
Petroleum Refining Processes Chemical Industries

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KANE ROSS

Handbook of Petroleum Processing CRC
Press

Written by an author with over 38 years of experience in the chemical and petrochemical process industry, this handbook will present an analysis of the process steps used to produce industrial hydrocarbons from various raw materials. It is the first book to offer a thorough

analysis of external factors effecting production such as: cost, availability and environmental legislation. An A-Z list of raw materials and their properties are presented along with a commentary regarding their cost and availability. Specific processing operations described in the book include: distillation, thermal cracking and coking, catalytic methods, hydroprocesses, thermal and catalytic reforming, isomerization, alkylation processes, polymerization processes, solvent processes, water removal, fractionation and acid gas removal. Flow

diagrams and descriptions of more than 250 leading-edge process technologies An analysis of chemical reactions and process steps that are required to produce chemicals from various raw materials Properties, availability and environmental impact of various raw materials used in hydrocarbon processing
Handbook of Petrochemical Processes
McGraw-Hill Professional Publishing
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.

Petrochemistry CRC Press

Leveraging Synergies Between Refining and Petrochemical Processes provides a detailed description of the interfaces and connections between crude oil refining

and petrochemicals. It offers a view of global and regional markets and economic opportunities for synergies between these sectors. Features: Shows a global and regional market outlook for crude oil refining and petrochemical sectors Explores economic and market opportunities for taking advantage of the synergies between both sectors Analyzes the technical challenges and opportunities that come with these synergies Gives an outlook and prediction of what companies will be able to achieve in the mid-term future Provides introductory and explanatory material as well as in-depth insight into future technology and market developments This book serves as a reference for professionals in chemical engineering, oil and gas engineering, and industrial chemistry. It aims to help engineers and industry professionals understand the challenges and the potential benefits of developing expansion or optimization projects that may bridge the gap between refining and petrochemicals.

USSR, Energy Consumption in the Chemical, Petrochemical, and Petroleum Refining Industries CRC

Press

Petroleum refining and the petrochemical industry play an important role in the current world economy. They provide the platform to convert basic raw materials into many essential products, ranging from transportation fuels (such as gasoline, jet fuel, diesel, and gas oil) to basic and intermediate materials for petrochemical industries and many other valuable chemical products. *Advanced Catalysis Processes in Petrochemicals and Petroleum Refining: Emerging Research and Opportunities* is an essential comprehensive research publication that provides knowledge on refining processes that could be integrated by the petrochemical industry and discusses how to integrate refining products with petrochemical industries through the use of new technologies. Featuring a range of topics such as biofuel production, environmental sustainability, and biorefineries, this book is ideal for engineers, chemists, industry professionals, policymakers, researchers, academicians, and petrochemical companies.

The Chemical Process Industries

Infrastructure CRC Press

Petroleum refining involves refining crude petroleum as well as producing raw materials for the petrochemical industry. This book covers current refinery processes and process-types that are likely to come on-stream during the next three to five decades. The book includes (1) comparisons of conventional feedstocks with heavy oil, tar sand bitumen, and bio-feedstocks; (2) properties and refinability of the various feedstocks; (3) thermal processes versus hydroprocesses; and (4) the influence of refining on the environment.

Handbook of Petroleum Refining Processes, Fourth Edition Gulf Professional Publishing

Besides covering topics like catalytic cracking, hydrocracking, and alkylation, this volume has chapters on waste water treatment and the economics of managing or commissioning the design of a petroleum refinery. Found only in this volume is material on operating a jointly owned and operated refinery. (Over the last decade, the ownership of many refineries has shifted to small companies, from the large, integrated companies.

