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## Basic Principles and Calculations in Chemical Engineering

FT Press Best-selling introductory chemical engineering book - now updated with far more coverage of biotech, nanotech, and green engineering • Thoroughly covers material balances, gases, liquids, and energy balances. • Contains new biotech and bioengineering problems throughout. • Adds new examples and homework on nanotechnology, environmental engineering, and green engineering. • All-new student projects chapter. • Self-assessment tests, discussion problems, homework, and glossaries in each chapter. Basic Principles and Calculations in Chemical Engineering, 8/e, provides a complete, practical, and student-friendly introduction to the principles and techniques of modern chemical, petroleum, and environmental engineering. The authors introduce efficient and consistent methods for solving problems, analyzing data, and conceptually understanding a wide variety of processes. This edition has been revised to reflect growing interest in the life sciences, adding biotechnology and bioengineering problems and examples throughout. It also adds many new examples and homework assignments on nanotechnology, environmental, and green engineering, plus many updates to existing examples. A new chapter presents multiple student projects, and several chapters from the previous edition have been condensed for greater focus. This text's features include: • Thorough introductory coverage, including unit conversions, basis selection, and process measurements. • Short chapters supporting flexible, modular learning. • Consistent, sound strategies for solving material and energy balance problems. • Key concepts ranging from stoichiometry to enthalpy. • Behavior of gases, liquids, and solids. • Many tables, charts, and reference appendices. • Self-assessment tests, thought/discussion problems, homework problems, and glossaries in each chapter.

## Chemical Engineering Design

## Principles, Practice and Economics of Plant and Process Design

Elsevier 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

## Experimental Methods and Instrumentation for Chemical Engineers

Newnes Experimental Methods and Instrumentation for Chemical Engineers is a practical guide for research engineers and students, process engineers and, consultants, and others in the chemical engineering field. This unique book thoroughly describes experimental measurements and instrumentation in the contexts of pressure, temperature, fluid metering, chromatography, and more. Chapters on physico-chemical analysis and analysis of solids and powders are included as well. Throughout the book, the author examines all aspects of engineering practice and research. The principles of unit operations, transport phenomena, and plant design form the basis of this discipline. Experimental Methods and Instrumentation for Chemical Engineers integrates these concepts with statistics and uncertainty analysis to define factors that are absolutely necessary to measure and control, how precisely, and how often. Experimental Methods and Instrumentation for Chemical Engineers is divided into several themes, including the measurement of pressure, temperature flow rate, physico-chemical properties, gas and liquid concentrations and solids properties. Throughout the book, the concept of uncertainty is discussed in context, and the last chapter is dedicated to designing and experimental plan. The theory around the measurement principles is illustrated with examples. These examples include notions related to plant design as well as cost and safety. Contains extensive diagrams, photos, and other illustrations as well as manufacturers' equipment and descriptions with up-to-date, detailed drawings and photos Includes exercises at the end of each chapter, helping the reader to understand the problem by solving practical examples Covers research and plant application, including emerging technologies little discussed in other sources

## Innovation, Engineering and Entrepreneurship

Springer This book presents endeavors to join synergies in order to create added value for society, using the latest scientific knowledge to boost technology transfer from academia to industry. It potentiates the foundations for the creation of knowledge- and entrepreneurial cooperation networks involving engineering, innovation, and entrepreneurship stakeholders. The Regional HELIX 2018 conference was organized at the University of Minho's School of Engineering by the MEtRICs and Algoritmi Research Centers, and took place in Guimarães, Portugal, from June 27th to 29th, 2018. After a rigorous peer-review process, 160 were accepted for publication, covering a wide range of topics, including Control, Automation and Robotics; Mechatronics Design, Medical Devices and Wellbeing; Cyber-Physical Systems, IoT and Industry 4.0; Innovations in Industrial Context and Advanced Manufacturing; New Trends in Mechanical Systems Development; Advanced Materials and Innovative Applications; Waste to Energy and Sustainable Environment; Operational Research and Industrial Mathematics; Innovation and Collaborative Arrangements; Entrepreneurship and Internationalization; and Oriented Education for Innovation, Engineering and/or Entrepreneurship.

