

Modeling Of Catalyst Fixed Bed Reactor For Production Of

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Chemical Reactor Modeling - Hugo A. Jakobsen 2014-04-02

Chemical Reactor Modeling closes the gap between Chemical Reaction Engineering and Fluid Mechanics. The second edition consists of two volumes: Volume 1: Fundamentals. Volume 2: Chemical Engineering Applications In volume 1 most of the fundamental theory is presented. A few numerical model simulation application examples are given to elucidate the link between theory and applications. In volume 2 the chemical reactor equipment to be modeled are described. Several engineering models are introduced and discussed. A survey of the frequently used numerical methods, algorithms and schemes is provided. A few practical engineering applications of the modeling tools are presented and discussed. The working principles of several experimental techniques employed in order to get data for model validation are outlined. The monograph is based on lectures regularly taught in the fourth and fifth years graduate courses in transport phenomena and chemical reactor modeling and in a post graduate course in modern reactor modeling at the Norwegian University of Science and Technology, Department of Chemical Engineering, Trondheim, Norway. The objective of the book is to present the fundamentals of the single-fluid and multi-fluid models for the analysis of single and multiphase reactive flows in chemical reactors with a chemical reactor engineering

rather than mathematical bias. Organized into 13 chapters, it combines theoretical aspects and practical applications and covers some of the recent research in several areas of chemical reactor engineering. This book contains a survey of the modern literature in the field of chemical reactor modeling.

Plasma Catalysis - Xin Tu 2019-11-21

This book provides a comprehensive overview of the field of plasma catalysis, regarded as a promising alternative to thermal processes for energy and environmental applications. It bridges the gap between the plasma and catalysis research communities, covering both the fundamentals of plasma catalysis and its application in environmental and energy research. The first section of the book offers a broad introduction to plasma catalysis, covering plasma-catalyst systems, interactions, and modeling. The core of the book then focuses on different applications, describing a wide range of plasma-catalytic processes in catalyst synthesis, environmental clean-up, greenhouse gas conversion and synthesis of materials for energy applications. Chapters cover topics ranging from removal of NO_x and VOCs to conversion of methane, carbon dioxide and the reforming of ethanol and methanol. Written by a group of world-leading researchers active in the field, the book forms a valuable resource for scientists, engineers and students

with different research backgrounds including plasma physics, plasma chemistry, catalysis, energy, environmental engineering, electrical engineering and material engineering.

Elements of Chemical Reaction Engineering - H. Scott Fogler 1999

"The fourth edition of *Elements of Chemical Reaction Engineering* is a completely revised version of the book. It combines authoritative coverage of the principles of chemical reaction engineering with an unsurpassed focus on critical thinking and creative problem solving, employing open-ended questions and stressing the Socratic method. Clear and organized, it integrates text, visuals, and computer simulations to help readers solve even the most challenging problems through reasoning, rather than by memorizing equations."--BOOK JACKET.

Chemical and Catalytic Reactor Modeling - American Chemical Society. Meeting 1984

Computational Flow Modeling for Chemical Reactor Engineering - Vivek V. Ranade 2002

Full text engineering e-book.

Solution of Differential Equation Models by Polynomial Approximation - John Villadsen 1978

Adiabatic Fixed-Bed Reactors - Jonathan Worstell 2014-08-19

Practical Guides in Chemical Engineering are a cluster of short texts that each provides a focused introductory view on a single subject. The full library spans the main topics in the chemical process industries that engineering professionals require a basic understanding of. They are 'pocket publications' that professional engineers can easily carry with them or access electronically while working. Each text is highly practical and applied, and presents first principles for engineers who need to get up to speed in a new area fast. The focused facts provided in each guide will help you converse with experts in the field, attempt your own initial troubleshooting, check calculations, and solve rudimentary problems. *Adiabatic Fixed-bed Reactors* covers the fundamentals of fixed-bed reactors, including various types and their physical properties.

