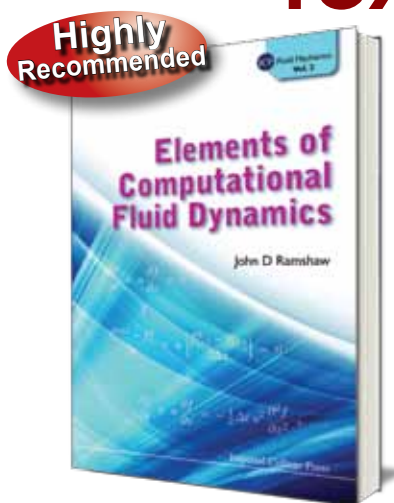


# Chemical Engineering Textbooks 2011/12



ICP Fluid Mechanics - Vol. 2

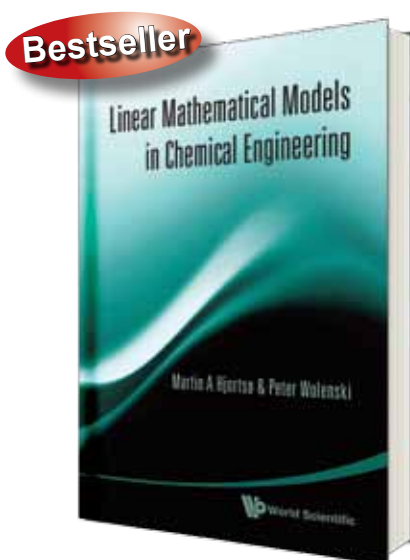
## ELEMENTS OF COMPUTATIONAL FLUID DYNAMICS

by **John D Ramshaw** (Portland State University, USA)

This book aims to present a brief introduction to the basic fundamental concepts of computational fluid dynamics (CFD) in their simplest and most transparent form. In essence it describes the ABC's of CFD, so its scope is limited to the bare essentials of the subject, and readers are directed to other sources for more advanced topics. The book should be suitable both for self-study and as a textbook, especially for use in CFD short courses, but due to its brevity much of its market will likely be as a supplement to more comprehensive CFD and fluid dynamics texts and courses.

**Readership:** Undergraduate, graduate students and professional in the field of computational fluid dynamics, fluid dynamics, fluid mechanics and numerical methods for partial differential equations.

<b>150pp</b>	<b>Jan 2011</b>	
<b>978-1-84816-695-0</b>	<b>US\$69</b>	<b>£43</b>
<b>978-1-84816-705-6(pbk)</b>	<b>US\$32</b>	<b>£20</b>



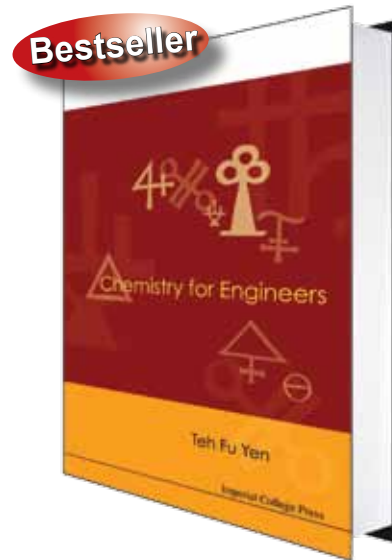
## LINEAR MATHEMATICAL MODELS IN CHEMICAL ENGINEERING

by **Martin A Hjortso** (Louisiana State University, USA) & **Peter Wolenski** (Louisiana State University, USA)

Solution manual is provided for free to instructors who adopt this textbook. Understanding the mathematical modeling of chemical processes is fundamental to the successful career of a researcher in chemical engineering. This book reviews, introduces, and develops the mathematics that is most frequently encountered in sophisticated chemical engineering models. The book places a heavy emphasis on applications to motivate the theory, but simultaneously maintains a high standard of rigor to add mathematical depth and understanding.

**Readership:** Graduate students, academics and researchers in chemical engineering.

<b>524pp</b>	<b>Jan 2010</b>
<b>978-981-279-415-4</b>	<b>US\$107</b>
	<b>£74</b>



## CHEMISTRY FOR ENGINEERS

by **Teh Fu Yen** (University of Southern California, USA)

This book aims at bridging the concepts and theory of chemistry with examples from fields of practical application, thus reinforcing the connection between science and engineering. It deals with the basic principles of various branches of chemistry, namely, physical chemistry, inorganic chemistry, organic chemistry, analytical chemistry, surface chemistry, biochemistry, geochemistry, fuel chemistry, polymer chemistry, cement chemistry, materials chemistry, and asphalt chemistry.