## Handbook of Research on Pedagogical Innovations for Sustainable Development

IGI Global Summary: "This book brings together case study examples in the fields of sustainability, sustainable development, and education for sustainable development"--

## Rules of Thumb for Chemical Engineers

Butterworth-Heinemann Rules of Thumb for Chemical Engineers, Fifth Edition, provides solutions, common sense techniques, shortcuts, and calculations to help chemical and process engineers deal with practical on-the-job problems. It discusses physical properties for proprietary materials, pharmaceutical and biopharmaceutical sector heuristics, and process design, along with closed-loop heat transfer systems, heat exchangers, packed columns, and structured packings. Organized into 27 chapters, the book begins with an overview of formulae and data for sizing piping systems for incompressible and compressible flow. It then moves to a discussion of design recommendations for heat exchangers, practical equations for solving fractionation problems, along with design of reactive absorption processes. It also considers different types of pumps and presents narrative as well as tabular comparisons and application notes for various types of fans, blowers, and compressors. The book also walks the reader through the general rules of thumb for vessels, how cooling towers are sized based on parameters such as return temperature and supply temperature, and specifications of refrigeration systems. Other chapters focus on pneumatic conveying, blending and agitation, energy conservation, and process modeling. Chemical engineers faced with fluid flow problems will find this book extremely useful. Rules of Thumb for Chemical Engineers brings together solutions, information and work-arounds that engineers in the process industry need to get their job done. New material in the Fifth Edition includes physical properties for proprietary materials, six new chapters, including pharmaceutical, biopharmaceutical sector heuristics, process design with simulation software, and guidelines for hazardous materials and processes Now includes SI units throughout alongside

## Proceedings of the 3rd International Gas Processing

## Symposium

### Qatar, March 2012

[Elsevier Proceedings of the 3rd International Gas Processing Symposium; CopyrightPage; List of Contents; Preface; International Technical Committee Members \(Reviewers\); Exercising the Option of CO2 Slippage to Mitigate Acid Gas Flaring During SRU Expansion Bellow Failure; Abstract; 1. Introduction; 2. Methodology to minimize Acid Gas Flaring; 3. Conclusion; Flare Reduction Options and Simulation for the Qatari Oil and Gas Industry; Abstract; 1. Introduction; 2. Ethylene process overview; 3. Flare Reduction -- Industrial Case Study; 4. Result and discussion; 5. Conclusions; 6. Acknowledgment7. ReferencesReview of Cooling Water Discharge Simulation Models; Abstract; 1. Introduction; 2. Model Comparison; 3. Conclusions; References; Combining post-combustion CO2 capture with CO2 utilization; Abstract; 1. Introduction; 2. Carbon capture; 3. Carbon dioxide disposal and utilization; 4. Conclusions; References; Step Change Adsorbents and Processes for CO2 Capture "STEP CAP; Abstract; 1. Introduction; 2. ...](#)

## Elementary Principles of Chemical Processes, 3rd Edition

### 2005 Edition Integrated Media and Study Tools, with Student Workbook

[Wiley This best selling text prepares students to formulate and solve material and energy balances in chemical process systems and lays the foundation for subsequent courses in chemical engineering. The text provides a realistic, informative, and positive introduction to the practice of chemical engineering. The Integrated Media Edition update provides a stronger link between the text, media supplements, and new student workbook.](#)

## Basic Principles and Calculations in Chemical Engineering

## CHEMICAL PROCESS SIMULATION AND THE ASPEN PLUS V10.0 SOFTWARE.

## Introduction to Chemical Principles: A Laboratory Approach

[Cengage Learning The seventh edition of this superb lab manual offers 36 class-tested experiments, suitable for introductory, preparatory, and health science chemistry courses and texts, including INTRODUCTORY CHEMISTRY: AN ACTIVE LEARNING APPROACH, Fourth Edition by Cracolice and Peters. Experiments in this lab manual teach students to collect and analyze experimental data and provide them with a strong foundation for further course work in general chemistry. This edition offers instructors a wide variety of experiments to customize their laboratory program, including many microscale experiments. All experiments can be completed in a three-hour laboratory period. As in the Sixth Edition, there are Work Pages for each experiment as well as Report Sheets for students to take notes and record experimental data and results, which facilitate instructor grading of experiments. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.](#)

