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fundamentals of catalysis and catalytic processes are fully covered before delving into the important industrial applications of catalysis and catalytic processes, with an emphasis on green and sustainable technologies. Several case studies illustrate new and sustainable ways of designing catalysts and catalytic processes. The intended audience of the book includes researchers in academia and industry, as well as chemical engineers, process development chemists, and technologists working in chemical industries and industrial research laboratories. Discusses the fundamentals of catalytic processes, catalyst preparation and characterization, and reaction engineering Outlines the homogeneous catalytic processes as they apply to specialty chemicals Introduces industrial catalysis and catalytic processes for fine chemicals Includes a number of case studies to demonstrate the various processes and methods for designing green catalysts

Industrial Catalytic Processes for Fine and Specialty Chemicals - Sunil S Joshi - 2016-04-12
Industrial Catalytic Processes for Fine and Specialty Chemicals provides a comprehensive methodology and state-of-the art toolbox for industrial catalysis. The book begins by introducing the reader to the interesting, challenging, and important field of catalysis and catalytic processes. The fundamentals of catalysis and catalytic processes are fully covered before delving into the important industrial applications of catalysis and catalytic processes, with an emphasis on green and sustainable technologies. Several case studies illustrate new and sustainable ways of designing catalysts and
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**Preparation of Solid Catalysts** - Gerhard Ertl - 1999-11-12
Solid catalysts play a fundamental role in all areas between basic research and industrial applications. This book offers a large amount of information about the preparation of solid catalysts. All types of solid catalysts and all important aspects of their preparation are discussed. The highly topical contributions are written by leading experts in disciplines ranging from solid state, interface and solution chemistry to industrial engineering. The straightforward presentation of the material and the comprehensive coverage make this book an essential and indispensable tool for every scientist and engineer working with solid catalysts.

**Catalysis** - G. C. Bond - 1983
Catalysis will be of interest to anyone working in academia and industry that needs an up-to-date critical analysis and summary of catalysis research and applications.

**Laboratory Studies of Heterogeneous Catalytic Processes** - E.G. Christoffel - 1989-01-01
Providing a concise treatment of methods of heterogeneous catalysis used in the laboratory, this book describes the basic phenomena of heterogeneous catalytic reaction systems and discusses in detail the experimental methods and procedures for investigating these systems. The introductory chapter illustrates the whole procedure with an actual example. The next chapter presents the basic phenomena of catalytic systems and the concepts used in studying them. The third chapter covers the description of methods for investigating reaction mechanisms and the dynamics of heterogeneous catalytic reaction systems. The last chapter discusses the design and operation modes of laboratory reactors, frequently used for the investigation of heterogeneous catalytic reactions. The approach is interdisciplinary, providing a balance between chemical engineering and chemical viewpoints of treating laboratory-scale reactors. Chemists and chemical engineers involved in catalyst research will be very interested in this book and it can also be usefully used in specialized courses for graduate students in chemistry or in chemical reaction engineering.
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**Encyclopedia of Chemical Processing** - Sunggyu Lee - 2006
Supplying nearly 350 expertly-written articles on technologies that can maximize and enhance the research and production phases of current and emerging chemical manufacturing practices and techniques, this second edition provides gold standard articles on the methods, practices, products, and standards recently influencing the chemical industries. New material includes: design of key unit operations involved with chemical processes; design, unit operation, and integration of reactors and separation systems; process system peripherals such as pumps, valves, and controllers; analytical techniques and equipment; current industry practices; and pilot plant design and scale-up criteria.

