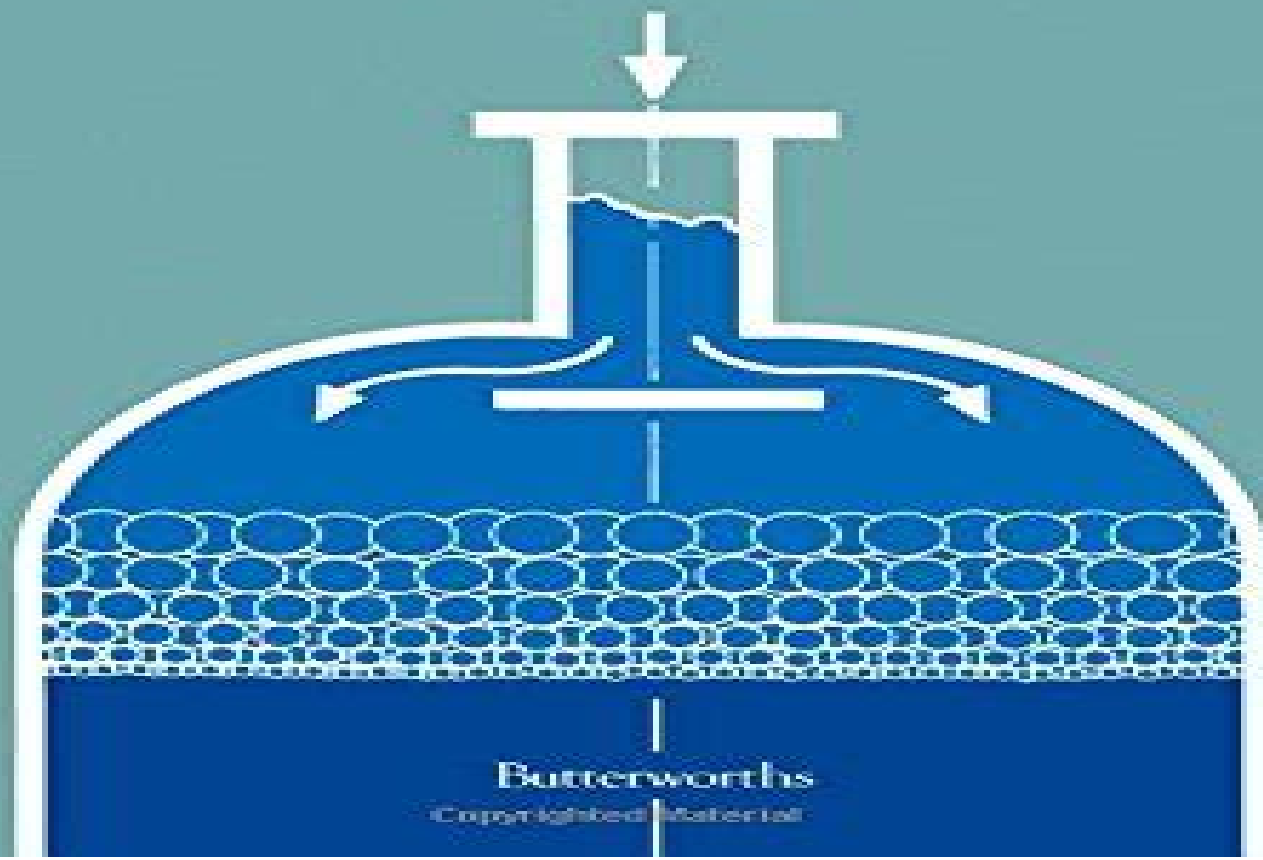


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Gas-Phase Reactions



Butterworths

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Fixed-Bed Reactor Design and Diagnostics Howard F. Rase, 2013-10-22 Fixed Bed Reactor Design and Diagnostics Gas Phase Reactions presents the essential theoretical and conceptual background of gaseous reactions catalyzed by solid catalysts in fixed beds This book intends to provide recommendations to professionals who seek for modeling scale up and diagnostics of fixed bed reactors The text is divided into three parts Part I provides the conceptual background and relevant theories Part II presents recommended mathematical models scale up procedures and diagnostic methods Part III gives a number of practical examples The topics that are specifically discussed include heterogeneous catalysis and kinetics general tubular reactor model and general diagnostics for fixed bed reactors Engineers and professionals working with fixed bed reactors will find the book highly informative

Multiphase Catalytic Reactors Zeynep Ilse Önsan, Ahmet Kerim Avci, 2016-06-03 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