## Introduction to Energy Analysis

[Taylor & Francis The energy supply and demand system is of great importance for society, from economic, social, and ecological viewpoints. The last decade in particular has seen rapid changes in the world of energy systems, and it is therefore now an important area for study, academic research, and professional work. This textbook provides an introduction to energy analysis for those students who want to specialise in this challenging field. In comparison to other textbooks, this book provides a balanced treatment of complete energy systems, covering the demand side, the supply side, and the energy markets that connect these. The emphasis is very much on presenting a range of tools and methodologies that will help students find their way in analysing real world problems in energy systems. Featuring learning objectives, further readings and practical exercises in each chapter, An Introduction to Energy Analysis will be essential reading for upper-level undergraduate and postgraduate students with a background in the natural sciences and engineering. This book may also be useful for professionals dealing with energy issues, as a first introduction into the field.](#)

# Green Chemistry Metrics

## A Guide to Determining and Evaluating Process Greenness

Springer This contribution to SpringerBriefs in Green Chemistry outlines and discusses the four major green chemistry metrics (atom economy, reaction mass efficiency, E factor and process mass intensity), at a level that is comprehensible by upper-level undergraduates. Such students have previously received fundamental training in organic chemistry basics, and are ideally positioned to learn about green chemistry principles, of which metrics is one foundational pillar. Following this, other green metrics in common use are discussed, along with applications that allow important calculations to be easily undertaken. Finally, an introduction to metrics in the context of life cycle analyses is presented. It should be noted that no other available publication teaches green chemistry metrics in detail with an emphasis on educating undergraduates, whilst simultaneously providing a contemporary industrial flavour to the material.

## CHEMICAL PROCESS CALCULATIONS

PHI Learning Pvt. Ltd. Keeping the importance of basic tools of process calculations—material balance and energy balance—in mind, the text prepares the students to formulate material and energy balance theory on chemical process systems. It also demonstrates how to solve the main process-related problems that crop up in chemical engineering practice. The chapters are organized in a way that enables the students to acquire an in-depth understanding of the subject. The emphasis is given to the units and conversions, basic concepts of calculations, material balance with/without chemical reactions, and combustion of fuels and energy balances. Apart from numerous illustrations, the book contains numerous solved problems and exercises which bridge the gap between theoretical learning and practical implementation. All the numerical problems are solved with block diagrams to reinforce the understanding of the concepts. Primarily intended as a text for the undergraduate students of chemical engineering, it will also be useful for other allied branches of chemical engineering such as polymer science and engineering and petroleum engineering. KEY FEATURES • Methods of calculation for stoichiometric proportions with practical examples from the Industry • Simplified method of solving numerical problems under material balance with and without chemical reactions • Conversions of chemical engineering equations from one unit to another • Solution of fuel and combustion, and energy balance problems using tabular column

## Chemical Process Design and Integration

John Wiley & Sons "The book provides a practical guide to chemical process design and integration for students and practicing process engineers in industry"--

## Chemical Engineering Primer with Computer Applications

CRC Press Taking a highly pragmatic approach to presenting the principles and applications of chemical engineering, this companion text for students and working professionals offers an easily accessible guide to solving problems using computers. The primer covers the core concepts of chemical engineering, from conservation laws all the way up to chemical kinetics, without heavy stress on theory and is designed to accompany traditional larger core texts. The book presents the basic principles and techniques of chemical engineering processes and helps readers identify typical problems and how to solve them. Focus is on the use of systematic algorithms that employ numerical methods to solve different chemical engineering problems by describing and transforming the information. Problems are assigned for each chapter, ranging from simple to difficult, allowing readers to gradually build their skills and tackle a broad range of problems. MATLAB and Excel® are used to solve many examples and the more than 70 real examples throughout the book include computer or hand solutions, or in many cases both. The book also includes a variety of case studies to illustrate the concepts and a downloadable file containing fully worked solutions to the book's problems on the publisher's website. Introduces the reader to chemical engineering computation without the distractions caused by the contents found in many texts. Provides the principles underlying all of the major processes a chemical engineer may encounter as well as offers insight into their analysis, which is essential for design calculations. Shows how to solve chemical engineering problems using computers that require numerical methods using standard algorithms, such as MATLAB® and Excel®. Contains selective solved examples of many problems within the chemical process industry to demonstrate how to solve them using the techniques presented in the text. Includes a variety of case studies to illustrate the concepts and a downloadable file containing fully worked solutions to problems on the publisher's website. Offers non-chemical engineers who are expected to work with chemical engineers on projects, scale-ups and process evaluations a solid understanding of basic concepts of chemical engineering analysis, design, and calculations.

