

Amines As Gas Sweetening Agents Aalborg Universitet

The corrosion of carbon steels in amine units used for gas treatment in refining operations is a major problem for the petrochemical industry. Maximising amine unit reliability, together with improving throughput, circulation and treatment capacity, requires more effective ways of measuring and predicting corrosion rates. However, there has been a lack of data on corrosion. This valuable report helps to remedy this lack of information by summarising findings from over 30 plants. It covers such amine types as methyl diethanolamine (MDEA), diethanolamine (DEA), monoethanolamine (MEA) and di-isopropanolamine (DIPA), and makes recommendations on materials and process parameters to maximise amine unit efficiency and reliability. Covers such amine types as Methyl Diethanolamine (MDEA) and Di-isopropanolamine Makes recommendations on materials and process parameters to maximise amine unit efficiency and reliability This book reviews and characterises promising single-compound solvents, solvent blends and advanced solvent systems suitable for CO₂ capture applications using gas-liquid absorption. Focusing on energy efficient solvents with minimal adverse environmental impact, the contributions included analyse the major technological advantages, as well as research and development challenges of promising solvents and solvent systems in various sustainable CO₂ capture applications. It provides a valuable source of information for undergraduate and postgraduate students, as well as for chemical engineers and energy specialists.

IPCC Report on sources, capture, transport, and storage of CO₂, for researchers, policy-makers and engineers.

Handbook of Natural Gas Transmission and Processing Elsevier

Fossil fuels still need to meet the growing demand of global economic development, yet they are often considered as one of the main sources of the CO₂ release in the atmosphere. CO₂, which is the primary greenhouse gas (GHG), is periodically exchanged among the land surface, ocean, and atmosphere where various creatures absorb and produce it daily. However, the balanced processes of producing and consuming the CO₂ by nature are unfortunately faced by the anthropogenic release of CO₂. Decreasing the emissions of these greenhouse gases is becoming more urgent. Therefore, carbon sequestration and storage (CSS) of CO₂, its utilization in oil recovery, as well as its conversion into fuels and chemicals emerge as active options and potential strategies to mitigate CO₂ emissions and climate change, energy crises, and challenges in the storage of energy.

This first in-depth and comprehensive reference on the most pertinent polar contaminant classes and their behavior in the whole water cycle includes, among others, industrial chemicals, consumer products, polar herbicides and pharmaceuticals. All chapters are uniformly structured, covering properties, pollution sources, occurrence in wastewater, surface water, and groundwater as well as water treatment aspects, while ecotoxicological and assessment aspects are also covered. Among the authors are leading experts in their relevant fields, many of whom provide here groundbreaking research results. The result is an up-to-date information source for researchers and professionals working in water quality monitoring, water supply, or wastewater treatment, as well as environmental and water chemists, geochemists, ecologists, chemists and engineers.

Aimed at students and professionals, this book covers every major aspect of petroleum: the origin of fossil hydrocarbons and their chemical/physical properties; discovering hydrocarbon reserves; recovering oil, gas, and bitumen; purifying gas; the chemical and physical characterization of crude oil; refining crudes into fuels and lubricants; and converting simple chemicals into solvents, polymers, fibers, rubbers, coatings, and myriad other products, including pharmaceuticals. Readers will learn how the industry operates, from "upstream" exploration and production, "midstream" transportation to "downstream" refining, and manufacturing of finished products. The book also contains unique chapters on midstream operations, learnings from major accidents, and safety/environmental laws and regulations. It builds on the authors' previous books and teaching material from a highly rated course that is taught at the Florida A&M University/Florida State University (USA).

Gasification is one of the most important advancements that has ever occurred in energy production. Using this technology, for example, coal can be gasified into a product that has roughly half the carbon footprint of coal. On a large scale, gasification could be considered a revolutionary development, not only prolonging the life of carbon-based fuels, but making them "greener" and cleaner. As long as much of the world still depends on fossil fuels, gasification will be an environmentally friendlier choice for energy production. But gasification is not just used for fossil fuels. Waste products that would normally be dumped into landfills or otherwise disposed of can be converted into energy through the process of gasification. The same is true of biofeedstocks and other types of feedstocks, thus making another argument for the widespread use of gasification. The Handbook of Gasification Technology covers all aspects of the gasification, in a "one-stop shop," from the basic science of gasification and why it is needed to the energy sources, processes, chemicals, materials, and machinery used in the technology. Whether a veteran engineer or scientist using it as a reference or a professor using it as a textbook, this outstanding new volume is a must-have for any library.

Covers process descriptions, design method, operating procedures, and troubleshooting in great detail. This text is the definitive source on its topic and contains numerous diagrams and appendices, as well as case histories and review questions with numerical problems.

Developed through an extensive process of consultation with leading professionals and health and safety institutions worldwide, the new, expanded, and long-awaited Fourth Edition of this well-respected reference provides comprehensive, timely, and accurate coverage of occupational health and safety. Aimed at the specialist and non-specialist alike, such as lawyers, doctors, nurses, engineers, toxicologists, regulators, and other safety professionals, this compendium is organized and designed to provide the most critical information in an easy-to-read format. It uses more than 1,000 illustrations, a new attractive layout, and provides thousands of cited references that provide up-to-date literature reviews. Indexes by subject, chemical name, and author make navigating through information quick and easy. The CD-ROM version includes the same information as

the print volumes, plus the benefit of a powerful search and retrieval engine to make searching for information as easy as a mouse click. Here's a sampling of what's covered in each volume and the CD-ROM: Volume 1: The body, health care, management and policy, tools and approaches Volume 2: Psychological and organizational factors, hazards, the environment, accidents, and safety Volume 3: Chemicals, industries and occupations Volume 4: Index by subject, chemical name, author, cross-reference guide, directory of contributors.