Mathematical Modeling of Complex Reaction Systems in the Oil and Gas Industry Jorge Ancheyta, Andrey Zagoruiko, Andrey Elyshev, 2024-07-25 Master the fundamentals of reaction systems modeling for the age of decarbonization Reactor design is one of the most important parts of the oil and gas industry with reactor processes and the accompanying technologies constantly evolving to meet industry needs A crucial component of effective reactor design is modelling complex reaction systems which can help predict commercial performance shape safety procedures and more At a time when decarbonization and clean energy transition are among the fundamental global technological challenges it has never been more important for engineers to grasp the cutting edge of reaction system modelling Mathematical Modeling of Complex Reaction Systems in the Oil and Gas Industry provides a systematic introduction to this timely subject Each chapter provides a step by step description of the kinetic and reactor models for a particular kind of process and its accompanying systems Backed by voluminous experimental data and incorporating extensive simulation results the book constitutes an indispensable contribution to the global search for clean energy solutions Mathematical Modeling of Complex Reaction Systems in the Oil and Gas Industry readers will also find All the required tools for developing new reactor models for different reaction scales Detailed discussion of topics including hydrocracking of heavy oils catalyst deactivation oxidative regeneration of catalysts and many more Extensive treatment of both steady state and dynamic simulations Mathematical Modeling of Complex Reaction Systems in the Oil and Gas Industry

is ideal for chemical and process engineers computational chemists and modelers catalysis researchers and any other researchers or professionals in petrochemical engineering and the oil and gas industry Chemical Process Design and Integration Robin Smith, 2016-08-02 Written by a highly regarded author with industrial and academic experience this new edition of an established bestselling book provides practical guidance for students researchers and those in chemical engineering The book includes a new section on sustainable energy with sections on carbon capture and sequestration as a result of increasing environmental awareness and a companion website that includes problems worked solutions and Excel spreadsheets to enable students to carry out complex calculations **Heterogeneous Catalysis** Abdullah A. Shaikh, 2020-08-10 This textbook is a perfect introduction to heterogeneous catalysis focusing on the industrial implementation It is written in a comprehensible manner using language that is easy accessible and provides problems to practice **Chemical Reaction Engineering** L.K. Doraiswamy, Deniz Uner, 2013-07-15 Filling a longstanding gap for graduate courses in the field Chemical Reaction Engineering Beyond the Fundamentals covers basic concepts as well as complexities of chemical reaction engineering including novel techniques for process intensification The book is divided into three parts Fundamentals Revisited Building on Fundamentals and Beyond Computer-Aided Modeling of Reactive Systems Warren E. Stewart, Michael Caracotsios, 2008-03-17 Learn to apply modeling and parameter estimation tools and strategies to chemical processes using your personal computer This book introduces readers to powerful parameter estimation and computational methods for modeling complex chemical reactions and reaction processes It presents useful mathematical models numerical methods for solving them and statistical methods for testing and discriminating candidate models with experimental data Topics covered include Chemical reaction models Chemical reactor models Probability and statistics Bayesian estimation Process modeling with single response data Process modeling with multi response data Computer software Athena Visual Studio is available via a related Web site <http://www.athenavisual.com> enabling readers to carry out parameter estimation based on their data and to carry out process modeling using these parameters As an aid to the reader an appendix of example problems and solutions is provided Computer Aided Modeling of Reactive Systems is an ideal supplemental text for advanced undergraduates and graduate students in chemical engineering courses while it also serves as a valuable resource for practitioners in industry who want to keep up to date on the most current tools and strategies available **Chemical Engineering Design** Gavin Towler, Ray Sinnott, 2021-07-14 Chemical Engineering Design Principles Practice and Economics of Plant and Process Design is one of the best known and most widely adopted texts available for students of chemical engineering The text deals with the application of chemical engineering principles to the design of chemical processes and equipment The third edition retains its hallmark features of scope clarity and practical emphasis while providing the latest US codes and standards including API ASME and ISA design codes and ANSI standards as well as coverage of the latest aspects of process design operations safety loss prevention equipment selection and more The text is