Applications of each device type are discussed, as well as troubleshooting Solid-supported Catalysts. This text is ideal for any engineer who is new to working with fixed-bed reactors and needs to know the basics quickly and easily. Practical, short, concise information on the basics will help you get an answer or teach yourself a new topic quickly Supported by industry examples to help you solve a real world problem Single subject volumes provide key facts for professionals
Chemical Reactors - Pierre Trambouze 2004

Chemical Reaction Engineering - Kenneth B. Bischoff 1972

Dynamic Modelling, Bifurcation and Chaotic Behaviour of Gas-Solid Catalytic Reactors - S. S. E. H. Elnashaie 1996-03-18

The discovery of chaos has considerably widened the scope of our knowledge regarding the dynamics of physical systems. Gas-solid catalytic reactors are important units in the petrochemical and petroleum refining industries and in the field of environmental protection. The knowledge required to understand and analyse the bifurcation, dynamics and chaotic behaviour of these reactors is widespread among many disciplines including chemical reaction, engineering, chemistry, physics and pure and applied mathematics. This book is the first to consolidate the progress in understanding the complex dynamics of catalytic reactors. It covers the most important aspects of the problem, which includes the formulation of the dynamic models for these systems, the basic dynamic, bifurcation and chaotic characteristics of the different types and configurations of these units, the industrial relevance of these complex dynamic phenomena, as well as the mathematical tools necessary for the detailed analysis of these complex dynamics. This book is easy to read, and will therefore appeal to a wide spectrum of chemical engineering students and chemical engineers in academia and in industry, also students and researchers from other disciplines who are interested in the rich and fascinating complex dynamic characteristics of gas-solid catalytic reactors, will find it both interesting and useful.

Nonlinear Analysis in Chemical Engineering - Bruce A. Finlayson
2003

Sulfuric Acid Manufacture - Matt King 2013-05-11

By some measure the most widely produced chemical in the world today, sulfuric acid has an extraordinary range of modern uses, including phosphate fertilizer production, explosives, glue, wood preservative and lead-acid batteries. An exceptionally corrosive and dangerous acid, production of sulfuric acid requires stringent adherence to environmental regulatory guidance within cost-efficient standards of production. This work provides an experience-based review of how sulfuric acid plants work, how they should be designed and how they should be operated for maximum sulfur capture and minimum environmental impact. Using a combination of practical experience and deep physical analysis, Davenport and King review sulfur manufacturing in the contemporary world where regulatory guidance is becoming ever tighter (and where new processes are being required to meet them), and where water consumption and energy considerations are being brought to bear on sulfuric acid plant operations. This 2e will examine in particular newly developed acid-making processes and new methods of minimizing unwanted sulfur emissions. The target readers are recently graduated science and engineering students who are entering the chemical industry and experienced professionals within chemical plant design companies, chemical plant production companies, sulfuric acid recycling companies and sulfuric acid users. They will use the book to design, control, optimize and operate sulfuric acid plants around the world. Unique mathematical analysis of sulfuric acid manufacturing processes, providing a sound basis for optimizing sulfuric acid manufacturing processes Analysis of recently developed sulfuric acid manufacturing techniques suggests advantages and disadvantages of the new processes from the energy and environmental points of view Analysis of tail gas sulfur capture processes indicates the best way to combine sulfuric acid making and tailgas sulfur-capture processes from the energy and environmental points of view Draws on industrial

connections of the authors through years of hands-on experience in sulfuric acid manufacture

Fluidization Engineering - D. Kunii 2013-10-22

Fluidization Engineering, Second Edition, expands on its original scope to encompass these new areas and introduces reactor models specifically for these contacting regimes. Completely revised and updated, it is essentially a new book. Its aim is to distill from the thousands of studies those particular developments that are pertinent for the engineer concerned with predictive methods, for the designer, and for the user and potential user of fluidized beds. Covers the recent advances in the field of fluidization. Presents the studies of developments necessary to the engineers, designers, and users of fluidized beds.

