankow format, which allows a broad and deep understanding of aquatic chemistry. The text is appropriate for a wide audience, including undergraduate and graduate students, industry professionals, consultants, and regulators. Every professional using water chemistry will want this text within close reach, and students and professionals alike will expect to find at least one copy on their library shelves. Key Features Extremely thorough, one-of-a-kind treatment of aquatic chemistry Discussions of how to carry out complex calculations regarding the chemistry of lakes, rivers, groundwater, and seawater Numerous example problems worked in complete detail Special foreword by Jerry L. Schnoor Experimental Methods and Instrumentation for Chemical Engineers, Second Edition, touches many aspects of engineering practice, research, and statistics. The principles of unit operations, transport phenomena, and plant design constitute the focus of chemical engineering in the latter years of the curricula. Experimental methods and instrumentation is the precursor to these subjects. This resource integrates these concepts with statistics and uncertainty analysis to define what is necessary to measure and to control, how precisely and how often. The completely updated second edition is divided into several themes related to data: metrology, notions of statistics, and design of

experiments. The book then covers basic principles of sensing devices, with a brand new chapter covering force and mass, followed by pressure, temperature, flow rate, and physico-chemical properties. It continues with chapters that describe how to measure gas and liquid concentrations, how to characterize solids, and finally a new chapter on spectroscopic techniques such as UV/Vis, IR, XRD, XPS, NMR, and XAS. Throughout the book, the author integrates the concepts of uncertainty, along with a historical context and practical examples. A problem solutions manual is available from the author upon request. Includes the basics for 1st and 2nd year chemical engineers, providing a foundation for unit operations and transport phenomena Features many practical examples Offers exercises for students at the end of each chapter Includes up-to-date detailed drawings and photos of equipment Through research and conversations with MCS sufferers, discusses the causes, symptoms, treatment options, and methods of coping physically and emotionally with the disease. Featuring new techniques of physicochemical analysis and broader coverage of textile applications, the thoroughly rewritten and enlarged Second Edition provides hands-on assistance in the use, formulation, synthesis, processing, and handling of epoxy resins. Epoxy Resins, Second Edition, Revised and Expanded documents available commercial products, including rarer species of epoxides ... shows how to achieve quality assurance through analytical methods ... discusses toxicity, hazards, and safe handling ... looks closely at elastomer modification of resins as well as adhesives, coatings, electrical and electronic applications, fiber-reinforced composites, and the use of epoxy resins in the stabilization of polymers, plasticizers, and textiles ... and assists in the more efficient selection and application of epoxy resins. Complete with nearly 300 pages of tables for quick references, plus over 300 diagrams and photographs, and more than 4,400 bibliographic references, this volume will prove indispensable to polymer, physical, and organic chemists, rheologists,

materials scientists and engineers, and chemical, plastics, aerospace, automotive, and electrical and electronics engineers. Step-by-step instructions enable chemical engineers to master key software programs and solve complex problems. Today, both students and professionals in chemical engineering must solve increasingly complex problems dealing with refineries, fuel cells, microreactors, and pharmaceutical plants, to name a few. With this book as their guide, readers learn to solve these problems using their computers and Excel, MATLAB, Aspen Plus, and COMSOL Multiphysics. Moreover, they learn how to check their solutions and validate their results to make sure they have solved the problems correctly. Now in its Second Edition, *Introduction to Chemical Engineering Computing* is based on the author's firsthand teaching experience. As a result, the emphasis is on problem solving. Simple introductions help readers become conversant with each program and then tackle a broad range of problems in chemical engineering, including: Equations of state, Chemical reaction equilibria, Mass balances with recycle streams, Thermodynamics and simulation of mass transfer equipment, Process simulation, Fluid flow in two and three dimensions. All the chapters contain clear instructions, figures, and examples to guide readers through all the programs and types of chemical engineering problems. Problems at the end of each chapter, ranging from simple to difficult, allow readers to gradually build their skills, whether they solve the problems themselves or in teams. In addition, the book's accompanying website lists the core principles learned from each problem, both from a chemical engineering and a computational perspective. Covering a broad range of disciplines and problems within chemical engineering, *Introduction to Chemical Engineering Computing* is recommended for both undergraduate and graduate students as well as practicing engineers who want to know how to choose the right computer software program and tackle almost any chemical engineering problem. Written by a hands-on industry consultant and