designed for chemical and biochemical engineering students senior undergraduate year plus appropriate for capstone design courses where taken and professionals in industry chemical process biochemical pharmaceutical petrochemical sectors Provides students with a text of unmatched relevance for chemical process and plant design courses and for the final year capstone design course Written by practicing design engineers with extensive undergraduate teaching experience Contains more than 100 typical industrial design projects drawn from a diverse range of process industries NEW TO THIS EDITION Includes new content covering food pharmaceutical and biological processes and commonly used unit operations Provides updates on plant and equipment costs regulations and technical standards Includes limited online access for students to Cost Engineering s Cleopatra Enterprise cost estimating software *Practical Advances in Petroleum Processing* Chang Samuel Hsu, Paul R. Robinson, 2007-01-10 Includes topics not found together in books on petroleum processing economics automation process modeling online optimization safety environmental protection Combines overviews of petroleum composition refinery processes process automation and environmental protection with comprehensive chapters on recent advances in hydroprocessing FCC lubricants hydrogen management Gives diverse perspectives both geographic and topical because contributors include experts from eight different countries in North America Europe and Asia representing oil companies universities catalyst vendors process licensors consultants and engineering contractors **Handbook of Commercial Catalysts** Howard F. Rase, 2016-04-05 Despite the advances in understanding the phenomena that occur on a catalyst surface much of the successful catalyst development and use continues to be half science and half art The art resides in the practical knowledge of experts in the development and use of commercial catalysts it comes with experience Now the background needed to nurture t Chemical Process Robin Smith, 2005-06-10 This book deals with the design and integration of chemical processes emphasizing the conceptual issues that are fundamental to the creation of the process Chemical process design requires the selection of a series of processing steps and their integration to form a complete manufacturing system The text emphasizes both the design and selection of the steps as individual operations and their integration Also the process will normally operate as part of an integrated manufacturing site consisting of a number of processes serviced by a common utility system The design of utility systems has been dealt with in the text so that the interactions between processes and the utility system and interactions between different processes through the utility system can be exploited to maximize the performance of the site as a whole Chemical processing should form part of a sustainable industrial activity For chemical processing this means that processes should use raw materials as efficiently as is economic and practicable both to prevent the production of waste that can be environmentally harmful and to preserve the reserves of raw materials as much as possible Processes should use as little energy as economic and practicable both to prevent the build up of carbon dioxide in the atmosphere from burning fossil fuels and to preserve reserves of fossil fuels Water must also be consumed in sustainable quantities that do not cause deterioration in the quality of the water source and the long term

quantity of the reserves Aqueous and atmospheric emissions must not be environmentally harmful and solid waste to landfill must be avoided Finally all aspects of chemical processing must feature good health and safety practice It is important for the designer to understand the limitations of the methods used in chemical process design The best way to understand the limitations is to understand the derivations of the equations used and the assumptions on which the equations are based Where practical the derivation of the design equations has been included in the text The book is intended to provide a practical guide to chemical process design and integration for undergraduate and postgraduate students of chemical engineering practicing process designers and chemical engineers and applied chemists working in process development Examples have been included throughout the text Most of these examples do not require specialist software and can be performed on spreadsheet software Finally a number of exercises have been added at the end of each chapter to allow the reader to practice the calculation procedures

Handbook of Fluidization and Fluid-Particle Systems Wen-Ching Yang, 2003-03-19 This reference details particle characterization dynamics manufacturing handling and processing for the employment of multiphase reactors as well as procedures in reactor scale up and design for applications in the chemical mineral petroleum power cement and pharmaceuticals industries The authors discuss flow through fixed beds elutriation and entrainment gas distributor and plenum design in fluidized beds effect of internal tubes and baffles general approaches to reactor design applications for gasifiers and combustors dilute phase pneumatic conveying and applications for chemical production and processing This is a valuable guide for chemists and engineers to use in their day to day work

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

Chemical Engineering and Chemical Process Technology - Volume III Ryszard Pohorecki, John Bridgwater, M. Molzahn. Rafiqul Gani and Crispulo Gallegos, 2010-11-30 Chemical Engineering and Chemical Process Technology is a theme component of Encyclopedia of Chemical Sciences Engineering and Technology Resources in

the global Encyclopedia of Life Support Systems EOLSS which is an integrated compendium of twenty Encyclopedias

Chemical engineering is a branch of engineering dealing with processes in which materials undergo changes in their physical or chemical state These changes may concern size energy content composition and or other application properties Chemical engineering deals with many processes belonging to chemical industry or related industries petrochemical metallurgical food pharmaceutical fine chemicals coatings and colors renewable raw materials biotechnological etc and finds application in manufacturing of such products as acids alkalis salts fuels fertilizers crop protection agents ceramics glass paper colors dyestuffs plastics cosmetics vitamins and many others It also plays significant role in environmental protection biotechnology nanotechnology energy production and sustainable economical development