The Method of Volume Averaging - S. Whitaker 2013-03-09

Multiphase systems dominate nearly every area of science and technology, and the method of volume averaging provides a rigorous foundation for the analysis of these systems. The development is based on classical continuum physics, and it provides both the spatially smoothed equations and a method of predicting the effective transport coefficients that appear in those equations. The text is based on a ten-week graduate course that has been taught for more than 20 years at the University of California at Davis and at other universities around the world. Problems dealing with both the theoretical foundations and the applications are included with each chapter, and detailed solutions for all problems are available from the author. The course has attracted participants from chemical engineering, mechanical engineering, civil engineering, hydrologic science, mathematics, chemistry and physics.

Parametric Sensitivity in Chemical Systems - Arvind Varma 2005-09-15

The behavior of a chemical system is affected by many physicochemical parameters. The sensitivity of the system's behavior to changes in parameters is known as parametric sensitivity. When a system operates in a parametrically sensitive region, its performance becomes unreliable and changes sharply with small variations in parameters. Thus, it is of great value to those who design and operate chemical systems to be able to analyze and predict their sensitivity behavior. This book is the first to

provide a thorough treatment of the concept of parametric sensitivity and the mathematical tool it generated, sensitivity analysis. The emphasis is on applications to real situations. The book begins with definitions of various sensitivity indices and describes the numerical techniques most commonly used for their evaluation. Extensively illustrated chapters discuss sensitivity analysis in a variety of chemical reactors--batch, tubular, continuous-flow, fixed-bed--and in combustion systems, mechanistic studies, air pollution, and metabolic processes. Seniors and graduate students in various fields of science and engineering, researchers, and practicing engineers will welcome this valuable resource.

Modeling of Chemical Kinetics and Reactor Design - A. Kayode Coker 2001

Selecting the best type of reactor for any particular chemical reaction, taking into consideration safety, hazard analysis, scale-up, and many other factors is essential to any industrial problem. An understanding of chemical reaction kinetics and the design of chemical reactors is key to the success of the of the chemist and the chemical engineer in such an endeavor. This valuable reference volume conveys a basic understanding of chemical reactor design methodologies, incorporating control, hazard analysis, and other topics not covered in similar texts. In addition to covering fluid mixing, the treatment of wastewater, and chemical reactor modeling, the author includes sections on safety in chemical reaction and scale-up, two topics that are often neglected or overlooked. As a real-world introduction to the modeling of chemical kinetics and reactor design, the author includes a case study on ammonia synthesis that is integrated throughout the text. The text also features an accompanying CD, which contains computer programs developed to solve modeling problems using numerical methods. Students, chemists, technologists, and chemical engineers will all benefit from this comprehensive volume. Shows readers how to select the best reactor design, hazard analysis, and safety in design methodology Features computer programs developed to solve modeling problems using numerical methods

Catalytic Reactors - Basudeb Saha 2016-01-01

Reactor design for Chemical Engineering deals with maximization of product yields and the net present value for the chemical reaction, optimization of the reaction efficiency, and minimization of costs. This book discusses the best choice of catalysts, different reaction steps and intermediates and the design of the catalytic reactors, in which the catalysis and chemical reaction are combined to achieve intensification. *Modelling, Simulation and Optimization of Industrial Fixed Bed Catalytic Reactors* - S.S.E.H. Elnashaie 2022-01-27

In the last two decades impressive advances have been made toward the understanding and quantitative description of the kinetics. Despite these advances, however, the use of mathematical modelling of gas-solid catalytic reactors in industry is still limited. By consolidating progress in the understanding of catalytic processes, this book applies these fundamental advances to the development of models for design, simulation and optimization of industrial reactors. Paying particular attention to the verification of the developed models against industrial data, these models are used to optimize the performance of many practical reactor cases. Using a systems approach for the development of the different components and the resulting overall models, the book is easy to read and gives an insight into the behaviour of these complex industrial systems. In addition, the practical relevance of bifurcation, instability and chaos to industrial reactors is briefly discussed.

