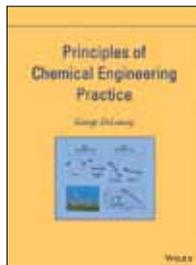


# Books

## PRINCIPLES OF CHEMICAL ENGINEERING PRACTICE



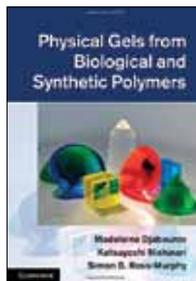
**George DeLancey, John Wiley & Sons, Hoboken, NJ, \$175, 456 pages, June 2013, ISBN: 978-0-470536-74-2**

New applications — and opportunities — have emerged in chemical engineering practice. Microchemical systems, for example, require attention to design parameters that are not important at larger scales. The shift from the design

of commodity chemical manufacturing processes to the design of chemical products themselves is creating a demand for chemical engineers with a broader view of design than the traditional capstone design experience. Emerging opportunities in medical devices and drug manufacturing call for more emphasis on the life sciences and physiology.

This book integrates scientific principles with practical engineering experience, enabling readers to understand the fundamentals of chemical processing and to apply their knowledge of such topics as material and energy balances, transport phenomena, reactor design, and separations across a range of chemical industries. The book distinguishes between the macroscopic — examining equipment design and behavior from the vantage point of inlet and outlet conditions — and the microscopic — focusing on the equipment interior resulting from conditions prevailing at the equipment boundaries. The author, a professor emeritus of chemical engineering at Stevens Institute of Technology, guides readers step by step through the execution of both chemical process analysis and equipment design, allowing readers to master such chemical engineering operations and equipment as separators, reactors, heat exchangers, and more.

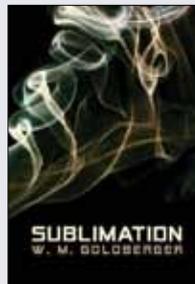
## PHYSICAL GELS FROM BIOLOGICAL AND SYNTHETIC POLYMERS



**Madeleine Djabournov, Katsuyoshi Nishinari, and Simon B. Ross-Murphy, Cambridge Univ. Press, New York, NY, \$130, 365 pages, June 2013, ISBN: 978-0-521769-64-8**

Presenting a unique perspective on state-of-the-art physical gels, this guide provides a complete, critical analysis of the field and highlights recent developments. Based on the authors' original scientific work on rheology and phase transitions, the book shows the inter-

connections between the key aspects of gels, from molecules and structure to rheological and functional properties, with each chapter focusing on a different class of gel. A final chapter covers innovative systems and applications and provides



## SUBLIMATION

**W. M. Goldberger, CreateSpace Independent Publishing Platform, www.createpace.com, \$15, 318 pages, Jan. 2013, ISBN: 978-1-478110-74-3**

This fictional novel offers insight into the world of scientific and engineering research — more specifically, the business of contract research. The author, a chemical engineer and inventor who has served as a technical consultant for industry and governments, has based his narrative on subjects, programs, and projects that are real, providing an impetus to discuss issues such as those related to energy independence and the role of governments in research and development.

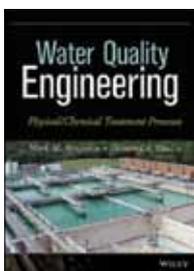
The story details the career and murder of a young research scientist shortly after his return from Pakistan as a consultant for the United Nations. With government funding in the real world playing such a decisive role in R&D (and in the careers of engineers and scientists), government policy and politics are brought into play as factors in the murder. Thus, the tale describes how the excitement of invention is often tempered by the difficulties inherent in bringing a new technology into beneficial use.

the information needed to understand current and future practical applications of gels in the pharmaceutical, agricultural, cosmetic, chemical, and food industries.

This interdisciplinary book collates and rationalizes the many different points of view — of theoreticians, experimentalists, and chemical engineers — to provide an understanding of these complex systems.

**WATER QUALITY ENGINEERING: PHYSICAL/CHEMICAL TREATMENT PROCESSES**

## WATER QUALITY ENGINEERING: PHYSICAL/CHEMICAL TREATMENT PROCESSES



**Mark F. Benjamin and Desmond F. Lawler, John Wiley & Sons, Hoboken, NJ, \$170, 904 pages, July 2013, ISBN: 978-1-118169-65-0**

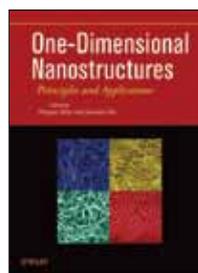
Drawing from the latest research findings and industry practices, this book presents the fundamentals of physical and chemical treatment processes for water and wastewater — employing detailed

examples and step-by-step mathematical calculations to describe real-world challenges and their solutions. The book is designed to give readers an understanding of how water-

treatment processes actually work. It explores the application of mass balances in continuous-flow systems, enabling readers to understand and predict changes in water quality; processes for removing soluble contaminants from water, including treatment of municipal and industrial wastes; processes for removing particulate materials from water; and membrane processes to remove both soluble and particulate materials.