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**Encyclopedia of Chemical Processing (Online)** - Sunggyu Lee - 2005-11-01
This second edition Encyclopedia supplies nearly 350 gold standard articles on the methods, practices, products, and standards influencing the chemical industries. It offers expertly written articles on technologies at the forefront of the field to maximize and enhance the research and production phases of current and emerging chemical manufacturing practices and techniques. This collecting of information is of vital interest to chemical, polymer, electrical, mechanical, and civil engineers, as well as chemists and chemical researchers. A complete reconceptualization of the classic reference series the Encyclopedia of Chemical Processing and Design, whose first volume published in 1976, this resource offers extensive A-Z treatment of the subject in five simultaneously published volumes, with comprehensive indexing of all five volumes in the back matter of each tome. It includes material on the design of key unit operations involved with chemical processes; the design, unit operation, and integration of reactors and separation systems; process system peripherals such as pumps, valves, and controllers; analytical techniques and equipment; and pilot plant design and scale-up criteria. This reference contains well-researched sections on automation, equipment, design and simulation, reliability and maintenance, separations technologies, and energy and environmental issues. Authoritative contributions cover chemical processing equipment, engineered systems, and laboratory apparatus currently utilized in the field. It also presents expert overviews on key engineering science topics in property predictions, measurements and analysis, novel materials and devices, and emerging chemical fields. ALSO AVAILABLE ONLINE This Taylor & Francis encyclopedia is also available through online subscription, offering a variety of extra benefits for both researchers, students, and librarians, including: Citation tracking and alerts Active reference linking Saved searches and marked lists HTML and PDF format options Contact Taylor and Francis for more information or to inquire about subscription options and print/online combination packages. US: (Tel) 1.888.318.2367;
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Applied Industrial Catalysis - Bruce Leach - 2012-12-02
Applied Industrial Catalysis, Volume 1 provides a practical description of catalysis by industrial scientists. This book provides information pertinent to industrial catalysis, which is influenced by science, business, economic, markets, and politics. Organized into 10 chapters, this volume starts with an overview of the significance of industrial catalysis and its effect on human lifestyle and environment. This text then describes how to take a laboratory catalyst to successful commercialization with minimum problems. Other chapters consider in detail two major refinery processes, namely, hydrotreating and reforming. The reader is introduced to the specific processes for polyethylene and polypropylene manufacture. This book reviews as well ethylene oxide synthesis and explains oxychlorination of ethylene to ethylene dichloride. The final chapter reviews methanol carbonylation to acetic acid, which is produced by continuously reacting methanol and carbon monoxide in a homogeneous catalytic reactor at Industrial scientists and process engineers will find this book useful.

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The Development of Catalysis - Adriano Zecchina - 2017-02-27
This book gradually brings the reader, through illustrations of the most crucial discoveries, into the modern world of chemical catalysis. Readers and experts will better understand the enormous influence that catalysis has given to the development of modern societies. • Highlights the field's onset up to its modern days, covering the life and achievements of luminaries of the catalytic era • Appeals to general audience in interpretation and analysis, but preserves the precision and clarity of a scientific approach • Fills the gap in publications that cover the history of specific catalytic processes

Homogeneous Catalysis - Sumit Bhaduri - 2014-09-08
Over the last decade, the area of homogeneous catalysis with transition metal has grown in great scientific interest and technological promise, with research in this area earning three Nobel Prizes and filing thousands of patents relating to metalloocene and non-metalloocene single site catalysts, asymmetric catalysis, carbon-carbon bond forming metathesis and cross coupling reactions. This text explains these new developments in a unified, cogent, and comprehensible manner while also detailing earlier discoveries and the fundamentals of homogeneous catalysis. Serving as a self-study guide for students and all chemists seeking to gain entry into this field, it can also be used by experienced researchers from both academia and industry for referring to leading state of the art review articles and patents, and also as a quick self-study manual in an area that is outside their immediate expertise. The book features: • Topics including renewable feed stocks (biofuel, glycerol), carbon dioxide based processes (polycarbonates), fluorous solvents, ionic liquid, hydroformylation, polymerization, oxidation, asymmetric catalysis, and more • Basic principles of organometallic chemistry, homogeneous catalysis, and relevant technological issues • Problems and answers, industrial applications (casestudies), and examples from proven industrial processes with clear discussions on environmental and techno-commercial issues • Extensive references to cutting edge research with application potential and leading patents • Tables and illustrations to help explain difficult concepts