Plasma Catalysis - Annemie Bogaerts 2019-04-02

Plasma catalysis is gaining increasing interest for various gas conversion applications, such as CO₂ conversion into value-added chemicals and fuels, N₂ fixation for the synthesis of NH₃ or NO_x, methane conversion into higher hydrocarbons or oxygenates. It is also widely used for air pollution control (e.g., VOC remediation). Plasma catalysis allows thermodynamically difficult reactions to proceed at ambient pressure and temperature, due to activation of the gas molecules by energetic electrons created in the plasma. However, plasma is very reactive but not selective, and thus a catalyst is needed to improve the selectivity. In spite of the growing interest in plasma catalysis, the underlying mechanisms of the (possible) synergy between plasma and catalyst are

not yet fully understood. Indeed, plasma catalysis is quite complicated, as the plasma will affect the catalyst and vice versa. Moreover, due to the reactive plasma environment, the most suitable catalysts will probably be different from thermal catalysts. More research is needed to better understand the plasma-catalyst interactions, in order to further improve the applications.

Catalyst Design - Massimo Morbidelli 2005-09-15

Since heterogeneous catalysis is widely used in chemical, refinery, and pollution-control processes, achieving optimal catalytic performance is a significant issue for chemical engineers and chemists. This book addresses the question of how catalytic material should be distributed inside a porous support to obtain optimal performance. It treats single and multiple reaction systems, isothermal and nonisothermal conditions, pellets, monoliths, fixed-bed reactors, and membrane reactors. The effects of physicochemical and operating parameters are analyzed to gain insight into the underlying phenomena governing the performance of optimally designed catalysts. Throughout, the authors offer a balanced treatment of theory and experiment and stress problems of commercial importance.

Modeling and Simulation of Catalytic Reactors for Petroleum

Refining - Jorge Ancheyta 2011-04-20

Modeling and Simulation of Catalytic Reactors for Petroleum Refining deals with fundamental descriptions of the main conversion processes employed in the petroleum refining industry: catalytic hydrotreating, catalytic reforming, and fluid catalytic cracking. Common approaches for modeling of catalytic reactors for steady-state and dynamic simulations are also described and analyzed. Aspects such as thermodynamics, reaction kinetics, process variables, process scheme, and reactor design are discussed in detail from both research and commercial points of view. Results of simulation with the developed models are compared with those determined at pilot plant scale as well as commercial practice. Kinetics data used in the reactor model are either taken from the literature or obtained under controlled experiments at the laboratory.

Chemical Reactor Analysis and Design - Gilbert F. Froment 1990-01-16

This is the Second Edition of the standard text on chemical reaction engineering, beginning with basic definitions and fundamental principles and continuing all the way to practical applications, emphasizing real-world aspects of industrial practice. The two main sections cover applied or engineering kinetics, reactor analysis and design. Includes updated coverage of computer modeling methods and many new worked examples. Most of the examples use real kinetic data from processes of industrial importance.

Heat And Mass Transfer In Fixed And Fluidized Beds - W. Van Swaaij 1986-06-01

Modelling, Simulation and Optimization of Industrial Fixed Bed Catalytic Reactors - S. S. E. H. Elnashaie 1994-03-07

The use of mathematical modelling of gas-solid catalytic reactors in industry is still limited. By consolidating progress in the understanding of catalytic processes, this book applies these fundamental advances to the development of models for design, simulation and optimization of industrial reactors.

Fischer-Tropsch Synthesis, Catalysts, and Catalysis - Burtron H. Davis 2016-04-06

With petroleum prices spiraling upward, making synthetic fuels-or "synfuels"-from coal, natural gas, and biomass has become more economically competitive. Advanced energy companies now focus exclusively on alternative fuels, and many oil companies have programs dedicated to developing synthetic fuels. The Fischer-Tropsch process, which uses a colle

Analysis of the K-Epsilon Turbulence Model - B. Mohammadi 1994-09-06

Aimed at applied mathematicians interested in the numerical simulation of turbulent flows. Centered around the k- ϵ model, it also deals with other models such as one equation models, subgrid scale models and Reynolds Stress models. Presents the k- ϵ method for turbulence in a language familiar to applied mathematicians, but has none of the technicalities of turbulence theory.