## The Principles of Chemical Equilibrium

# With Applications in Chemistry and Chemical Engineering

Cambridge University Press Sample Text

## Chemistry for Engineering Students

Cengage Learning CHEMISTRY FOR ENGINEERING STUDENTS, connects chemistry to engineering, math, and physics; includes problems and applications specific to engineering; and offers realistic worked problems in every chapter that speak to your interests as a future engineer. Packed with built-in study tools, this textbook gives you the resources you need to master the material and succeed in the course. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

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## Bioprocess Engineering Principles

[Elsevier The emergence and refinement of techniques in molecular biology has changed our perceptions of medicine, agriculture and environmental management. Scientific breakthroughs in gene expression, protein engineering and cell fusion are being translated by a strengthening biotechnology industry into revolutionary new products and services. Many a student has been enticed by the promise of biotechnology and the excitement of being near the cutting edge of scientific advancement. However, graduates trained in molecular biology and cell manipulation soon realise that these techniques are only part of the picture. Reaping the full benefits of biotechnology requires manufacturing capability involving the large-scale processing of biological material. Increasingly, biotechnologists are being employed by companies to work in co-operation with chemical engineers to achieve pragmatic commercial goals. For many years aspects of biochemistry and molecular genetics have been included in chemical engineering curricula, yet there has been little attempt until recently to teach aspects of engineering applicable to process design to biotechnologists. This textbook is the first to present the principles of bioprocess engineering in a way that is accessible to biological scientists. Other texts on bioprocess engineering currently available assume that the reader already has engineering training. On the other hand, chemical engineering textbooks do not consider examples from bioprocessing, and are written almost exclusively with the petroleum and chemical industries in mind. This publication explains process analysis from an engineering point of view, but refers exclusively to the treatment of biological systems. Over 170 problems and worked examples encompass a wide range of applications, including recombinant cells, plant and animal cell cultures, immobilised catalysts as well as traditional fermentation systems. \\* \\* First book to present the principles of bioprocess engineering in a way that is accessible to biological scientists \\* Explains process analysis from an engineering point of view, but uses worked examples relating to biological systems \\* Comprehensive, single-authored \\* 170 problems and worked examples encompass a wide range of applications, involving recombinant plant and animal cell cultures, immobilized catalysts, and traditional fermentation systems \\* 13 chapters, organized according to engineering sub-disciplines, are grouped in four sections - Introduction, Material and Energy Balances, Physical Processes, and Reactions and Reactors \\* Each chapter includes a set of problems and exercises for the student, key references, and a list of suggestions for further reading \\* Includes useful appendices, detailing conversion factors, physical and chemical property data, steam tables, mathematical rules, and a list of symbols used \\* Suitable for course adoption - follows closely curricula used on most bioprocessing and process biotechnology courses at senior undergraduate and graduate levels.](#)

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## Basic of Engineering Chemistry (For RGPV, Bhopal)

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## Waste Heat Recovery: Principles And Industrial Applications

World Scientific This book presents a comprehensive coverage of fundamentals, latest technologies and industrial applications of Waste Heat Recovery (WHR) in process industries. Simple and effective WHR techniques are illustrated with industrial examples, to help readers to identify, calculate and develop heat recovery potential in their processes. Key benefits of WHR projects, which are useful for developing successful WHR business cases, are demonstrated. Special emphasis is given towards major technical risks and mitigation plans, for implementing sound WHR projects. Techniques for reaping benefits of WHR projects for longer periods are also outlined. Applying these techniques with an understanding of the principles explained in this book, and taking cues from the examples and suggestions, the reader will be able to realise sustained benefits in their process.Solution manual is provided for free to instructors who adopt this textbook. Please send your request to sales@wspc.com.