The book provides insight into the working of clays and clay minerals in speeding up a variety of organic reactions. Clay minerals are known to have a large propensity for taking up organic molecules and can catalyse numerous organic reactions due to fine particle size, extensive surface area, layer structure, and peculiar charge characteristics. They can be used as heterogeneous catalysts and catalyst carriers of organic reactions because they are non-corrosive, easy to separate from the reaction mixture, and reusable. Clays and clay minerals have an advantage over other solid acids as they are abundant, inexpensive, and non-polluting.

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Catalysis of Organic Reactions - Mike G. Scaros - 2017-11-22
Based on the papers and posters presented at the 15th Conference on Catalysis of Organic Reactions, this work covers developments in the study of catalysis as it relates to organic synthesis, emphasizing applications in industrial processes. Over 1000 bibliographic citations and over 250 tables, drawings, and photographs are provided. Theoretical and practical aspects of the field are highlighted.

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Catalysis - James J Spivey - 2007-10-31
There is an increasing challenge for chemical industry and research institutions to find cost-efficient and environmentally sound methods of converting natural resources into fuels chemicals and energy. Catalysts are essential to these processes and the Catalysis Specialist Periodical Report series serves to highlight major developments in this area. This series provides systematic and detailed reviews of topics of interest to scientists and engineers in the catalysis field. The coverage includes all major areas of heterogeneous and homogeneous catalysis and also specific applications of catalysis such as NOx control kinetics and experimental techniques such as microcalorimetry. Each chapter is compiled by recognised experts within their specialist fields and provides a summary of the current literature. This series will be of interest to all those in academia and industry who need an up-to-date critical analysis and summary of catalysis research and applications. Catalysis will be of interest to anyone working in academia and industry that needs an up-to-date critical analysis and summary of catalysis research and applications. Specialist Periodical Reports provide systematic and detailed review coverage in major areas of chemical research. Compiled by teams of leading experts in their specialist fields, this series is designed to help the chemistry community keep current with the latest developments in their field. Each volume in the series is published either annually or biennially and is a superb reference point for researchers. www.rsc.org/spr
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Aspects of Homogeneous Catalysis - R. Ugo - 2012-12-06
1. INTRODUCTION Although quite spectacular results have been obtained in the last few decades in the field of homogeneous transition metal catalyzed transformations of olefins and alkynes [1], reactions which could lead to heterocycles have been partly neglected. An obvious reason for this is that substrates containing heteroatoms such as N, O or S could coordinate the metal and suppress the catalytic activity. Nevertheless, some interesting early examples of transition-metal-catalyzed syntheses of heterocyclic compounds have been reported and these have been reviewed by C. W. Bird [2]. More recently the incorporation of CO, which enables esters and lactones to be synthesized from olefinic starting materials, has begun to attract attention (see, for example, ref. [3]). The dominant role of palladium as the catalyst for the formation of O-containing heterocycles has been suggested to be associated with the relatively low strength of the Pd-O bond. Among the first examples of a nitrogen-containing heterocycle to be formed by homogeneous catalysis is the triazine shown in Equation 1 which is the product of the trimerization of benzonitrile in the presence of iron penta carbonyl or Raney nickel [4].

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Catalyst Handbook - Martyn V. Twigg - 2018-12-19
This book bridges the gap between theory and practice. It provides fundamental information on heterogeneous catalysis and the practicalities of the catalysts and processes used in producing ammonia, hydrogen and methanol via hydrocarbon steam reforming. It also covers the oxidation reactions in making formaldehyde from methanol, nitric acid from ammonia and sulphuric acid from sulphur dioxide. Designed for use in the chemical industry and by those in teaching, research and the study of industrial catalysts and catalytic processes. Students will also find this book extremely useful for obtaining practical information not available in more conventional textbooks.