The Theme on Chemical Engineering and Chemical Process Technology deals in five volumes and covers several topics such as Fundamentals of Chemical Engineering Unit Operations Fluids Unit Operations Solids Chemical Reaction Engineering Process Development Modeling Optimization and Control Process Management The Future of Chemical Engineering Chemical Engineering Education Main Products which are then expanded into multiple subtopics each as a chapter These five volumes are aimed at the following five major target audiences University and College students Educators Professional practitioners Research personnel and Policy analysts managers and decision makers and NGOs

Successful Trouble Shooting for Process Engineers Donald R. Woods, 2006-05-12 Chemical production processes consist of many complex apparatuses involving both moving and static parts as well as interconnecting pipes control mechanisms and electronics mechanical and thermal stages heat exchangers waste and side product processing units power ducts and many others Bringing such a complicated unit online and ensuring its continued productivity requires substantial skill at anticipating detecting and solving acute problems This book is the professional s and student s entrance to the fascinating and important world of trouble shooting for chemical pharmaceutical and other production processes

Modeling with Differential Equations in Chemical Engineering Stanley M. Walas, 1991 Modelling with Differential Equations in Chemical Engineering covers the modelling of rate processes of engineering in terms of differential equations While it includes the purely mathematical aspects of the solution of differential equations the main emphasis is on the derivation and solution of major equations of engineering and applied science Methods of solving differential equations by analytical and numerical means are presented in detail with many solved examples and problems for solution by the reader Emphasis is placed on numerical and computer methods of solution A key chapter in the book is devoted to the principles of mathematical modelling These principles are applied to the equations in important engineering areas The major disciplines covered are thermodynamics diffusion and mass transfer heat transfer fluid dynamics chemical reactions and automatic control These topics are of particular value to chemical engineers but also are of interest to mechanical civil and environmental engineers as well as applied scientists The material is also suitable for undergraduate and beginning graduate students as well as for review by practising engineers

Energy Research Abstracts ,1993

Fuel Cells: Technologies for Fuel Processing Dushyant Shekhawat, J.J. Spivey, David A Berry, 2011-03-18 Fuel Cells Technologies for Fuel Processing provides an overview of the most important aspects of fuel reforming to the generally interested reader researcher technologist teacher student or engineer The topics covered include all aspects of fuel reforming fundamental chemistry different modes of reforming catalysts catalyst deactivation fuel desulfurization reaction engineering novel reforming concepts thermodynamics heat and mass transfer issues system design and recent research and development While no attempt is made to describe the fuel cell itself there is sufficient description of the fuel cell to show how it affects the fuel reformer By focusing on the fundamentals this book aims to be a source of information now and in the future By avoiding time sensitive information analysis e g economics it serves as a single source of information for scientists and engineers in fuel processing technology The material is presented in such a way that this book will serve as a reference for graduate level courses fuel cell developers and fuel cell researchers Chapters written by experts in each area Extensive bibliography supporting each chapter Detailed index Up to date diagrams and full colour illustrations *Lees' Loss Prevention in the Process Industries* Frank Lees, 2012-11-05 Safety in the process industries is critical for those who work with chemicals and hazardous substances or processes The field of loss prevention is and continues to be of supreme importance to countless companies municipalities and governments around the world and Lees is a detailed reference to defending against hazards Recognized as the standard work for chemical and process engineering safety professionals it provides the most complete collection of information on the theory practice design elements equipment regulations and laws covering the field of process safety An entire library of alternative books and cross referencing systems would be needed to replace or improve upon it but everything of importance to safety professionals engineers and managers can be found in this all encompassing three volume reference instead The process safety encyclopedia trusted worldwide for over 30 years Now available in print and online to aid searchability and portability Over 3 600 print pages cover the full scope of process safety and loss prevention compiling theory practice standards legislation case studies and lessons learned in one resource as opposed to multiple sources *Operaciones unitarias y reactores químicos* MUÑOZ ANDRÉS Vicenta, MAROTO VALIENTE Ángel, 2013-04-09 Este texto es material b sico para los estudiantes del grado en Qu mica En l encontrar n los conocimientos elementales de la asignatura Operaciones Unitarias y Reactores Qu micos Su finalidad es proporcionar al estudiante un somero estudio de t cnicas y modos de actuar en ingenier a qu mica basados en los conocimientos suministrados por otras disciplinas como la termodin mica la cin tica los fen menos de transporte adem s de otras ense anzas de la qu mica y la f sica y de las ciencias en general

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