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# Progress in Sustainable Energy Technologies Vol II

## Creating Sustainable Development

Springer This multi-disciplinary volume presents information on the state-of-the-art in the sustainable development technologies and tactics. Its unique amalgamation of the latest technical information, research findings and examples of successfully applied new developments in the area of sustainable development will be of keen interest to engineers, students, practitioners, scientists and researchers concerned with sustainability. Problem statements, projections, new concepts, models, experiments, measurements and simulations from not only engineering and science, but disciplines as diverse as ecology, education, economics and information technology are included, in order to create a truly holistic vision of the sustainable development field. The contributions feature coverage of topics including green buildings, exergy analysis, clean carbon technologies, waste management, energy conservation, environmental remediation, energy security and sustainable development policy.

## Electrochemical Engineering

John Wiley & Sons A Comprehensive Reference for Electrochemical Engineering Theory and Application From chemical and electronics manufacturing, to hybrid vehicles, energy storage, and beyond, electrochemical engineering touches many industries—any many lives—every day. As energy conservation becomes of central importance, so too does the science that helps us reduce consumption, reduce waste, and lessen our impact on the planet. Electrochemical Engineering provides a reference for scientists and engineers working with electrochemical processes, and a rigorous, thorough text for graduate students and upper-division undergraduates. Merging theoretical concepts with widespread application, this book is designed to provide critical knowledge in a real-world context. Beginning with the fundamental principles underpinning the field, the discussion moves into industrial and manufacturing processes that blend central ideas to provide an advanced understanding while explaining observable results. Fully-worked illustrations simplify complex processes, and end-of chapter questions help reinforce essential knowledge. With in-depth coverage of both the practical and theoretical, this book is both a thorough introduction to and a useful reference for the field. Rigorous in depth, yet grounded in relevance, Electrochemical Engineering: Introduces basic principles from the standpoint of practical application Explores the kinetics of electrochemical reactions with discussion on thermodynamics, reaction fundamentals, and transport Covers battery and fuel cell characteristics, mechanisms, and system design Delves into the design and mechanics of hybrid and electric vehicles, including regenerative braking, start-stop hybrids, and fuel cell systems Examines electrodeposition, redox-flow batteries, electrolysis, regenerative fuel cells, semiconductors, and other applications of electrochemical engineering principles Overlapping chemical engineering, chemistry, material science, mechanical engineering, and electrical engineering, electrochemical engineering covers a diverse array of phenomena explained by some of the important scientific discoveries of our time. Electrochemical Engineering provides the critical understanding required to work effectively with these processes as they become increasingly central to global sustainability.

## Nanoscience and Nanotechnology, Proceedings of the INFN-LNF 2018 Conference

MDPI The results presented in this volume highlight some of the most recent advances in nanoscience and nanotechnology studies, from both the physical and chemical point of view, with an eye also to possible engineering applications. These studies demonstrate directly how effective, and at the same time stimulating is implementing the “cross-fertilization” procedure. Indeed, multidisciplinary research allows one to catch more easily the analogies inherent different areas of science, as well as to take advantage and optimize different methods and techniques, often borrowed from other research areas. In the present Special Issue, we included six published papers. The latter contributions, on the one hand, are developed at the theory level and, on the other hand, show experimental results on the realization and experimental characterization of nanostructured systems, suitable for yielding progress towards the realization of systems and devices, that can ultimately lead to industrial applications. The results show that recent scientific research advances in these areas may provide important steps in the direction of fostering innovation and technological development.

## Journal of Chemical Engineering of Japan

Includes abstracts of Kagaku kōgaku, v. 31-

## Physical Chemistry of Metallurgical Processes, Second Edition

Springer Nature This updated, second edition retains its classroom-tested treatment of physical chemistry of metallurgical topics, such as roasting of sulfide minerals, matte smelting, converting, structure, properties and theories of slag, reduction of oxides and reduction smelting, interfacial phenomena, steelmaking, secondary steelmaking, role of halides in extraction of metals, refining, hydrometallurgy and electrometallurgy, and adds new data in worked-out examples as well as up-to-date references to the literature. The book further explains the physical chemistry of various metallurgical topics, steps involved in extraction of metals, such as roasting, matte smelting/converting, reduction smelting, steelmaking reactions, deoxidation, stainless steelmaking, vacuum