Diameter-Transformed Fluidized Bed - Youhao Xu 2020-06-05

This book puts forward the concept of the Diameter-Transformed Fluidized Bed (DTFB): a fluidized bed characterized by the coexistence of multiple flow regimes and reaction zones, achieved by transforming the bed into several sections of different diameters. It reviews fundamental aspects, including computational fluid dynamics simulations and industrial practices in connection with DTFB. In particular, it highlights an example concerning the development of maximizing iso-paraffins (MIP) reactors for regulating complex, fluid catalytic cracking reactions in petroleum refineries. The book is a must-have for understanding how academic and industrial researchers are now collaborating in order to develop novel catalytic processes.

Trickle Bed Reactors - Vivek V. Ranade 2011-03-18

This book provides a hybrid methodology for engineering of trickle bed reactors by integrating conventional reaction engineering models with state-of-the-art computational flow models. The content may be used in several ways and at various stages in the engineering process: it may be used as a basic resource for making appropriate reactor engineering decisions in practice; as study material for a course on reactor design, operation, or optimization of trickle bed reactors; or in solving practical reactor engineering problems. The authors assume some background knowledge of reactor engineering and numerical techniques. Facilitates development of high fidelity models for industrial applications Facilitates selection and application of appropriate models Guides development and application of computational models to trickle beds

Chemical Reaction and Reactor Engineering - James John Carberry 2020-08-27

This book presents an authoritative progress report that will remain germane to the topic and prove to be a substantial inspiration to further progress. It is valuable to academic and industrial practitioners of the art and science of chemical reaction and reactor engineering.

Modeling and Simulation of Heterogeneous Catalytic Processes -

Anthony G. Dixon 2014-09-19

Heterogeneous catalysis and mathematical modeling are essential components of the continuing search for better utilization of raw

materials and energy, with reduced impact on the environment.

Numerical modeling of chemical systems has progressed rapidly due to increases in computer power, and is used extensively for analysis, design and development of catalytic reactors and processes. This book presents reviews of the state-of-the-art in modeling of heterogeneous catalytic reactors and processes. . Reviews by leading authorities in the respective areas. . Up-to-date reviews of latest techniques in modeling of catalytic processes. . Mix of US and European authors, as well as academic/industrial/research institute perspectives. . Connections between computation and experimental methods in some of the chapters.

Chemical Reactor Omnibook- soft cover - Octave Levenspiel 2013

The Omnibook aims to present the main ideas of reactor design in a simple and direct way. it includes key formulas, brief explanations, practice exercises, problems from experience and it skims over the field touching on all sorts of reaction systems. Most important of all it tries to show the reader how to approach the problems of reactor design and what questions to ask. In effect it tries to show that a common strategy threads its way through all reactor problems, a strategy which involves three factors: identifying the flow patten, knowing the kinetics, and developing the proper performance equation. It is this common strategy which is the heart of Chemical Reaction Engineering and identifies it as a distinct field of study.

Precision Process Technology - M.P.C. Weijnen 2012-12-06

New process technology strategies are required to cope with the future. Fossil feedstocks are losing ground in favour of renewable feedstocks and secondary resources. Conventional processing routes using thermal 'sledgehammer' techniques are replaced by highly selective (bio)catalytic conversions. The future process engineer is neither allowed to think in terms of unit operations, nor to take for granted the conventional practice of continuous steady state processing. Hybrid systems and transient operations are more and more frequently encountered. The continuing impressive progress being made in process modelling and control will revolutionize the process industries. In the new generation of chemical production processes the keyword is

precision. Precision in terms of selectivity and of efficiency, is required to maximize the utilisation of materials and energy. Moreover, enhanced precision is needed to exploit the quality of materials and energy to the full extent. Only by reducing the squandering of materials, energy and quality will a harmonious relationship be established between the process industries, the economy, and the environment. Process integration, as well as an integrated effort by the disciplines involved in process technology, will be of crucial importance in attaining the goals of precision process technology. These emerging strategies involve an active exchange of tools and ideas between a variety of disciplines, not only in plant design and operation, but even more in the early stages of process development and design. By looking from various angles at what the future has in store for the process industries, this volume systematically lifts the corners of the veil and may inspire to establish a new tradition of precision in process technology.