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Advanced Materials in Catalysis - Frank Bolz - 2013-10-22
Advanced Materials in Catalysis is a collection of materials that discusses various catalysts. The book presents the physical and chemical properties that indicate that a particular class of materials may be of catalytic interest. The text first covers bimetallic catalysts, and then proceeds to examining the catalytic properties of compounds such as graphite intercalation compounds; oxides with the scheelite structure; and synthetic layered silicates and aluminosilicate. The book also covers reduction catalysts, biological catalysts, and monolithic catalyst supports. The selection will be of great use to students and practitioners of chemistry, particularly those who are involved in research studies that investigate materials problems in catalysis.

Catalyst Deactivation 1991 was an expanded version of earlier, highly successful symposia. The symposium featured invited and solicited papers including 4 plenary lectures, 78 oral presentations and 23 poster papers. Most of the papers are contained in this volume. The eight main topics emphasised at this most recent symposium were: deactivation mechanisms/phenomena (carbon deposition, poisoning, and sintering), methods (modeling and techniques), and important catalysts (hydrotreating, oxides, and zeolites). All of these areas were well represented as attested by the substantial number of papers contained in these proceedings. Four review papers based on the plenary lectures provide state-of-the-art perspectives on new thrusts in deactivation research and development.

This volume compiles 63 peer-reviewed scientific papers documenting the latest developments in the application of homogeneous, heterogeneous, and immobilized homogenous catalysts used in organic synthesis. Catalysis of Organic Reactions consists of primary research articles accompanied by experimental sections that emphasize chemical processes with

Handbook of Commercial Catalysts - Howard F. Rase - 2016-04-05
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**Recent Developments in Catalysis** - B. Viswanathan - 1991

**Complex Catalytic Processes** - C.H. Bamford - 1978-01-01

**Complex Catalytic Processes** - C.H. Bamford - 1978-01-01

**Catalysis in C1 Chemistry** - W. Keim - 2012-12-06
Continuously increasing oil prices, a dwindling supply of petroleum, and the existence of extensive reserves of biomass, especially of coal, have given rise to a growing interest in generating CO/H from these sources. Catalytic reactions can convert CO/H mixtures to useful hydrocarbons or hydrocarbon intermediates. There is little doubt that petroleum will remain the backbone of the organic chemical industry for many years to come, yet there is great opportunity for CO as an alternative feedstock at times when it is needed. The loosely defined body of chemistry and technology contained in these areas of development has become known as C1 chemistry, embracing many C1 building blocks such as CH, CO/H, CO, CH OH, CO and HCN; still emphasis 4 2 3 2 rests on carbon monoxide. Academic research laboratories, oil and chemical companies are in the vanguard of C1 chemistry. The Japanese Ministry of International Trade and Industry is sponsoring a seven-year program of 14 major chemical companies in C1 chemistry aimed at developing new technology for making basic chemicals from CO and H2. It is likely that C1 chemistry will develop slowly but persistently and the future holds great potential.

Preparation and Examination of Practical Catalysts: Volume II deals with preparing and examining practical catalysts and provides useful accounts of methods used in catalytic research by specialists. The text covers topics such as molecular sieve zeolites – the estimation of zeolite purity and zeolite modification, the introduction of catalytically active components, and the methods of preparation and characterization of supported metal catalysts. Also covered are topics such as the use of the electron probe microanalyzer in catalysts, electron microscopy - related instruments, principles in scanning electron microscopy, and the principles and specimen preparation in transmission electron microscopy; Mössbauer spectroscopy, and microbalances in adsorption and catalysts. The book is recommended for chemists who would like to know more about the preparation and usage of catalysts, as well as the studies on the field.
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Written by more than 40 world renowned authorities in the field, this reference presents information on plant design, significant chemical reactions, and processing operations in industrial use - offering shortcut calculation methods wherever possible.