featuring more than 200 illustrations, This new edition follows the original format, which combines a detailed case study - the production of phthalic anhydride - with practical advice and comprehensive background information. Guiding the reader through all major aspects of a chemical engineering design, the text includes both the initial technical and economic feasibility study as well as the detailed design stages. Each aspect of the design is illustrated with material from an award-winning student design project. The book embodies the "learning by doing" approach to design. The student is directed to appropriate information sources and is encouraged to make decisions at each stage of the design process rather than simply following a design method. Thoroughly revised, updated, and expanded, the accompanying text includes developments in important areas and many new references. Designed to serve as the first point of reference on the subject, Comprehensive Chemometrics presents an integrated summary of the present state of chemical and biochemical data analysis and manipulation. The work covers all major areas ranging from statistics to data acquisition, analysis, and applications. This major reference work provides broad-ranging, validated summaries of the major topics in chemometrics—with chapter introductions and advanced reviews for each area. The level of material is appropriate for graduate students as well as active researchers seeking a ready reference on obtaining and analyzing scientific data. Features the contributions of leading experts from 21 countries, under the guidance of the Editors-in-Chief and a team of specialist Section Editors: L. Buydens; D. Coomans; P. Van Espen; A. De Juan; J.H. Kalivas; B.K. Lavine; R. Leardi; R. Phan-Tan-Luu; L.A. Sarabia; and J. Trygg Examines the merits and limitations of each technique through practical examples and extensive visuals: 368 tables and more than 1,300 illustrations (750 in full color) Integrates coverage of chemical and biological methods, allowing readers to consider and test a range of techniques Consists of 2,200 pages and more than

90 review articles, making it the most comprehensive work of its kind Offers print and online purchase options, the latter of which delivers flexibility, accessibility, and usability through the search tools and other productivity-enhancing features of ScienceDirect Written by a highly regarded author with industrial and academic experience, this new edition of an established bestselling book provides practical guidance for students, researchers, and those in chemical engineering. The book includes a new section on sustainable energy, with sections on carbon capture and sequestration, as a result of increasing environmental awareness; and a companion website that includes problems, worked solutions, and Excel spreadsheets to enable students to carry out complex calculations. The role of the chemical reactor is crucial for the industrial conversion of raw materials into products and numerous factors must be considered when selecting an appropriate and efficient chemical reactor. Chemical Reaction Engineering and Reactor Technology defines the qualitative aspects that affect the selection of an industrial chemical reactor and couples various reactor models to case-specific kinetic expressions for chemical processes. Thoroughly revised and updated, this much-anticipated Second Edition addresses the rapid academic and industrial development of chemical reaction engineering. Offering a systematic development of the chemical reaction engineering concept, this volume explores: essential stoichiometric, kinetic, and thermodynamic terms needed in the analysis of chemical reactors homogeneous and heterogeneous reactors reactor optimization aspects residence time distributions and non-ideal flow conditions in industrial reactors solutions of algebraic and ordinary differential equation systems gas- and liquid-phase diffusion coefficients and gas-film coefficients correlations for gas-liquid systems solubilities of gases in liquids guidelines for laboratory reactors and the estimation of kinetic parameters The authors pay special attention to the exact formulations and

derivations of mass energy balances and their numerical solutions. Richly illustrated and containing exercises and solutions covering a number of processes, from oil refining to the development of specialty and fine chemicals, the text provides a clear understanding of chemical reactor analysis and design. Aquatic Chemistry Concepts fills the need for a true, easy-to-use aquatic chemistry book that goes into the details behind some of the complicated equations and principles of aquatic chemistry. It places established science into a text that allows you to learn and to solve important practical environmental problems. Environmental consultants in all fields, regulators, and libraries will consider this text an excellent reference for its clear explanation of aquatic chemistry principles. Chemical Oceanography, Second Edition remains an important textbook and useful reference for students and researchers. Each chapter has been expanded and/or updated in accordance with the current state of knowledge about the chemistry of oceans. This textbook introduces the reader to the elementary chemistry on which materials science depends by discussing the different classes of materials and their applications. It shows the reader how different types of materials are produced, why they possess specific properties, and how they are used in technology. Each chapter contains study questions to enable discussions and consolidation of the acquired knowledge. The new edition of this textbook is completely revised and updated to reflect the significant expansion of the field of materials chemistry over the last years, covering now also topics such as graphene, nanotubes, light emitting diodes, extreme photolithography, biomedical materials, and metal organic frameworks. From the reviews of the first edition: "This book is not only informative and comprehensive for a novice reader, but also a valuable resource for a scientist and/or an industrialist for new and novel challenges." (Materials and Manufacturing Process, June 2009) "Allcock provides a clear path by first describing basic chemical principles, then distinguishing between the various major materials

groups, and finally enriching the student by offering a variety of special examples." (CHOICE, April 2009) "Proceeding logically from the basics to materials in advanced technology, it covers the fundamentals of materials chemistry, including principles of materials synthesis and materials characterization methods." (Internationale Fachzeitschrift Metall, January 2009) Wood Chemistry, Fundamentals and Applications, Second Edition, examines the basic principles of wood chemistry and its potential applications to pulping and papermaking, wood and wood waste utilization, pulping by-products for production of chemicals and energy, and biomass conversion. From a chemistry aspect, graphene is the extrapolated extreme of condensed polycyclic hydrocarbon molecules to infinite size. Here, the concept on aromaticity which organic chemists utilize is applicable.

