

Fluid Catalytic Cracking Handbook Second Edition

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[Handbook of Fluidization and Fluid-Particle Systems](#) CRC Press

Because of the importance of multiphase flows in a wide variety of industries, including power, petroleum, and numerous processing industries, an understanding of the behavior and underlying theoretical concepts of these systems is critical. Contributed by a team of prominent experts led by a specialist with more than thirty years of experience, the *Multiphase Flow Handbook* provides such an understanding, and much more. It covers all aspects of multiphase flows, from fundamentals to numerical methods and instrumentation. The book begins with an introduction to the fundamentals of particle/fluid/bubble interactions followed by gas/liquid flows and methods for calculating system parameters. It includes up-to-date information on practical industrial applications such as boiling and condensation, fluidized beds, aerosols, separation systems, pollution control, granular and porous media flow, pneumatic and slurry transport, and sprays. Coverage then turns to the most recent information on particle/droplet-fluid interactions, with a chapter devoted to microgravity and microscale flows and another on basic multiphase interactions. Rounding out the presentation, the authors discuss numerical methods, state-of-the-art instrumentation, and advanced experimental techniques. Supplying up-to-date, authoritative information on all aspects of multiphase flows along with numerous problems and examples, the *Multiphase Flow Handbook* is the most complete reference available for understanding the flow of multiphase mixtures.

[Springer Handbook of Petroleum Technology](#) Elsevier

This book follows the 2002 edition of *Catalysis by Ceria and Related Materials*, which was the first book entirely devoted to ceria and its catalytic properties. In the ten years since the first edition a massive amount of work has been carried out in the field, and ceria has gained a prominent position in catalysis as one of the most valuable material for several applications. This second edition covers fundamental and applied aspects of the latest advances in ceria-based materials with a special focus on structural, redox and catalytic features. Special emphasis is given to nano-engineered and nano-shaped systems which are a key factor in the predictive and rational design of ceria with novel properties. In addition, the book presents recent advances in emerging and traditional large-scale applications of ceria in catalysis, such as the treatment of emissions from mobile sources (including diesel and gasoline engines). The primary readership includes catalysis and material science researchers from academy and industry and postdoctorate and graduate students in chemistry, chemical engineering and physics. Contents: Crystal and Electronic Structures, Structural Disorder, Phase Transformation, and Phase Diagram of Ceria – Zirconia and Ceria-Based Materials (Masatomo Yashima) Understanding Ceria-Based Catalytic Materials: An Overview of Recent Progress (Juan Jos é Delgado, Eloy del R í o, Xiaowei Chen, Ginesa Blanco, Jos é Mar í a Pintado, Seraf í n Bernal and Jos é Juan Calvino) Investigation of the Oxygen Storage and Release Kinetics of Model and Commercial Three-Way Catalytic Materials by Transient Techniques (Angelos M Efstathiou and Stavroula Y Christou) Interaction of Nitrogen Oxides with Ceria-Based Materials (Avelina Garc í a-Garc í a and Agustin Bueno-L ó pez) Atomistic Modelling of Ceria Nanostructures: Introducing Structural Complexity (Dean C Sayle and Thi X T Sayle) Two-Dimensional and Three-Dimensional Ceria-Based Nanoarchitectures (Zhen-Xing Li, Wei Feng, Chao Zhang, Ling-Dong Sun, Ya-Wen Zhang and Chun-Hua Yan) Core-Shell-Type Materials Based on Ceria (Matteo Carnello, Raymond J Gorte and Paolo Fornasiero) New Developments in Ceria-Based Mixed Oxide Synthesis and Reactivity in Combustion and Oxidation Reactions (Benjaram M Reddy, Thallada Vinod Kumar and Naga Durgasri) Design and Modeling of Active Sites in Metal – Ceria Catalysts for the Water Gas Shift Reaction and Related Chemical Processes (Jose A Rodriguez) Ceria-Based Gold Catalysts: Synthesis, Properties, and Catalytic Performance for the WGS and PROX Processes (Donka Andreeva, Tatyana Tabakova and Lyuba Ilieva) Ceria-Based Formulations for Catalysts for Diesel Soot Combustion (Eleonora Aneggi, Carla de Leitenburg and Alessandro Trovarelli) Ceria and Its Use in Solid Oxide Cells and Oxygen Membranes (Christodoulos Chatzichristodoulou, Peter T Blennow, Martin S ø gaard, Peter V Hendriksen and Mogens B Mogensen) Transformation of Oxygenated Compounds Derived from Biomass into Valuable Chemicals Using