**Readership:** Engineers, chemists, and chemical engineering students at both graduate and undergraduate levels.

<b>576pp</b>	<b>Jan 2008</b>
<b>978-1-86094-774-2</b>	<b>US\$108</b>
<b>978-1-86094-775-9(pbk)</b>	<b>US\$61</b>
	<b>£33</b>

### HIGHLIGHTS

Advances in Chemical and Process Engineering - Vol. 1

#### MATERIAL AND ENERGY BALANCES FOR ENGINEERS AND ENVIRONMENTALISTS

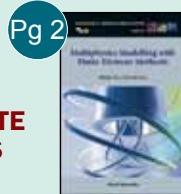
by **Colin Oloman** (University of British Columbia, Canada)



Series on Stability Vibration and Control of Systems, Series A - Vol. 18

#### MULTIPHYSICS MODELING WITH FINITE ELEMENT METHODS

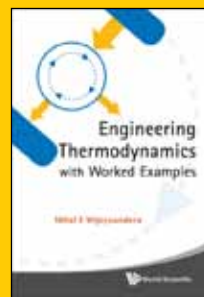
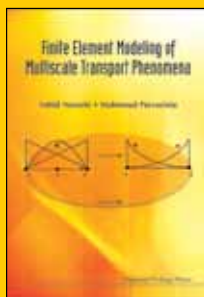
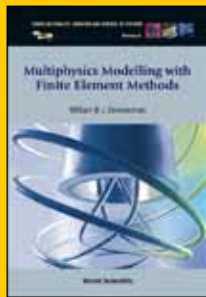
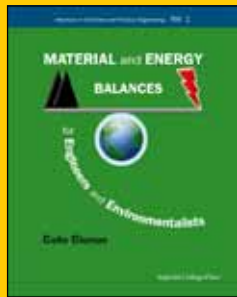
by **William B J Zimmerman** (University of Sheffield, UK)



#### AN INTRODUCTION TO TURBULENT REACTING FLOWS

by **R S Cant** (University of Cambridge, UK) & **E Mastorakos** (University of Cambridge, UK)





Advances in Chemical and Process Engineering - Vol. 1

## MATERIAL AND ENERGY BALANCES FOR ENGINEERS AND ENVIRONMENTALISTS

by **Colin Oloman** (*University of British Columbia, Canada*)

Following a review of the basic science and economics, the text focuses on material and energy accounting in batch and continuous operations, with emphasis on generic process units, flow sheets, stream tables and spreadsheet calculations. There is a unified approach to reactive and non-reactive energy balance calculations, plus chapters dedicated to the general balance equation and simultaneous material and energy balances. Seventy worked examples show the elements of process balances and connect them with the material and energy concerns of the 21st century.

**Readership:** Undergraduates in engineering and industrial chemistry (and science); graduates in engineering (and science) for review of core material; professional engineers (and scientists) for review of core material; other professionals, such as those in economics, geography and the environmental or social sciences, for guidance on quantitative methods for assessing the "triple bottom line" of the industrial economy.

<b>296pp</b>	<b>May 2009</b>	
<b>978-1-84816-368-3</b>	<b>US\$80</b>	<b>£60</b>
<b>978-1-84816-369-0(pbk)</b>	<b>US\$55</b>	<b>£41</b>

Series on Stability Vibration and Control of Systems, Series A - Vol. 18

## MULTIPHYSICS MODELING WITH FINITE ELEMENT METHODS

by **William B J Zimmerman** (*University of Sheffield, UK*)

This textbook introduces the intellectual framework for modeling with Comsol Multiphysics, a package which has unique features in representing multiply linked domains with complex geometry, highly coupled and nonlinear equation systems, and arbitrarily complicated boundary, auxiliary, and initial conditions. But with this modeling power comes great opportunities and great perils. As a revision of Process Modeling and Simulation with Finite Element Methods, this book uses the very latest features of Comsol Multiphysics. There are new case studies on multiphase flow with phase change, plasma dynamics, electromagnetohydrodynamics, microfluidic mixing, and corrosion. In addition, major improvements to the level set method for multiphase flow to ensure phase conservation is introduced.