Interesting issues appearing between physics and chemistry are pronounced in nano-sized graphene (nanographene), as we recognize the importance of the shape of nanographene in understanding its electronic structure. In this book, the fundamental issues on the electronic, magnetic, and chemical properties of condensed polycyclic hydrocarbon molecules, nanographene and graphene are comprehensively discussed. Focusing on the application of mathematics to chemical engineering, Applied Mathematical Methods for Chemical Engineers addresses the setup and verification of mathematical models using experimental or other independently derived data. The book provides an introduction to differential equations common to chemical engineering, followed by examples of first-order and linear second-order ordinary differential equations. Later chapters examine Sturm-Liouville problems, Fourier series, integrals, linear partial differential equations, regular perturbation, combination of variables, and numerical methods emphasizing the method of lines with MATLAB® programming examples. Fully revised and updated, this Third Edition: Includes additional examples related to process control, Bessel Functions, and contemporary areas such as

drug delivery Introduces examples of variable coefficient Sturm-Liouville problems both in the regular and singular types Demonstrates the use of Euler and modified Euler methods alongside the Runge-Kutta order-four method Inserts more depth on specific applications such as nonhomogeneous cases of separation of variables Adds a section on special types of matrices such as upper- and lower-triangular matrices Presents a justification for Fourier-Bessel series in preference to a complicated proof Incorporates examples related to biomedical engineering applications Illustrates the use of the predictor-corrector method Expands the problem sets of numerous chapters Applied Mathematical Methods for Chemical Engineers, Third Edition uses worked examples to expose several mathematical methods that are essential to solving real-world process engineering problems. Designed as an introduction to numerical methods for students, this book combines mathematical correctness with numerical performance, and concentrates on numerical methods and problem solving. It applies actual numerical solution strategies to formulated process models to help identify and solve chemical engineering problems. Second edition comes with additional chapter on numerical integration and section on boundary value problems in the relevant chapter. Additional material on general modelling principles, mass/energy balances and separate section on DAE's is also included. Case study section has been extended with additional examples. Chemical Engineering Design, Second Edition, deals with the application of chemical engineering principles to the design of chemical processes and equipment. Revised throughout, this edition has been specifically developed for the U.S. market. It provides the latest US codes and standards, including API, ASME and ISA design codes and ANSI standards. It contains new discussions of conceptual plant design, flowsheet development, and revamp design; extended coverage of capital cost estimation, process costing, and economics; and new chapters on equipment selection, reactor

design, and solids handling processes. A rigorous pedagogy assists learning, with detailed worked examples, end of chapter exercises, plus supporting data, and Excel spreadsheet calculations, plus over 150 Patent References for downloading from the companion website. Extensive instructor resources, including 1170 lecture slides and a fully worked solutions manual are available to adopting instructors. This text is designed for chemical and biochemical engineering students (senior undergraduate year, plus appropriate for capstone design courses where taken, plus graduates) and lecturers/tutors, and professionals in industry (chemical process, biochemical, pharmaceutical, petrochemical sectors). New to this edition: Revised organization into Part I: Process Design, and Part II: Plant Design. The broad themes of Part I are flowsheet development, economic analysis, safety and environmental impact and optimization. Part II contains chapters on equipment design and selection that can be used as supplements to a lecture course or as essential references for students or practicing engineers working on design projects. New discussion of conceptual plant design, flowsheet development and revamp design Significantly increased coverage of capital cost estimation, process costing and economics New chapters on equipment selection, reactor design and solids handling processes New sections on fermentation, adsorption, membrane separations, ion exchange and chromatography Increased coverage of batch processing, food, pharmaceutical and biological processes All equipment chapters in Part II revised and updated with current information Updated throughout for latest US codes and standards, including API, ASME and ISA design codes and ANSI standards Additional worked examples and homework problems The most complete and up to date coverage of equipment selection 108 realistic commercial design projects from diverse industries A rigorous pedagogy assists learning, with detailed worked examples, end of chapter exercises, plus supporting data and Excel spreadsheet calculations plus

over 150 Patent References, for downloading from the companion website Extensive instructor resources: 1170 lecture slides plus fully worked solutions manual available to adopting instructors

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