Ceria-Based Solid Catalysts (Laurence Vivier and Daniel Duprez) Ceria-Based Catalysts for Air Pollution Abatement (Anna Maria Venezia, Leonarda Francesca Liotta, Giuseppe Pantaleo and Alessandro Longo) Readership: Graduate students and researchers in the fields of chemistry, physics, materials science and chemical engineering.

Keywords: Ceria; Catalysis; Nanomaterials; Exhaust Gas Treatment Key Features: New edition with additional chapters Unique collection of reviews on a specific topic from a wide perspective Distinguished contributors from the field

[Materials, Methods and Process Innovations Fluid Catalytic Cracking Handbook](#) An Expert Guide to the Practical Operation, Design, and Optimization of FCC Units

This volume is based on different aspects of chemical technology that are associated with research and the development of theories for chemical engineers, helping to bridge the gap between classical analysis and modern, real-life applications. Taking an interdisciplinary approach, the authors present the current state-of-the-art technology in key materials with an emphasis on the rapidly growing technologies.

[Catalysis for Clean Energy and Environmental Sustainability](#) CRC Press

Fluid Catalytic Cracking (FCC) is known to be one of the most profitable processes in oil refineries. However, during FCC, two inevitable and undesirable phenomena occur: coking (which deactivates the catalyst) and resistance to mass transfer. Computational techniques can be employed to simulate the FCC reactor with a view to predicting the optimum operating conditions of the process. Process operation within the optimum conditions increases profitability. A number of mathematical models have been developed for the FCC riser. However, two major set backs were observed in the models. Some of the previous models were oversimplified as a result of the negligence of mass transfer resistance and the assumption of one dimensional (1D) plug flow. On the other hand, the models were made unwieldy by the use of 3D geometry and the incorporation of large numbers of lumped species. In this book, a 2D model was used to simulate the FCC riser. Mass transfer resistance and coking were considered. This book will be beneficial to oil refineries. It will also make an excellent reference and teaching material for students, lecturers and researchers in Chemical Engineering, Mathematics and Chemistry **Volume 1 - Fundamentals** Springer Science & Business Media

Despite the length of time it has been around, its importance, and vast amounts of research, combustion is still far from being completely understood. Environmental, cost, and fuel consumption issues add further complexity, particularly in the process and power generation industries. Dedicated to advancing the art and science of industrial combustion, *The John Zink Hamworthy Combustion Handbook, Second Edition: Volume One – Fundamentals* gives you a strong understanding of the basic concepts and theory. Under the leadership of Charles E. Baukal, Jr., top combustion engineers and technologists from John Zink Hamworthy Combustion examine the interdisciplinary fundamentals—including chemistry, fluid flow, and heat transfer—as they apply to industrial combustion. What's New in This Edition Expanded to three volumes, with Volume One focusing on fundamentals Extensive updates and revisions throughout Updated information on HPI/CPI industries, including alternative fuels, advanced refining techniques, emissions standards, and new technologies Expanded coverage of the physical and chemical principles of combustion New practices in coal combustion, such as gasification The latest developments in cold-flow modeling, CFD-based modeling, and mathematical modeling Greater coverage of pollution emissions and NOx reduction techniques New material on combustion diagnostics, testing, and training More property data useful for the design and operation of combustion equipment Coverage of technologies such as metallurgy, refractories, blowers, and vapor control equipment Now expanded to three volumes, the second edition of the bestselling *The John Zink Combustion Handbook* continues to provide the comprehensive coverage, up-to-date information, and visual presentation that made the first edition an industry standard. Featuring color illustrations and photographs throughout, *Volume One: Fundamentals* helps you broaden your understanding of industrial combustion to better meet the challenges of this field. For the other volumes in the set,

see *The John Zink Hamworthy Combustion Handbook, Second Edition: Three-Volume Set.*

[Modeling and Simulation of Fluid Catalytic Cracking \(FCC\) Riser](#) CRC Press

Full text engineering e-book.