Chemical Reactor Design and Technology - Hugo de Lasa 2012-12-06
Today's frustrations and anxieties resulting from two energy crises in only one decade, show us the problems and fragility of a world built on high energy consumption, accustomed to the use of cheap non-renewable energy and to the acceptance of eXisting imbalances between the resources and demands of countries. Despite all these stressing factors, our world is still hesitating about the urgency of undertaking new and decisive research that could stabilize our future, Could this trend change in the near future? In our view, two different scenarios are possible. A renewed energy tension could take place with an unpredictable timing mostly related to political and economic factors, This could bring again scientists and technologists to a new state of shock and awaken our talents, A second interesting and beneficial scenario could result from the positive influence of a new generation of researchers that with or without immediate crisis, acting both in industry and academia, will face the challenge of developing technologies and processes to pave the way to a less vulnerable society, Because Chemical Reactor Design and Technology activities are at the heart of these required new technologies the timeliness of the NATO-Advanced Study Institute at the University of

Western Ontario, London, was very appropriate.

Process Intensification - David Reay 2013-06-05

Process Intensification: Engineering for Efficiency, Sustainability and Flexibility is the first book to provide a practical working guide to understanding process intensification (PI) and developing successful PI solutions and applications in chemical process, civil, environmental, energy, pharmaceutical, biological, and biochemical systems. Process intensification is a chemical and process design approach that leads to substantially smaller, cleaner, safer, and more energy efficient process technology. It improves process flexibility, product quality, speed to market and inherent safety, with a reduced environmental footprint. This book represents a valuable resource for engineers working with leading-edge process technologies, and those involved research and development of chemical, process, environmental, pharmaceutical, and bioscience systems. No other reference covers both the technology and application of PI, addressing fundamentals, industry applications, and including a development and implementation guide Covers hot and high growth topics, including emission prevention, sustainable design, and pinch analysis World-class authors: Colin Ramshaw pioneered PI at ICI and is widely credited as the father of the technology

Fast Pyrolysis of Biomass - A. V. Bridgwater 1999

This edited and updated version of the final report of the IEA Bioenergy Pyrolysis Task, is useful both to newcomers to the subject area and those already involved in research, development, and implementation.

Multiphase Catalytic Reactors - Zeynep Ilse Önsan 2016-06-09

Provides a holistic approach to multiphase catalytic reactors from their modeling and design to their applications in industrial manufacturing of chemicals Covers theoretical aspects and examples of fixed-bed, fluidized-bed, trickle-bed, slurry, monolith and microchannel reactors Includes chapters covering experimental techniques and practical guidelines for lab-scale testing of multiphase reactors Includes mathematical content focused on design equations and empirical relationships characterizing different multiphase reactor types together with an assortment of computational tools Involves detailed coverage of

multiphase reactor applications such as Fischer-Tropsch synthesis, fuel processing for fuel cells, hydrotreating of oil fractions and biofuels processing