**Readership:** Undergraduate and postgraduate students and researchers in chemical engineering and applied mathematics.

<b>432pp</b>	<b>Oct 2006</b>	
<b>978-981-256-843-4</b>	<b>US\$89</b>	<b>£52</b>
<b>978-981-277-330-2(ebook)</b>	<b>US\$116</b>	

## FINITE ELEMENT MODELING OF MULTISCALE TRANSPORT PHENOMENA

by **Vahid Nassehi** (*Loughborough University, UK*) & **Mahmoud Parvazini** (*Polymer and Petrochemical Institute, Iran*)

Due to the importance of the described multiscale processes in applications such as separation processes, reaction engineering and environmental systems analysis, a sound knowledge of such methods is essential for many researchers and design engineers who wish to develop reliable solutions for industrially relevant problems. The main scope of this book is to provide an authoritative description of recent developments in the field of finite element analysis, with a particular emphasis on the multiscale finite element modeling of transport phenomena and flow problem.

**Readership:** Graduate students, researchers and engineers in the field of mechanical engineering, chemical engineering, material engineering, civil engineering, applied mathematics and physics.

<b>280pp</b>	<b>Sep 2010</b>	
<b>978-1-84816-429-1</b>	<b>US\$73</b>	<b>£51</b>

## ENGINEERING THERMODYNAMICS WITH WORKED EXAMPLES

by **Nihal E Wijesundera** (*National University of Singapore*)

The book includes all the subject matter covered in a typical undergraduate course in engineering thermodynamics. It includes 20 to 25 worked examples for each chapter, carefully chosen to expose students to diverse applications of engineering thermodynamics. Each worked example is designed to be representative of a class of physical problems. At the end of each chapter, there are an additional 10 to 15 problems for which numerical answers are provided.

**Readership:** Undergraduate and graduate students in mechanical engineering, chemical engineering, civil engineering, electrical & electronic engineering, bioengineering, applied physics and thermodynamics.

<b>720pp</b>	<b>Aug 2010</b>	
<b>978-981-4293-13-6</b>	<b>US\$148</b>	<b>£98</b>
<b>978-981-4293-14-3(pbk)</b>	<b>US\$78</b>	<b>£51</b>

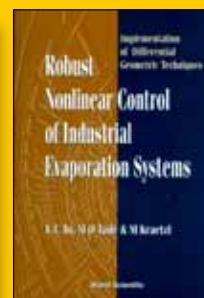
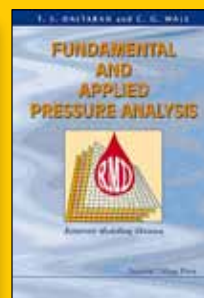
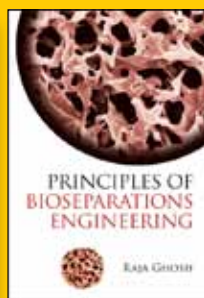
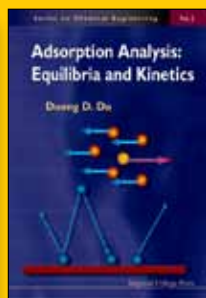
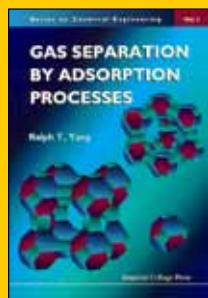
## POLYMER MEMBRANES IN BIOTECHNOLOGY: Preparation, Functionalization and Application

by **Seeram Ramakrishna** (*National University of Singapore*), **Zuwei Ma** (*National University of Singapore*) & **Takeshi Matsuura** (*University of Ottawa, Canada*)

This book provides a concise and comprehensive introduction of polymer membranes' preparation, functionalization and applications in biotechniques including affinity membrane chromatography, membrane-based biosensor and membrane-based bioreactor. It provides a concept of membrane separation, preparation of polymeric membranes, membrane surface activation, ligand immobilization techniques and the organic chemistries, application of affinity membrane chromatography, membranes used in biosensors and gas sensors, enzymatic membranes used as biosensor, and finally, membrane biosensor for waste water treatment. A novel filter medium, i.e. nonwoven nanofiber membrane, and its preparation method, i.e. electrospinning technique, are also introduced in this book.

**Readership:** Undergraduates, graduates and researchers in membrane science, polymer membrane preparation, affinity membrane chromatography and theories, polymer surface modification and enzyme functionalized membrane.