[Petroleum Refining Design and Applications Handbook](#) Editions TECHNIP

Since the third edition of this reference was completed, there have been major changes in the global chemical industry. With less emphasis on new processes for making basic chemicals and more emphasis on pollution prevention and waste disposal, petrochemical processes are giving way to biochemical processes. These changes are reflected in the new processes being developed, many of which have their own names. In addition, niche improvements are still being made in petrochemistry, and some of these processes have new names as well. Gathering and defining a large portion of special named processes that may fall outside standard chemical texts or be scattered among industry manuals, *Encyclopedic Dictionary of Named Processes in Chemical Technology, Fourth Edition* provides a single-source reference on an extensive array of named processes. It provides concise descriptions of those processes in chemical technology that are known by special names that are not self-explanatory. While overviews of the chemical technology industry are present in other books, most of the names defined within this volume are unique to this compilation. This reference includes named processes in current commercial use around the world, processes that have been or are being piloted on a substantial scale, and even obsolete processes that have been important in the past. The length of the dictionary entries reflects their importance and topicality. The text includes references that document the origins of the processes and review the latest developments. Written by a highly experienced and respected author, this user-friendly text is presented in a practical dictionary format that is useful for a broad audience including industrial chemists and engineers.

[Testing, Characterization, and Environmental Regulations](#)

McGraw Hill Professional

This handbook describes and discusses the features that make up the petroleum refining industry. It begins with a description of the crude oils and their nature, and continues with the saleable products from the refining processes, with a review of the environmental impact. There is a complete overview of the processes that make up the refinery with a brief history of those processes. It also describes design technique, operation, and, in the case of catalytic units, the chemistry of the reaction routes. These discussions are supported by calculation procedures and examples, sufficient to enable input to modern computer simulation packages. Gulf Professional Publishing

A thorough introduction to environmental monitoring in the oil and gas industry *Analytical Techniques in the Oil and Gas Industry for Environmental Monitoring* examines the analytical side of the oil and gas industry as it also provides an overall introduction to the industry. You'll discover how oil and natural gas are sourced, refined, and processed. You can learn about what's produced from oil and natural gas, and why evaluating these sourced resources is important. The book discusses the conventional analyses for oil and natural gas feeds, along with their limitations. It offers detailed descriptions of advanced analytical techniques that are commercially available, plus explanations of gas and oil industry equipment and instrumentation. You'll find technique descriptions supplemented with a list of references as well as with real-life application examples. With this book as a reference, you can prepare to apply specific analytical methods in your organization's lab environment. *Analytical Techniques* can also serve as your comprehensive resource on key techniques in the characterization of oil and gas samples, within both refinery and environmental contexts. Understand of the scope of oil and gas industry techniques available Consider the benefits and limitations of each available process Prepare for applying analytical techniques in your lab See real examples and a list of references for each technique Read descriptions of off-line analytics, as well as on-line and process applications As a chemist, engineer, instructor, or student, this book will also expand your awareness of the role these techniques have in environmental monitoring and environmental impact assessments.