Because of this shift, many refineries are now jointly owned and operated.) Filled with handy process flow diagrams, this volume is the only reference that a chemical engineer or process manager in a petroleum refinery needs for answers to everyday process and operations questions. * Covers the technologies and operations of petroleum refineries * Provides material on operating a jointly owned and operated refinery * Gives readers a comprehensive introduction to petroleum refining, as well as a full reference to engineers in the field Separation Technologies for the Industries of the Future McGraw Hill Professional Fundamentals of Petroleum Refining presents the fundamentals of thermodynamics and kinetics, and it explains the scientific background essential for understanding refinery operations. The text also provides a detailed introduction to refinery engineering topics, ranging from the basic principles and unit operations to overall refinery economics. The book covers important topics, such as clean fuels, gasification, biofuels, and environmental impact of refining, which are not

commonly discussed in most refinery textbooks. Throughout the source, problem sets and examples are given to help the reader practice and apply the fundamental principles of refining. Chapters 1-10 can be used as core materials for teaching undergraduate courses. The first two chapters present an introduction to the petroleum refining industry and then focus on feedstocks and products. Thermophysical properties of crude oils and petroleum fractions, including processes of atmospheric and vacuum distillations, are discussed in Chapters 3 and 4. Conversion processes, product blending, and alkylation are covered in chapters 5-10. The remaining chapters discuss hydrogen production, clean fuel production, refining economics and safety, acid gas treatment and removal, and methods for environmental and effluent treatments. This source can serve both professionals and students (on undergraduate and graduate levels) of Chemical and Petroleum Engineering, Chemistry, and Chemical Technology. Beginners in the engineering field, specifically in the oil and gas industry, may also find this book invaluable.

Provides balanced coverage of fundamental and operational topics Includes spreadsheets and process simulators for showing trends and simulation case studies Relates processing to planning and management to give an integrated picture of refining

Handbook of Petroleum Refining Processes Handbook of Petroleum Refining

Clearly divided into three main sections, this practical book familiarizes readers with the area of planning in petroleum refining and petrochemical industry, while introducing several planning and modeling strategies encompassing single site refinery plants, multiple refinery networks, petrochemical networks, and refinery and petrochemical planning systems. It equally provides an insight into possible research directions and recommendations for the area of refinery and petrochemical planning. Furthermore, several appendices are included to explain the general background necessary, including stochastic programming, chance constraint programming, and robust optimization. For engineers and managers working in the petroleum industry as well

as academic researchers in production, logistics, and supply chain management.

Handbook of Refinery Desulfurization Springer

Handbook of Petroleum Refining CRC Press
Handbook of Industrial Hydrocarbon Processes CRC Press

The petroleum and chemical industries contain a wide variety of corrosive environments, many of which are unique to these industries. Oil and gas production operations consume a tremendous amount of iron and steel pipe, tubing, pumps, valves, and sucker rods. Metallic corrosion is costly. However, the cost of corrosion is not just financial. Beyond the huge direct outlay of funds to repair or replace corroded structures are the indirect costs - natural resources, potential hazards, and lost opportunity. Wasting natural resources is a direct contradiction to the growing need for sustainable development. By selecting the correct material and applying proper corrosion protection methods, these costs can be reduced, or even eliminated. This book provides a minimum design requirement for consideration when designing systems in order to prevent or control corrosion

damage safely and economically, and addresses:

- Corrosion problems in petroleum and chemical industries
- Requirements for corrosion control
- Chemical control of corrosive environments
- Corrosion inhibitors in refineries and petrochemical plants
- Materials selection and service life of materials
- Surface preparation, protection and maintainability
- Corrosion monitoring - plant inspection techniques and laboratory corrosion testing techniques

Intended for engineers and industry personnel working in the petroleum and chemical industries, this book is also a valuable resource for research and development teams, safety engineers, corrosion specialists and researchers in chemical engineering, engineering and materials science.