<b>300pp</b>	<b>Aug 2010</b>	
<b>978-1-84816-379-9</b>	<b>US\$75</b>	<b>£50</b>
<b>978-1-84816-380-5(pbk)</b>	<b>US\$45</b>	<b>£30</b>



Series on Chemical Engineering - Vol. 1

## **GAS SEPARATION BY ADSORPTION PROCESSES**

by **Ralph T Yang** (*University of Michigan*)

*Gas Separation by Adsorption Processes* is a complete treatise on all aspects of adsorptive processes. It covers all fundamental principles as well as process design and simulation of gas adsorption processes for separation and purification. This highly popular book in the field has now been reprinted and made available in paperback form.

**Readership:** Professionals and students interested in gas separation and purification processes.

**364pp** Jun 1997  
**978-1-86094-047-7(pbk)** US\$67 £46

Series on Chemical Engineering - Vol. 2

## **ADSORPTION ANALYSIS: EQUILIBRIA AND KINETICS (With CD Containing Computer Matlab Programs)**

by **Duong D Do** (*University of Queensland*)

This book covers topics of equilibria and kinetics of adsorption in porous media. Fundamental equilibria and kinetics are dealt with for homogeneous as well as heterogeneous particles. Five chapters of the book deal with equilibria and eight chapters deal with kinetics. Single component as well as multicomponent systems are discussed. In kinetics analysis, we deal with the various mass transport processes and their interactions inside a porous particle. Conventional approaches as well as the new approach using Maxwell–Stefan equations are presented. Various methods to measure diffusivity, such as the Differential Adsorption Bed (DAB), the time lag, the diffusion cell, chromatography, and the batch adsorber methods are also covered by the book.

**Readership:** Lecturers and students in adsorption analysis, and engineers.

**916pp** Sep 1998  
**978-1-86094-130-6** US\$118 £82  
**978-1-86094-137-5(pbk)** US\$69 £47

## **A PRAGMATIC INTRODUCTION TO THE FINITE ELEMENT METHOD FOR THERMAL AND STRESS ANALYSIS: With the Matlab Toolkit SOFEA**

by **Petr Krysl** (*University of California, San Diego*)

This textbook provides an accessible and self-contained description of the Galerkin finite element method for the two important models of continuum mechanics, transient heat conduction and elastodynamics, from formulation of the governing equations to implementation in Matlab. The coverage follows an intuitive approach: the salient features of each initial boundary value problem are reviewed, including a thorough description of the boundary conditions; the method of weighted residuals is applied to derive the discrete equations; and clear examples are introduced to illustrate the method.

**Readership:** Undergraduates and graduate students, academics and researchers in mechanical, civil, chemical, materials and bioengineering majors.

**292pp** Oct 2006  
**978-981-256-876-2** US\$82 £57  
**978-981-270-411-5(pbk)** US\$41 £28

## **PRINCIPLES OF BIOSEPARATIONS ENGINEERING**

by **Raja Ghosh** (*McMaster University, Canada*)

Bioseparations engineering deals with the scientific and engineering principles involved in large-scale separation and purification of biological products. It is a key component of most chemical engineering/biotechnology/bioprocess engineering programmes. This book discusses the underlying principles of bioseparations engineering written from the perspective of an undergraduate course. It covers membrane based bioseparations in much more detail than some of the other books on bioseparations engineering.

**Readership:** Undergraduate students in biochemical engineering, bioengineering, chemical engineering, biotechnology, and graduate students in these disciplines.

**284pp** Oct 2006  
**978-981-256-892-2** US\$69 £47  
**978-981-277-301-2(ebook)** US\$90

## **FUNDAMENTAL AND APPLIED PRESSURE ANALYSIS**

by **T S Daltaban** (*Imperial College*) & **C G Wall** (*Imperial College*)

Although the book is clearly targeted at petroleum engineers, the approach taken by the authors will no doubt find favour with practitioners in other areas of fluid flow in porous media, such as hydrology and the flow of pollutants. Scattered throughout the book are worked examples of the use of the methods described in the text.

**Readership:** Graduate and undergraduate students in petroleum engineering, geological engineering, civil engineering, environmental sciences, engineering and applied mathematics. Also, practicing engineers in those disciplines.