[An Expert Guide to the Practical Operation, Design, and Optimization of FCC Units](#) Springer Nature

Extensive practical plant based knowledge to achieve the best automation system
BACK COVER DESCRIPTION: This fully updated on-the-job reference contains all the automation and control information you need to make timely decisions, and maximize process capacity and efficiency. Featuring contributions from 50 top technical experts, *Process/Industrial Instruments and Controls Handbook*, Sixth Edition covers the latest technologies and advances. More importantly, the book helps you select the right instrumentation, install and maintain it correctly, and leverage it to maximize plant performance and profitability. You will get all you need to know to execute a successful automation project including time-saving tables, lists of essential best practices, and hundreds of topic-defining illustrations. Coverage includes: •Process variable measurements•Analytical measurements•Control Network communications•Safety instrumented systems•Control systems fundamentals•PID control strategies•Continuous and batch control•Improving operator performance•Improving process performance•Project management•And more
Analytical Techniques in the Oil and Gas Industry for Environmental Monitoring CRC Press

Handbook of Industrial Hydrocarbon Processes, Second Edition, provides an analysis of the process steps required to produce hydrocarbons from various raw materials and how the choice of a process depends not only on technology, but also on external effects, such as social and economic developments, political factors affecting the availability of raw materials, and environmental legislation. This book qualitatively examines chemical processes and plant design by showing the factors determining process structures, including the underlying chemistry, feedstock, product specifications and reactor design. The book also compares the processes for different products based on raw materials and manufacturing processes based on their respective applications. With the addition of useful flowcharts that present an overview of the chemical processes, process design and equipment, this book is a valuable resource to industry professionals on how to understand how hydrocarbons are produced from different raw materials and how to develop an instinct for the right process development strategy. Provides a qualitative analysis of chemical processes and plant design by showing the factors determining process structures Presents chemical processes in an organized, easy-to-read and understandable manner with the use of useful flowcharts and concise descriptions Includes updates on changes in existing technological and chemical processes, as well as possible future improvements or changes to other more economic or more readily available feedstocks

Handbook of Environmental Fluid Dynamics, Two-Volume Set John Wiley & Sons

The Handbook of Chemical Technology and Pollution Control, 3rd Edition provides a detailed review of the chemistry and operating conditions of many of the present large-scale chemical processes important to our economy and high standards of living. The processes that could lead to emissions affecting our air, soil, and water are considered, together with ways in which it may be possible to reduce or eliminate these pollutants. Focusing on cleaner production concepts without neglecting 'end of pipe' measures. With an increase in the awareness of corporate and social responsibility among business and industry leaders, the pressure to reduce harmful emissions and the desire to increase efficiencies and energy utilization, this book provides an essential resource. Suitable for researchers, practitioners and postgraduate students in the fields of chemical and biochemical engineering and environmental science, as well as government monitoring and regulatory agencies and industry leaders who want to stay one step ahead, this book will be a valuable addition to any library. Integrated treatment of chemical technology with emission control chemistry Introductory outline of the causes and effects of air and water pollution chemistry Outline of the operating features and efficiency of basic emission control devices Historical background of developments in industrial chemistry to 2004 in a single volume Organized for easy access to chemical technology, new developments, or emission control details Referenced to current additional sources of information in each area covered Review questions provide working experience with the material provided
Fundamentals of Fluidized-Bed Chemical Processes Elsevier

Since 1987, the Petroleum Division of the American Chemical Society (ACS) has sponsored at 3 year intervals an international symposium on fluid cracking catalysts (FCC) technology. This volume collects the recent progress of this technology as reported in the papers presented during the 232th National Meeting of the ACS in San Francisco, September 10-14, 2006. Sixty-six years after the introduction of the fluid cracking catalyst process, it remains the main process of gasoline generation for the estimated 237 millions cars on US roads. Catalysts testing and evaluation still remains a subject of interest, debate and controversy. Lambda sweep testing, testing of SO_x, NO_x and combustion promoters have been discussed in details together with catalyst evaluation for atmospheric residues and metal contaminated oils cracking. Of particular interest has been the introduction of novel concept in process design aimed at improving cracked product selectivity such as two-stage risers for better gasoline and olefins production and downer technology for high severity processes. The importance of solid state nuclear magnetic resonance (NMR) in the study of crude oils, catalysts and reaction products are illustrated by several examples. Two contributions describe the use of predictive methods to understand FCC aging and deactivation and personal overviews of the development of SO_x and combustion promoters technology are presented. * Presents findings from the tri-annual international symposium on fluid cracking catalysts (FCC) technology, sponsored by the Petroleum Division of the American Chemical Society (ACS) * Two

contributions describe the use of predictive methods to understand FCC aging and deactivation * Personal overviews by the authors of the development of SO_x and combustion promoters technology