Fundamental Aspects of Heterogeneous Catalysis Studied by Particle Beams - H.H. Brongersma - 2013-03-08
Present day heterogeneous catalysis is rapidly being transformed from a technical art into a science-based technology. A major contribution to this important change is the advance of surface spectroscopic techniques able to characterize the complex surfaces of the heterogeneous catalytic system. The Advanced Study Institute (on which the current proceedings is based) has as its primary aim the bringing together of a variety of lecturers, outstanding in those fields of experience, to enable a broad coverage of different relevant approaches. Not only catalyst characterization but also catalytic reactivity had to be covered in order to relate catalyst properties with catalyst performance. Since modern catalysis relates catalytic performance to microscopic molecular catalyst features, theoretical electronic aspects also had to be included. The Advanced Study Institute had a unique feature in that it brought together physicists, catalytic chemists and chemical engineers whom rarely directly interact. From physics especially new experimental possibilities of beams were emphasized. At present it is possible to obtain very detailed information on model catalysts, whilst the applications to practical catalysts are gaining rapidly in sophistication. Apart from the plenary lectures, the Institute included "hot topics" to highlight special developments and offered participants the opportunity to present contributed papers (either orally or as a poster). These contributions formed an integral part of the summer school and significantly enhanced the interaction between participants. Inclusion of the hot topics and contributed papers in these proceedings give them an added topical value.
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A reference that details the pertinent chemical reactions and emphasizes the plant design and operations of petroleum processing procedures. The handbook is divided into four sections: products, refining, manufacturing processes, and treating processes. Wherever possible, shortcut methods of calcula

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**Principles of Catalyst Development** - James T. Richardson - 2013-12-21
Successful industrial heterogeneous catalysts fulfill several key requirements: in addition to high catalytic activity for the desired reaction, with high selectivity where appropriate, they also have an acceptable commercial life and are rugged enough for transportation and charging into plant reactors. Additional requirements include the need to come online smoothly in a short time and reproducible manufacturing procedures that involve convenient processes at acceptable cost. The development of heterogeneous catalysts that meet these (often mutually exclusive) demands is far from straightforward, and in addition much of the actual manufacturing technology is kept secret for commercial reasons—thus there is no modern text that deals with the whole of this important subject. Principles of Catalyst Development, which deals comprehensively with the design, development, and manufacture of practical heterogeneous catalysts, is therefore especially valuable in meeting the long-standing needs of both industrialists and academics. As one who has worked extensively on a variety of catalyst development problems in both industry and academia, James T. Richardson is well placed to write an authoritative book covering both the theory and the practice of catalyst development. Much of the material contained in this book had its origin in a series of widely acclaimed lectures, attended mainly by industrial researchers, given over many years in the United States and Europe. All those in industry who work with catalysts, both beginners and those of considerable experience, should find this volume an essential guide.
Carbon and Coal Gasification

Carbon gasification reactions form the basis of many important industrial processes, such as the combustion of coal and the production of synthesis gas, fuel gases, and activated carbons. They are also involved in metallurgical processes and in the regeneration of coked catalysts. Thus, understanding the fundamentals of carbon gasification is of vital importance for further technological development. Moreover, the subject is of interdisciplinary nature, involving chemistry, materials science, and chemical engineering. Therefore, it was thought that an Advanced Study Institute would be fruitful in establishing the state of the art, in bringing together experts from the various sectors involved, and in identifying areas of required research and industrial development. Such a meeting was held at Alvor, Portugal, from the 20th to the 31st May 1985, and the lectures presented are collected in this volume. The present volume is organized in seven chapters. The Introduction presents the carbon gasification reactions and their relevance for particular processes and industrial uses. In the second chapter, the structures of carbon and coal are reviewed, together with methods of structural, chemical, and textural characterization.

Encyclopedia of Chemical Processing and Design

"Written by engineers for engineers (with over 150 International Editorial Advisory Board members), this highly lauded resource provides up-to-the-minute information on the chemical processes, methods, practices, products, and standards in the chemical, and related, industries."
obtain metals of high purity. The electrodeposition of the PGM and their
provides an up-to-date insight into the most important developments in the
field of industrial catalysis and chemical reactor engineering. In addition,
several ways of improving efficiency, selectivity, activity and improved
methods for scale-up, modeling and design are presented in a compact
manner.