Structured Catalysts and Reactors - Andrzej Cybulski 2005-11-02

Interest in structured catalysts is steadily increasing due to the already proven, as well as potential, advantages of these catalysts. Updating the comprehensive coverage of the first edition published in 1998 with the latest science and applications, *Structured Catalysts and Reactors, Second Edition* gives detailed information on all aspects of structured catalysts and reactors, including: materials, mass transfer, selectivity, activity, and stability; catalyst preparation, design, and characterization; process development; modeling and optimization; reactor design; and operation costs and considerations. The book first examines how monolithic catalysts are used to clean exhaust gas from gasoline engines, treat industrial off-gases, burn fuels in commercial settings, and synthesize chemicals in two- and three-phase processes. It discusses configurations, microstructure, physical properties, and manufacture of ceramic and metallic monoliths before directing its focus to arranged catalysts and structured packings in terms of mass transfer. The book then explores catalytically active membranes and filters, featuring metallic membranes, permeation mechanisms, preparation and modeling, commercial membranes, and the latest applications, such as zeolitic membranes. Finally, several chapters present techniques for incorporating catalytic species into the structured catalyst support and controlling catalyst nanoporosity. This book conveys the scientific as well as economic advantages of using these unconventional catalytic techniques. With over 1500 references, tables, drawings, and photographs, as well as in-depth discussions and a new approach to catalytic processes, *Structured Catalysts and Reactors, Second Edition* is an essential reference for anyone working with or studying catalysis.

Modeling of Processes and Reactors for Upgrading of Heavy Petroleum - Jorge Ancheyta 2013-01-29

The worldwide petroleum industry is facing a dilemma: the production level of heavy petroleum is higher than that of light petroleum. Heavy

crude oils possess high amounts of impurities (sulfur, nitrogen, metals, and asphaltenes), as well as a high yield of residue with consequent low production of valuable distillates (gasoline and diesel). These characteristics, in turn, are responsible for the low price of heavy petroleum. Additionally, existing refineries are designed to process light crude oil, and heavy oil cannot be refined to 100 percent. One solution to this problem is the installation of plants for heavy oil upgrading before sending this raw material to a refinery. *Modeling of Processes and Reactors for Upgrading of Heavy Petroleum* gives an up-to-date treatment of modeling of reactors employed in the main processes for heavy petroleum upgrading. The book includes fundamental aspects such as thermodynamics, reaction kinetics, chemistry, and process variables. Process schemes for each process are discussed in detail. The author thoroughly describes the development of correlations, reactor models, and kinetic models with the aid of experimental data collected from different reaction scales. The validation of modeling results is performed by comparison with experimental and commercial data taken from the literature or generated in various laboratory scale reactors. Organized into three sections, this book deals with general aspects of properties and upgrading of heavy oils, describes the modeling of non-catalytic processes, as well as the modeling of catalytic processes. Each chapter provides detailed experimental data, explanations of how to determine model parameters, and comparisons with reactor model predictions for different situations, so that readers can adapt their own computer programs. The book includes rigorous treatment of the different topics as well as the step-by-step description of model formulation and application. It is not only an indispensable reference for professionals working in the development of reactor models for the petroleum industry, but also a textbook for full courses in chemical reaction engineering. The author would like to express his sincere appreciation to the Marcos Moshinsky Foundation for the financial support provided by means of a Cátedra de Investigación.

Three-phase Catalytic Reactors - P. A. Ramachandran 1983

Heterogeneous Photocatalysis - Mario J. Muñoz-Batista 2020-07-01

The series Topics in Current Chemistry Collections presents critical reviews from the journal Topics in Current Chemistry organized in topical volumes. The scope of coverage is all areas of chemical science including the interfaces with related disciplines such as biology, medicine and materials science. The goal of each thematic volume is to give the non-specialist reader, whether in academia or industry, a comprehensive insight into an area where new research is emerging which is of interest to a larger scientific audience. Each review within the volume critically surveys one aspect of that topic and places it within the context of the volume as a whole. The most significant developments

of the last 5 to 10 years are presented using selected examples to illustrate the principles discussed. The coverage is not intended to be an exhaustive summary of the field or include large quantities of data, but should rather be conceptual, concentrating on the methodological thinking that will allow the non-specialist reader to understand the information presented. Contributions also offer an outlook on potential future developments in the field. The chapter "Mechanochemical Forces as a Synthetic Tool for Zero and One-Dimensional Titanium Oxide-Based Nano-photocatalysts" is available open access under a CC BY 4.0 License via link.springer.com.