Catalytic Cracking of Heavy Petroleum Fractions John Wiley & Sons

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, elutriati

Handbook of Petroleum Refining Processes Elsevier

This extensively updated second edition of the already valuable reference targets research chemists and engineers who have chosen a career in the complex and essential petroleum industry, as well as other professionals just entering the industry who seek a comprehensive and accessible resource on petroleum processing. The handbook describes and discusses the key components and processes that make up the petroleum refining industry. Beginning with the basics of crude oils and their nature, it continues with the commercial products derived from refining and with related issues concerning their environmental impact. More in depth coverage of many topics previously covered in the first edition, such as hydraulic fracturing or fracking as it is often termed, help ensure this reference remains a relevant and up-to-date resource. At its core is a complete overview of the processes that make up a modern refinery, plus a brief history of the development of processes. Also described in detail are design techniques, operations and in the case of catalytic units, the chemistry of the reaction routes. These discussions are supported by calculation procedures and examples, which enable readers to use today's simulation-software packages. The handbook also covers off-sites and utilities, as well as environmental and safety aspects relevant to the industry. The chapter on refinery planning covers both operational planning and the decision making procedures for new or revamped processes. Major equipment used in the industry is reviewed along with details and examples of the process specifications for each. An extensive glossary and dictionary of the terms and expressions used in petroleum refining, plus appendices supplying data such as converging factors and selected crude oil assays, as well as an example of optimizing a refinery configuration using linear programming are all included to aid the reader. The 2nd edition of the *Handbook of Petroleum Processing* is an indispensable desk reference for chemists and engineers as well as an essential part of the libraries of universities with a chemical engineering faculty and oil refineries and engineering firms performing support functions or construction.

Handbook of Petroleum Refining CRC Press

This volume, *Engineering Technology and Industrial Chemistry with Applications*, brings together innovative research, new concepts, and novel developments in the application of new tools for chemical and materials engineers. It provides a collection of innovative chapters on new scientific and industrial research from chemists and chemical engineers at several prestigious institutions. It looks at recent significant research and reports on new methodologies and important applications in the fields of chemical engineering as well as provides coverage of chemical databases, bringing together theory and practical applications. Highlighting theoretical foundations, real-world cases, and future directions, this authoritative reference source will be a valuable addition for researchers, practitioners, professionals, and students of chemistry material and chemical engineering.

An Expert Guide to the Practical Operation, Design, and Optimization of FCC Units World Scientific

The petrochemical industry is a scientific and engineering field that encompasses the production of a wide range of chemicals and polymers. The purpose of this book is not only to provide a follow-on to form the later chapters of the highly successful *Chemistry and Technology of Petroleum* 5th Edition but also provides a simplified approach to a very diverse chemical subject dealing with the chemistry and technology of various petroleum and petrochemical process. Following from the introductory chapters, this book provides the readers with a valuable source of information containing insights into petrochemical reactions and products, process technology, and polymer synthesis. Provides readers with a valuable source of information containing insights into petrochemical reactions and products, process technology, and polymer synthesis Introduces the reader to the various petrochemical intermediates are generally produced by chemical conversion of primary petrochemicals to form more complicated derivative products The reactions and processes involved in transforming petroleum-based hydrocarbons into the chemicals that form the basis of the multi-billion dollar petrochemical industry are reviewed and described The book includes information on new process developments for the production of raw materials

and intermediates for petrochemicals Includes a description of the origin of the raw materials for the petrochemicals industry – including an overview of the coal chemicals industry