Petroleum Refinery Process Modeling CRC Press

With demand for petroleum products increasing worldwide, there is a tendency for existing refineries to seek new approaches to optimize efficiency and throughput. In addition, changes in product specifications due to environmental regulations greatly

influence the development of petroleum refining technologies. These factors underlie the need for this fifth edition of The Chemistry and Technology of Petroleum, which continues in the tradition of the bestselling fourth edition, proving readers with a detailed overview of the chemistry and technology of petroleum as it evolves into the twenty-first century. The new edition has been updated with the latest developments in the refining industry, including new processes as well as updates on evolving processes and various environmental regulations. The book covers issues related to economics and future refineries, examines the changing character of refinery feedstock, and offers new discussions on environmental aspects of refining. It contains more than 300 figures and tables, including chemical structures and process flow sheets. A useful reference for scientists and engineers in the petroleum industry as well as in the catalyst manufacturing industry, this book introduces readers to the science and technology of petroleum, beginning with its formation in the ground and culminating in the production of a wide

variety of products and petrochemical intermediates.

Fundamentals of Petroleum and Petrochemical Engineering CRC Press

Although there is a shortage of light petroleum, there is plenty of heavy petroleum rich in macromolecules available, creating an increasing interest for processes that can convert heavy oils to light oils. Process Chemistry of Petroleum Macromolecules provides the scientific basis for such processes, presenting methods to determine improvement potential. Topics include characterization, thermal kinetics, phase behavior, and separation. Revealing that the science of petroleum macromolecules is simpler and more exciting than imagined, it also discusses macromolecules that self-associate, liquid crystalline phases, reactions triggered by phase separation, and both dispersed and dissolved solutes.

Refining Processes Handbook Elsevier Refineries must not only adapt to evolving environmental regulations for cleaner product specifications and processing, but also find ways to meet the increasing demand for petroleum

products, particularly for liquid fuels and petrochemical feedstocks. The Chemistry and Technology of Petroleum, Fourth Edition offers a 21st century perspective

Advanced Catalysis Processes in Petrochemicals and Petroleum Refining: Emerging Research and Opportunities CRC Press

This textbook covers the essential aspects of process safety engineering in a practical and comprehensive manner. It provides readers with an understanding of process safety hazards in the refining and petrochemical industries and how to manage them in a reliable and professional manner. It covers the most important concepts: static electricity, intensity of thermal radiation, thermodynamics of fluid phase equilibria, boiling liquid expanding vapor explosion (BLEVE), emission source models, hazard identification methods, risk control and methods for achieving manufacturing excellence while also focusing on safety. Extensive case studies are included. Aimed at senior undergraduate and graduate chemical engineering students and practicing engineers, this book covers process safety principles and engineering

practice authoritatively, with comprehensive examples: • Fundamentals, methods, and procedures for the industrial practice of process safety engineering. • The thermodynamic fundamentals and computational methods for release rates from ruptures in pipelines, vessels, and relief valves. • Fundamentals of static electricity hazards and their mitigation. • Quantitative assessment of fires and explosions. • Principles of dispersion calculations for toxic or flammable gases and vapors. • Methods of qualitative and quantitative risk assessment and control.

Process Chemistry of Petroleum Macromolecules John Wiley & Sons

A comprehensive review of the theory and practice of the simulation and optimization of the petroleum refining processes Petroleum Refinery Process Modeling offers a thorough review of how to quantitatively model key refinery reaction and fractionation processes. The text introduces the basics of dealing with the thermodynamics and physical property predictions of hydrocarbon components in the context of process modeling. The authors - three experts on the topic -

outline the procedures and include the key data required for building reaction and fractionation models with commercial software. The text shows how to filter through the extensive data available at the refinery and using plant data to begin calibrating available models and extend the models to include key fractionation sub-models. It provides a sound and informed basis to understand and exploit plant phenomena to improve yield, consistency, and performance. In addition, the authors offer information on applying models in an overall refinery context through refinery planning based on linear programming. This important resource: - Offers the basic information of thermodynamics and physical property predictions of hydrocarbon components in the context of process modeling -Uses the key concepts of fractionation lumps and physical properties to develop detailed models and workflows for atmospheric (CDU) and vacuum (VDU) distillation units -Discusses modeling FCC, catalytic reforming and hydroprocessing units Written for chemical engineers, process engineers, and engineers for measurement and control, this resource

explores the advanced simulation tools and techniques that are available to support experienced and aid new operators and engineers.