**Novel Concepts in Catalysis and Chemical Reactors** - Andrzej Cybulski - 2011-08-04
The chemical process industry faces a tremendous challenge of supplying a
growing and ever more demanding global population with the products we
need. The average efficiency at which resources are converted into the final
products is however still dramatically low. The most obvious solution is to
carry out chemical conversions at much higher yields and selectivity and
this is where active and selective catalysts and efficient chemical reactors
play a crucial role. Written by an international team of highly experienced
editors and authors from academia and industry, this ready reference
focuses on how to enhance the efficiency of catalysts and reactors. It treats
key topics such as molecular modeling, zeolites, MOFs, catalysis at room
temperature, biocatalysis, catalysis for sustainability, structured reactors
including membrane and microchannel reactors, switching from batch to
continuous reactors, application of alternative energies and process
intensification. By including recent achievements and trends, the book
provides an up-to-date insight into the most important developments in the
field of industrial catalysis and chemical reactor engineering. In addition,
several ways of improving efficiency, selectivity, activity and improved
methods for scale-up, modeling and design are presented in a compact
manner.

**Pt Platinum** - Gary J.K. Acres - 2013-06-29
Like most supplement volumes of the platinum-group metal series, Platinum
Suppl. Vol. A 1 has been written by an international team of specialists. It
comprises technological data of all six platinum-group metals and their
technically relevant alloys and compounds. The volume starts with a review
on the recovery of the platinum-group metals (23 pages); the next 42 pages
are devoted to processes for separating and refining the PGM in order to
obtain metals of high purity. The electrodeposition of the PGM and their
alloys is treated on 26 pages. The by far most extensive section deals with
PGMand their alloys and compounds in catalysis. After a historical survey
and a list of important reviewson PGMcatalysis, the catalytic properties of
the metals are treated in a general way, followed by unsupported metals
and alloys including preparation of catalysts and their reactions in various
industrial processes. The role of supported metals and alloys is described in
asimilar manner. This is followed by an extensive description of the
preparation and the reactions of PGM compounds with various nonmetals
and their catalytically active role in a number of industrial processes (226
pages). The last chapter (21 pages) is a compilation of data on the medical
use of cytostatic platinum compounds. Gelnhausen, December 1985 Kurt
Swarz IX Table of Contents Page Technology of the Platinum-Group Metals.

1.1 Review on the Recovery of the Platinum-Group Metals
1.1 Historical Perspective, , , , Period of Discovery, 1750 to 1820 , , , First Industrial
Period 1820 to 1900 , , ,
Studies in Surface Science and Catalysis is one of the oldest and most cited series in the field. It offers a privileged view of the topic covering the theory, applications and engineering of all topics of catalysis, including Heterogeneous-Homogeneous, Biocatalysis and Catalysis for Polymerization. This volume provides an invaluable source of information for academics and industrialists as well as graduate students.

Preparation of Catalysts III - G. Poncelet - 1983-04-01
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Catalysis plays an increasingly critical role in modern petroleum refining and basic petrochemical industries as market demands for and specifications of petroleum and petrochemical products are continuously changing. As we enter the 21st century, new challenges for catalysis science and technology are anticipated in almost every field. Particularly, better utilization of petroleum resources and demands for cleaner transportation fuels are major items. It was against this background that the 2nd International Conference on Catalysts in Petroleum Refining and Petrochemical Industries was organized. The conference was attended by around 300 specialists in the catalysis field from both academia and industry from over 30 countries. It provided a forum for the exchange of ideas between scientists and engineers from the region with their counterparts from industrialized countries. The papers from the conference, which were carefully selected from around 100 submissions, were refereed in terms of scientific and technical content and format in accordance with internationally accepted standards. They comprise a mix of reviews providing an overview of selected areas, original fundamental research results, and industrial experiences.