**832pp** Aug 1998  
**978-1-86094-091-0** US\$166 £114  
**978-1-84816-073-6(ebook)** US\$216

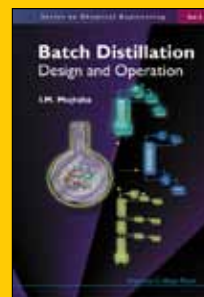
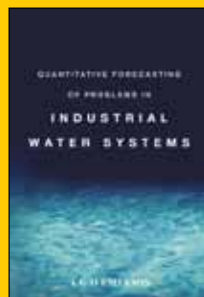
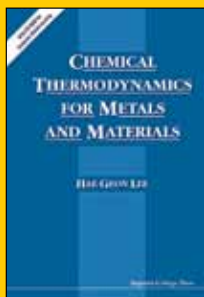
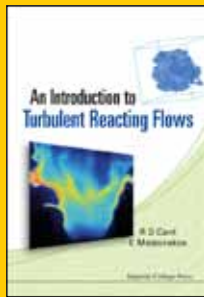
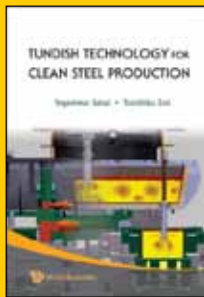
## **ROBUST NONLINEAR CONTROL OF INDUSTRIAL EVAPORATION SYSTEMS**

Implementation of Differential Geometric Techniques  
 by **L C To** (*Bristol Babcock Asia Pacific, Australia*), **M O Tade** (*Curtin University of Technology, Australia*) & **M Kraetzl** (*Defence Science and Technology Organisation, Australia*)

Nonlinearities exist in all process control systems. The use of linear control techniques is valid only in a narrow region of operation. Nonlinear control is central to future industrial development. In this book, multivariable nonlinear control techniques based on differential geometry are considered in a pragmatic manner. The book provides a simplified and systematic approach to geometric nonlinear control theory. A case study of an industrial evaporator is used as an example throughout the entire book. Various other examples are also used throughout the text to illustrate the theory.

**Readership:** Postgraduate students in engineering, industrial practitioners and engineers.

**340pp** Feb 1999  
**978-981-02-3614-4** US\$94 £65



## TUNDISH TECHNOLOGY FOR CLEAN STEEL PRODUCTION

by **Yogeshwar Sahai** (*The Ohio State University, USA*) & **Toshihiko Emi** (*Institute of Research of Iron & Steel, Jiangsu/Shan-Steel, China*)

This pioneering book is the first of its kind to cover all aspects of tundish technology, ranging from fundamental aspects and theory necessary for understanding the basic concepts of tundish operations to operational aspects of the tundish. Written by internationally recognized experts in continuous casting technology in general and tundish technology in particular, this book is sufficiently fundamental to serve as a graduate-level textbook on process metallurgy or as an important reference for metallurgical researchers and is comprehensive enough to contribute to the understanding of scientists and engineers engaged in research and development in the steel industry.

**Readership:** Undergraduate and graduate students in process metallurgy as well as researchers in steel and metallurgical production.

**328pp** **Dec 2007**  
**978-981-270-621-8** **US\$111 £76**  
**978-981-279-076-7(ebook)** **US\$144**

## AN INTRODUCTION TO TURBULENT REACTING FLOWS

by **R S Cant** (*University of Cambridge, UK*) & **E Mastorakos** (*University of Cambridge, UK*)

"Introducing newcomers to a complicated field, providing key entries to a vast literature by pointing out the differences and similarities between the available models, this book represents a very useful tool for approaching the different topic of turbulent reacting flows." **Zentralblatt MATH**

**Readership:** Graduate and senior undergraduate students in mechanical and chemical engineering and new researchers in turbulent reacting flows.

**192pp** **Dec 2007**  
**978-1-86094-778-0** **US\$69 £47**  
**978-1-86094-779-7(pbk)** **US\$36 £25**

## CHEMICAL THERMODYNAMICS FOR METALS AND MATERIALS

(with CD-ROM for Computer-Aided Learning)  
 by **Hae-Geon Lee** (*Pohang University of Science & Technology, Korea*)



A number of thermodynamic books claiming to be original in both presentation and approach have been published. However, thermodynamics is still a confusing subject for uninitiated students and an "easy-to-forget" one for graduate engineers. In order to solve these problems, this computer aided learning package — textbook and CD-ROM — takes a new approach.