degassing, refining, leaching, chemical precipitation, ion exchange, solvent extraction, cementation, gaseous reduction and electrowinning. Each topic 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. The problems require imagination and critical analyses and also encourage readers for creative application of thermodynamic data in metal extraction. Updates and condenses text throughout the book by sequential arrangement of paragraphs in different chapters; Maximizes readers' understanding of the physicochemical principles involved in extraction/production of common and rare/reactive metals by pyro- as well as hydrometallurgical routes; Reinforces concepts presented with worked examples in each chapter explaining the process steps; Explains the physical chemistry of various metallurgical steps, such as roasting, matte smelting/convertng, and reduction smelting, steelmaking, aqueous processing etc. in extraction of metals; Collects and uniformly presents scattered information on physicochemical principles of metal production from various books and journals.

## Principles of Chemical Engineering Processes

### Material and Energy Balances, Second Edition

CRC Press *Principles of Chemical Engineering Processes: Material and Energy Balances* introduces the basic principles and calculation techniques used in the field of chemical engineering, providing a solid understanding of the fundamentals of the application of material and energy balances. Packed with illustrative examples and case studies, this book: Discusses problems in material and energy balances related to chemical reactors Explains the concepts of dimensions, units, psychrometry, steam properties, and conservation of mass and energy Demonstrates how MATLAB® and Simulink® can be used to solve complicated problems of material and energy balances Shows how to solve steady-state and transient mass and energy balance problems involving multiple-unit processes and recycle, bypass, and purge streams Develops quantitative problem-solving skills, specifically the ability to think quantitatively (including numbers and units), the ability to translate words into diagrams and mathematical expressions, the ability to use common sense to interpret vague and ambiguous language in problem statements, and the ability to make judicious use of approximations and reasonable assumptions to simplify problems This Second Edition has been updated based upon feedback from professors and students. It features a new chapter related to single- and multiphase systems and contains additional solved examples and homework problems. Educational software, downloadable exercises, and a solutions manual are available with qualifying course adoption.

## Catalysis, Green Chemistry and Sustainable Energy

### New Technologies for Novel Business Opportunities

Elsevier *Catalysis, Green Chemistry and Sustainable Energy: New Technologies for Novel Business Opportunities* offers new possibilities for businesses who want to address the current global transition period to adopt low carbon and sustainable energy production. This comprehensive source provides an integrated view of new possibilities within catalysis and green chemistry in an economic context, showing how these potential new technologies may become useful to business. Fundamentals and specific examples are included to guide the transformation of idea to innovation and business. Offering an overview of the new possibilities for creating business in catalysis, energy and green chemistry, this book is a beneficial tool for students, researchers and academics in chemical and biochemical engineering. Discusses new developments in catalysis, energy and green chemistry from the perspective of converting ideas to innovation and business Presents case histories, preparation of business plans, patent protection and IP rights, creation of start-ups, research funds and successful written proposals Offers an interdisciplinary approach combining science and business

## Rules of Thumb for Petroleum Engineers

John Wiley & Sons Finally, there is a one-stop reference book for the petroleum engineer which offers practical, easy-to-understand responses to complicated technical questions. This is a must-have for any engineer or non-engineer working in the petroleum industry, anyone studying petroleum engineering, or any reference library. Written by one of the most well-known and prolific petroleum engineering writers who has ever lived, this modern classic is sure to become a staple of any engineer's library and a handy reference in the field. Whether open on your desk, on the hood of your truck at the well, or on an offshore platform, this is the only book available that covers the petroleum engineer's rules of thumb that have been compiled over decades. Some of these "rules," until now, have been "unspoken but everyone knows," while others are meant to help guide the engineer through some of the more recent breakthroughs in the industry's technology, such as hydraulic fracturing and enhanced oil recovery. The book covers every aspect of crude oil, natural gas, refining, recovery, and any other area of petroleum engineering that is useful for the engineer to know or to be able to refer to, offering practical solutions to everyday engineering problems and a comprehensive reference work that will stand the test of time and provide aid to its readers. If there is only one reference work you buy in petroleum engineering, this is it.