Chemical Process Equipment - James R. Couper - 2005-01-06
List of Examples; Rules of Thumb; Introduction; Flowsheets; Process Control; Drivers for Moving Equipment; Transfer of Solids; Flow of Fluids; Fluid Transport Equipment; Heat Transfer and Heat Exchangers; Dryers and Cooling Towers; Mixing and Agitation; Solid-Liquid Separation; Disintegration, Agglomeration, and Size Separation of Particulate Solids; Distillation and Gas Absorption; Extraction and Leaching; Adsorption and Ion Exchange; Crystallization from Solutions and Melts; Chemical Reactors; Process Vessels; Other Topics, Costs of Individual Equipment; Appendices;
The science of catalytic reaction engineering studies the catalyst and the catalytic process in the laboratory in order to predict how they will perform in production-scale reactors. Surprises are to be avoided in the scaleup of industrial processes. The laboratory results must account for flow, heat and mass transfer influences on reaction rate to be useful for scaleup. Calculated performance based on these results must also be useful to maximization of profit and safety and minimization of pollution. To this end, information on products as well as byproducts and heat produced must be generated. If a sufficiently large database of knowledge is produced, optimization studies will be possible later if economic conditions change. The field of reaction engineering required new tools. For kinetic and catalyst testing, the most successful of these tools was the internal recycle reactor. Studies in recycle reactors can be made under well-defined conditions of flow and associated transfer processes, and close to commercial operation. The recycle reactor eliminates or minimizes the effect of transfer process, and allows the remaining ones to be known.

Features of this book:

• Provides insight into a field that is neither well understood nor properly appreciated.
• Gives a deeper understanding of reaction engineering practice.
• Helps avoid frustration and disappointment in industrial research.

This book is short and clear enough to assist all members of the R&D and Engineering team, whether reaction engineers, or specialists in other fields. This is critical in this new age of computation and communication, when team members must each know at least something of their colleagues’ fields. Additionally, many scientists in more exploratory or fundamental fields can use recycle reactors to study basic phenomena free of transfer interactions.
their colleagues' fields. Additionally, many scientists in more exploratory or fundamental fields can use recycle reactors to study basic phenomena free of transfer interactions.

Introduction to Chemical Engineering Kinetics and Reactor Design - Charles G. Hill - 2014-04-24
The Second Edition features new problems that engage readers in contemporary reactor design. Highly praised by instructors, students, and chemical engineers, Introduction to Chemical Engineering Kinetics & Reactor Design has been extensively revised and updated in this Second Edition. The text continues to offer a solid background in chemical reaction kinetics as well as in material and energy balances, preparing readers with the foundation necessary for success in the design of chemical reactors. Moreover, it reflects not only the basic engineering science, but also the mathematical tools used by today's engineers to solve problems associated with the design of chemical reactors. Introduction to Chemical Engineering Kinetics & Reactor Design enables readers to progressively build their knowledge and skills by applying the laws of conservation of mass and energy to increasingly more difficult challenges in reactor design. The first one-third of the text emphasizes general principles of chemical reaction kinetics, setting the stage for the subsequent treatment of reactors intended to carry out homogeneous reactions, heterogeneous catalytic reactions, and biochemical transformations. Topics include: Thermodynamics of chemical reactions Determination of reaction rate expressions Elements of heterogeneous catalysis Basic concepts in reactor design and ideal reactor models Temperature and energy effects in chemical reactors Basic and applied aspects of biochemical transformations and bioreactors About 70% of the problems in this Second Edition are new. These problems, frequently based on articles culled from the research literature, help readers develop a solid understanding of the material. Many of these new problems also offer readers opportunities to use current software applications such as Mathcad and MATLAB®. By enabling readers to progressively build and apply their knowledge, the Second Edition of Introduction to Chemical Engineering Kinetics & Reactor Design remains a premier text for students in chemical engineering and a valuable resource for practicing engineers.