**Readership:** Students of materials science and chemical engineering.

**324pp** **Oct 1999**  
**978-1-86094-177-1** **US\$46 £32**

## QUANTITATIVE FORECASTING OF PROBLEMS IN INDUSTRIAL WATER SYSTEMS

by **A G D Emerson** (*formerly of Imperial Chemical Industries, UK*)

This textbook is a diagnostic tool. It enables chemical engineers, water technologists and others involved with the design and provision of an industrial water system, while it is still at the design stage, to start with the chemical analysis of a water supply and make a quantitative forecast of the likely problems (scale and corrosion). It is thus possible to make provision for an appropriate water treatment programme from the very outset.

**Readership:** Practitioners in industrial water technology and researchers in water chemistry.

**376pp** **Nov 2003**  
**978-981-238-184-2** **US\$111 £76**

Series on Chemical Engineering - Vol. 3

## BATCH DISTILLATION: Design and Operation

by **I M Mujtaba** (*University of Bradford, UK*)

"... this book is an excellent contribution. In a departure from the more traditional empirical and theoretical approaches, the author introduces the reader to the practice, by presenting design and operation techniques that have been demonstrated to be useful." Professor Günter Wozny, Technische Universität Berlin

**Readership:** Graduate students, academics, researchers and practitioners in chemical, environmental and industrial engineering.

**416pp** **Mar 2004**  
**978-1-86094-437-6** **US\$82 £57**

### Titles of Interest

Advances in Computational Fluid Dynamics - Vol. 1

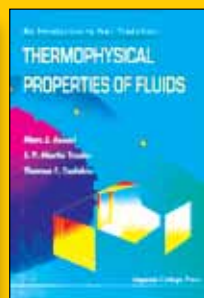
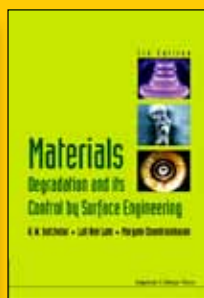
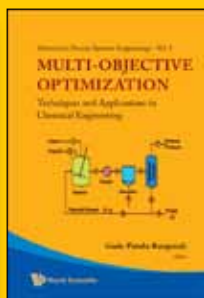
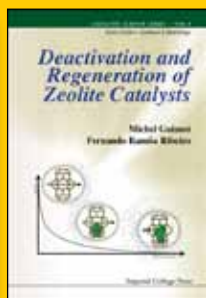
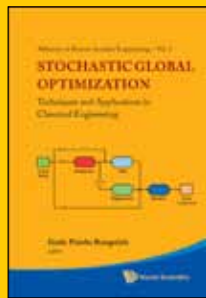
## COMPUTATIONAL METHODS FOR TWO-PHASE FLOWS

by **Peter D M Spelt** (*Imperial College London, UK*), **Stephen J Shaw** (*Xi'an Jiaotong — University of Liverpool, Suzhou, China*) & **Hang Ding** (*University of California, Santa Barbara, USA*)

This book uniquely presents an overview of methods for the numerical simulation of a wide range of two-phase flows, aimed at a broad readership of engineers and scientists at graduate level. Given that numerous methods have been proposed recently in this field, the new book series could not have been more timely and much needed for an up-to-date overview of the advances, whilst not restricting the focus on two-phase flows or any particular method. The book is written by a team of leading experts who have contributed substantially to the development of the methods and who have also applied the concepts and theories to a diverse range of applications.

**Readership:** Scientists and engineers in the field of computational fluid dynamics of two-phase flows.

**350pp** **Feb 2011**  
**978-981-4280-97-6** **US\$111 £76**  
**978-981-4280-98-3(ebook)** **US\$144**



Advances in Process Systems Engineering - Vol. 2

**STOCHASTIC GLOBAL OPTIMIZATION: Techniques and Applications in Chemical Engineering (With CD-ROM)**



edited by **Gade Pandu Rangaiah** (National University of Singapore)

So far, there are no books focusing on stochastic global optimization and its applications in chemical engineering. Stochastic Global Optimization — a monograph with contributions by leading researchers in the area — bridges the gap in this subject, with the aim of highlighting and popularizing stochastic global optimization techniques for chemical engineering applications. The book, with 19 chapters in all, is broadly categorized into two sections that extensively cover the techniques and the chemical engineering applications.