This text will be useful to chemical and environmental engineers and graduate students in search of contemporary perspectives on water- and wastewater-treatment processes.

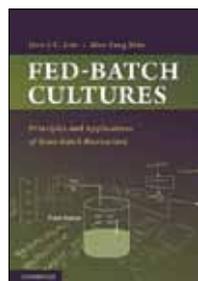
### ONE-DIMENSIONAL NANOSTRUCTURES: PRINCIPLES AND APPLICATIONS



**Tianyou Zhai and Jiannian Yao,**  
**John Wiley & Sons, Hoboken, NJ,**  
**\$150, 576 pages, Jan. 2013,**  
**ISBN: 978-1-118071-91-5**

Nanotechnology may be the driving force of the next industrial revolution — holding the key to breakthroughs in materials and manufacturing, electronics, medicine, energy, biotechnology, information technology, and national security. This book reviews both the underlying principles as well as the latest discoveries in the field. It covers all major classes of one-dimensional nanostructures, including carbon nanotubes, semiconductor nanowires, organic molecule nanostructures, polymer nanofibers, peptide nanostructures, and supramolecular nanostructures. The book also offers insights into the future of one-dimensional nanostructures, with expert forecasts of research breakthroughs and applications. Research findings and the state of the technology are detailed for applications such as energy, photonics, optoelectronics, sensing, plasmonics, electronics, biosciences, and more, and practical case studies demonstrate how the latest applications work.

The book will be valuable to researchers, academicians, and students of chemistry, physics, materials science, and engineering, and will help chemical engineers advance their own investigations into the next generation of applications.



**FED-BATCH CULTURES:  
PRINCIPLES AND APPLICATIONS  
OF SEMI-BATCH BIOREACTORS**  
**Henry C. Lim and Hwa Sung Shin,**  
**Cambridge Univ. Press,**  
**New York, NY, \$135, 471 pages,**  
**Apr. 2013, ISBN: 978-0-521513-36-4**

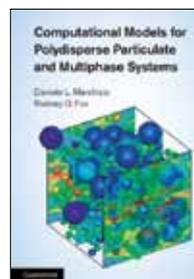
Many industrially important bioreactor operations are carried out in fed-batch

mode, in which one or more streams of feed containing nutrient sources, precursors, inducers, and minerals are fed either continuously or intermittently during the course of batch operations. By regulating the feed rates, it is possible to regulate the bioreactor environment to maximize the rate of production, the reactor productivity, or the product yield. Products of such fed-batch cultures include amino acids, antibiotics, enzymes, microbial cells, organic chemicals, polysaccharides, proteins, tissue culture products, and recombinant DNA products.

This book, containing contributions from world experts, aims to provide the what, why, and how of fed-batch operations. The systematic coverage begins with elementary principles and then progresses through theoretical developments in optimization and control, leading up to examples illustrating the practical implementation of optimal strategies for fed-batch processes.

The book will be a useful reference for practitioners and R&D personnel in the biotechnology, fermentation, food, pharmaceuticals, and industrial waste-treatment industries, as well as advanced students of biochemical engineering, environmental engineering, chemical engineering, and biotechnology.

### COMPUTATIONAL MODELS FOR POLYDISPERSE PARTICULATE AND MULTIPHASE SYSTEMS



**Daniele L. Marchisio and Rodney O. Fox,**  
**Cambridge Univ. Press,**  
**New York, NY, \$125, 544 pages,**  
**May 2013, ISBN: 978-0-521858-48-9**

This book, part of the Cambridge Series in Chemical Engineering, describes the theory of polydisperse multiphase flows, with emphasis on the mesoscale modeling approach and its relationship with microscale and macroscale models. The book links theory to practice through discussions of representative case studies involving such phenomena as particle, droplet, and bubble coalescence, break-up, nucleation, advection, and diffusion. Readers can apply the book's lessons in simulating systems related to their own applications. The practical cases presented also provide the foundation needed to use quadrature-based moment methods, choose appropriate options, and design high-order numerical methods that guarantee realizable moment sets. In addition to the numerous practical examples, MATLAB scripts for several algorithms are provided.

This all-inclusive introduction will be useful to chemical, mechanical, and environmental engineers and scientists working in the simulation of polydisperse multiphase flows.

CEP