Petroleum Refining Processes National Academies Press

A comprehensive textbook on petrochemical conversion processes for petroleum and natural gas fractions as produced by refinery operations This innovative textbook provides essential links between the chemical sciences and chemical technology, between petrochemistry and hydrocarbon technology. The book brings alive key concepts forming the basis of chemical technology and presents a solid background for innovative process development. In all chapters, the processes described are accompanied by simplified flow schemes, encouraging students to think in terms of conceptual process designs. Petrochemistry: Petrochemical Processing, Hydrocarbon Technology and Green Engineering introduces students to a variety of topics related to the petrochemical industry, hydrocarbon processing, fossil fuel resources, as well as fuels and chemicals

conversion. The first chapter covers the fundamentals and principals for designing several of the processes in the book, including discussions on thermodynamics, chemical kinetics, reactor calculations, and industrial catalysts. The following chapters address recent advances in hydrocarbon technology, energy technology, and sources of hydrocarbons. The book then goes on to discuss the petrochemical industry based on four basic pillars, all derived from petroleum and natural gas: Production of lower alkenes; other sources of lower alkenes; petrochemicals from C2-C3 alkenes Production of BTX aromatics; chemicals from BTX aromatics C1 technology Diversification of petrochemicals The growing importance of sustainable technology, process intensification and addressing greenhouse gas emissions is reflected throughout the book. Written for advanced students working in the areas of petrochemistry, hydrocarbon technology, natural gas, energy materials and technologies, alternative fuels, and recycling technologies the book is also a valuable reference for industrial practitioners in the oil and gas industry.

Advanced Catalysis Processes in Petrochemicals and Petroleum Refining: Emerging Research and Opportunities John Wiley & Sons

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.

The Chemistry and Technology of Petroleum Elsevier

The supply of petroleum continues to dwindle at an alarming rate, yet it is the source of a range of products- from gasoline and diesel to plastic, rubber, and synthetic fiber. Critical to the future of this commodity is that we learn to use it more judiciously and efficiently. Fundamentals of Petroleum and Petrochemical Engineering provides a holi
Lubricant Base Oil and Wax Processing Elsevier

For four decades, Petroleum Refining has guided thousands of readers toward a reliable understanding of the field, and

through the years has become the standard text in many schools and universities around the world offering petroleum refining classes, for self-study, training, and as a reference for industry professionals. The sixth edition of this perennial bestseller continues in the tradition set by Jim Gary as the most modern and authoritative guide in the field. Updated and expanded to reflect new technologies, methods, and topics, the book includes new discussion on the business and economics of refining, cost estimation and complexity, crude origins and properties, fuel specifications, and updates on technology, process units, and catalysts. The first half of the book is written for a general audience to introduce the primary economic and market characteristics of the industry and to describe the inputs and outputs of refining. Most of this material is new to this edition and can be read independently or in parallel with the rest of the text. In

the second half of the book, a technical review of the main process units of a refinery is provided, beginning with distillation and covering each of the primary conversion and treatment processes. Much of this material was reorganized, updated, and rewritten with greater emphasis on reaction chemistry and the role of catalysis in applications. Petroleum Refining: Technology, Economics, and Markets is a book written for users, the practitioners of refining, and all those who want to learn more about the field.

Petroleum Refining Processes CRC Press

This work provides comprehensive coverage of technological advances in residuum conversion. It illustrates state-of-the-art engineering methods for the refinement of heavy oils, bitumen, and other high-sulphur feedstocks. Contemporary approaches to resource utilization are highlighted.