**Readership:** Academics, students, researchers and postgraduate students in this field of research.

**724pp** **Jun 2010**  
**978-981-4299-20-6** **US\$140 £87**  
**978-981-4299-21-3(ebook)** **US\$182**

Catalytic Science Series - Vol. 9

**DEACTIVATION AND REGENERATION OF ZEOLITE CATALYSTS**

edited by **Michel Guisnet** (Technical University of Lisbon, Portugal) & **Fernando Ramoa Ribeiro** (Technical University of Lisbon, Portugal)

This book covers the fundamental and applied aspects of solid catalyst deactivation in a comprehensive way and encompasses the state of the art in the field of reactions catalyzed by zeolites.

**Readership:** Graduates and postgraduates in chemistry or chemical engineering, researchers and professionals in refining, petrochemical, fine chemicals and pollution abatement.

**350pp** **Dec 2010**  
**978-1-84816-637-0** **US\$90 £56**

Advances in Process Systems Engineering - Vol. 1

**MULTI-OBJECTIVE OPTIMIZATION: Techniques and Applications in Chemical Engineering (With CD-ROM)**



edited by **Gade Pandu Rangaiah** (National University of Singapore)

Following a brief introduction and general review on the development of multi-objective optimization applications in chemical engineering since 2000, the book gives a description of selected multi-objective techniques and then goes on to discuss chemical engineering applications. These applications are from diverse areas within chemical engineering, and are presented in detail. All chapters will be of interest to researchers in multi-objective optimization and/or chemical engineering; they can be read individually and used in one's learning and research.

**Readership:** Professors, graduates and senior-level undergraduates, researchers, and industry engineers and managers in chemical engineering.

**456pp** **Dec 2008**  
**978-981-283-651-9** **US\$142 £98**  
**978-981-283-652-6(ebook)** **US\$185**

**MATERIALS DEGRADATION AND ITS CONTROL BY SURFACE ENGINEERING (3rd Edition)**

by **Andrew Batchelor** (Aramco, Saudi Arabia), **Margam Chandrasekaran** (Bio-Scaffold International Pte Ltd, Singapore) & **Nee Lam Loh** (Nanyang Technological University, Singapore)

This book provides a general holistic view of materials degradation without undue emphasis on aqueous corrosion with the neglect of other important topics such as liquid metal corrosion. Discussion of materials degradation is balanced by detailed description and evaluation of surface engineering as a means of managing materials degradation. The control or management of materials degradation is not only discussed in scientific terms, but the economics or financial aspects of materials degradation and surface engineering is also discussed in detail with the help of analytical models.

**Readership:** Engineers and scientists in materials engineering, surface science, materials science (general), materials chemistry and surface and interface chemistry.

**450pp** **Jan 2011**  
**978-1-84816-501-4** **US\$138 £91**  
**978-1-84816-502-1(ebook)** **US\$179**

Advances in Process Systems Engineering - Vol. 3

**RECENT ADVANCES IN SUSTAINABLE PROCESS DESIGN AND OPTIMIZATION**

edited by **Dominic C Y Foo** (University of Nottingham Malaysia, Malaysia), **Mahmoud M El-Halwagi** (Texas A&M University, USA) & **Raymond R Tan** (De La Salle University-Manila, Philippines)

This book is a compilation of the various recently developed techniques emphasizing better chemical processes and products, with state-of-the-art contributions by world-renowned leaders in process design and optimization. It covers various areas such as grass-roots design, retrofitting, continuous and batch processing, energy efficiency, separations, and pollution prevention, striking a balance between fundamental techniques and applications. The book also contains industrial applications.

**Readership:** Advanced undergraduates and graduate students in chemical process design and optimization; non-experts interested in clean process design.

**900pp** **Dec 2010**  
**978-981-4271-95-0** **US\$178 £123**  
**978-981-4271-96-7(ebook)** **US\$231**

Series on Chemical Engineering and Chemical Technology - Vol. 1

**THERMOPHYSICAL PROPERTIES OF FLUIDS: An Introduction to Their Prediction**

by **Marc J Assael** (Aristotle University, Greece), **J P Martin Trusler** (Imperial College, UK) & **Thomas F Tsolakis** (Imperial College, UK)

"I recommend this book to chemistry and geochemistry students, and scientists in general, because it is one of the few textbooks available on the subject. The style is clear and concise and the text is well organised, with main references given at the end of each chapter." **Chemistry in Britain**

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