Advances in Refining Catalysis Springer Science & Business Media

This handbook provides a comprehensive but concise reference resource for the vast field of petroleum technology. Built on the successful book "Practical Advances in Petroleum Processing" published in 2006, it has been extensively revised and expanded to include upstream technologies. The book is divided into four parts: The first part on petroleum characterization offers an in-depth review of the chemical composition and physical properties of petroleum, which determine the possible uses and the quality of the products. The second part provides a brief overview of petroleum geology and upstream practices. The third part exhaustively discusses established and emerging refining technologies from a practical perspective, while the final part describes the production of various refining products, including fuels and lubricants, as well as petrochemicals, such as olefins and polymers. It also covers process automation and real-time refinery-wide process optimization. Two key chapters provide an integrated view of petroleum technology, including environmental and safety issues. Written by international experts from academia, industry and research institutions, including integrated oil companies, catalyst suppliers, licensors, and consultants, it is an invaluable resource for researchers and graduate students as well as practitioners and professionals.

The John Zink Hamworthy Combustion Handbook, Second Edition Gulf Professional Publishing

Protecting the global environment is a single-minded goal for all of us. Environmental engineers take this goal to task, meeting the needs of society with technical innovations. Revised, expanded, and fully updated to meet the needs of today's engineer working in industry or the public sector, the *Environmental Engineers' Handbook*, Second Edition is a single source of current information. It covers in depth the interrelated factors and principles that affect our environment and how we have dealt with them in the past, are dealing with them today, and how we will deal with them in the future. This stellar reference addresses the ongoing global transition in cleaning up the remains of abandoned technology, the prevention of pollution created by existing technology, and the design of future zero emission technology. Béla G. Lipták speaks on Post-Oil Energy Technology on the AT&T Tech Channel.

Zeolites: Science and Technology Butterworth-Heinemann

This book, written and edited by leading authorities from academia and industrial groups, covers both preventive- and curative-zeolite-based technologies in the field of chemical processing. The opening chapter presents the state of the art in zeolite science. The two subsequent chapters summarize the chemistries involved in the processes and the constraints imposed on the catalyst/adsorbent. Three major areas are covered: oil refining, petrochemicals and fine chemicals. A chapter on the (curative) use of zeolites in pollution abatement completes this overview. In the area of oil refining, a general lecture sets the scene for present and future challenges. It is followed by in-depth case studies involving FCC, hydrocracking and light naphtha isomerization. Also, an entire chapter is devoted to the often-overlooked subject of base oils. In the area of petrochemicals, the processing of aromatics and olefins is described and special attention is paid to the synergy between catalysis and separation on molecular sieves. Contents: Introduction to Zeolite Science and Technology (M Guisnet & J-P Gilson) The Chemistry of Catalytic Processes (A Corma & A Martínez) Preparation of Zeolite Catalysts (T G Roberie et al.) Refining Processes: Setting the Scene (R H Jensen) Advances in Fluid Catalytic Cracking (E T Habib et al.) Hydrocracking (J A R Van Veen) C4-C6 Alkane Isomerisation (F Schmidt & E Köhler) Base Oil Production and Processing (M Daage) Para-Xylene Manufacturing Catalytic Reactions and Processes (F Alario & M Guisnet) Separation of Paraxylene by Adsorption (A Méthivier) Aromatic Alkylation: Towards Cleaner Processes (J S Beck et al.) Methanol to Olefins (MTO) and Beyond (P Barger) Zeolite Effects on Catalytic Transformations of Fine Chemicals (D E De Vos & P A Jacobs) Functionalization of Aromatics over Zeolite Catalysts (P Marion et al.) Zeolites and 'Non-Zeolite' Molecular Sieves in the Synthesis of Fragrances and Flavors (W F Hoelderich & M C Laufer) Pollution Abatement Using Zeolites: State of the Art and Further Needs (G Delahay & B Coq) Readership: Undergraduates, graduate students, academics and researchers in catalyst chemistry. Reviews: "Chapter authors have provided a teaching text that gives excellent introductory chapters to zeolites, and to the nature and significance of the processes that they can catalyse ... This excellent book should be required reading for all scientists who have an interest in improving the environment." *Chemistry & Industry*