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.

Updated and better than ever, *Design of Gas-Handling Systems and Facilities*, 3rd Edition includes greatly expanded chapters on gas-liquid separation, gas sweetening, gas liquefaction, and gas dehydration —information necessary and critical to production and process engineers and designers. Natural gas is at the forefront of today's energy needs, and this book walks you through the equipment and processes used in gas-handling operations, including conditioning and processing, to help you effectively design and manage your gas production facility. Taking a logical approach from theory into practical application, *Design of Gas-Handling Systems and Facilities*, 3rd Edition contains many supporting equations as well as detailed tables and charts to facilitate process design. Based on real-world case studies and experience, this must-have training guide is a reference that no natural gas practitioner and engineer should be without. Packed with charts, tables, and diagrams Features the prerequisite ASME and API codes Updated chapters on gas-liquid separation, gas sweetening, gas liquefaction and gas dehydration

This two-volume set CCIS 751 and CCIS 752 constitutes the proceedings of the 17th Asia Simulation Conference, AsiaSim 2017, held in Malacca, Malaysia, in August/September 2017. The 124 revised full papers presented in this two-volume set were carefully reviewed and selected from 267 submissions. The papers contained in these proceedings address challenging issues in modeling and simulation in various fields such as embedded systems; symbiotic simulation; agent-based simulation; parallel and distributed simulation; high performance computing; biomedical engineering; big data; energy, society and economics; medical processes; simulation language and software; visualization; virtual reality; modeling and Simulation for IoT; machine learning; as well as the fundamentals and applications of computing.

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

This book introduces the recent technologies introduced for gases capture including CO₂, CO, SO₂, H₂S, NO_x, and H₂. Various processes and theories for gas capture and removal are presented. The book provides a useful source of information for engineers and specialists, as well as for undergraduate and postgraduate students in the fields of environmental and chemical science and engineering.

Shale Oil and Gas Production Processes delivers the basics on current production technologies and the processing and refining of shale oil. Starting with the potential of formations and then proceeding to production and completion, this foundational resource also dives into the chemical and physical nature of the precursor of oil shale, kerogen, to help users understand and optimize its properties in shale. Rounding out with reporting, in situ retorting, refining and environmental aspects, this book gives engineers and managers a strong starting point on how to manage the challenges and processes necessary for the further development of these complex resources. Helps readers grasp current research on production from shale formations, including properties and composition Fill in the gaps between research and practical application, including discussions of existing literature Includes a glossary to help readers fully understand key concepts

Shale Oil and Gas Handbook: Theory, Technologies, and Challenges provides users with information on how shale oil and gas exploration has revolutionized today's energy industry. As activity has boomed and job growth continues to increase, training in this area for new and experienced engineers is essential. This book provides comprehensive information on both the engineering design and research aspects of this emerging industry. Covering the full spectrum of basic definitions, characteristics, drilling techniques, and processing and extraction technologies, the book is a great starting point to educate oil and gas personnel on today's shale industry. Critical topics covered include characterization of shale gas, theory and methods, typical costs, and obstacles for exploration and drilling, R&D and technology development in shale production, EOR methods in shale oil reservoirs, and the current status and impending challenges for shale oil and gas, including the inevitable future prospects relating to worldwide development. Reveals all the basic information needed to quickly understand today's shale oil and gas industry, including advantages and disadvantages, equipment and costs, flow diagrams, and processing stages Evenly distributes coverage between oil and gas into two parts, as well as upstream and downstream content Provides a practical handbook with real-world case studies and problem examples, including formulas and calculations

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

Written by a scientist and researcher with more than 25 years of experience in the field, this serves as a complete guide to catalyst activity loss during the hydroprocessing of heavy oils. Explores the physical and chemical properties of heavy oils and hydroprocessing catalysts; the mechanisms of catalyst deactivation; catalyst characterization by a variety of techniques and reaction conditions; laboratory and commercial information for model validations; and more Demonstrates how to develop correlations and models for a variety of reaction scales with step-by-step descriptions and detailed experimental data Contains important implications for increasing operational efficiencies within the petroleum industry An essential reference for professionals and researchers working in the refining industry as well as students taking courses on chemical reaction engineering Handbook of Refinery Desulfurization describes the operation of the various desulfurization process units in a petroleum refinery. It also explains the processes that produce raw materials for the petrochemical industry. It illustrates all the possible processes to lower the sulfur contents in petroleum and its fractions to decrease emissions of sulfur oxides. This book introduces you to desulfurization concepts, including biodesulfurization, as well as technology, giving guidance on how to accomplish desulfurization in various refining processes. It contains background chapters on the composition and evaluation of feedstocks and includes diagrams and tables of feedstocks and their respective produce. It also outlines how to decide which method should be employed to remove sulfur from different feedstocks. A practical and thorough discussion of the field, Handbook of Refinery Desulfurization gives you a strong grasp of the various processes involved with industrial desulfurization while giving you pointers on which procedures to use under certain conditions.

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

Handbook of Natural Gas Transmission and Processing gives engineers and managers complete coverage of natural gas transmission and processing in the most rapidly growing sector to the petroleum industry. The authors provide a unique discussion of new technologies that are energy efficient and environmentally appealing at the same time. It is an invaluable reference on natural gas engineering and the latest techniques for all engineers and managers moving to natural gas processing as well as those currently working on natural gas projects. Provides practicing engineers critical information on all aspects of gas gathering, processing and transmission First book that treats multiphase flow transmission in great detail Examines natural gas energy costs and pricing with the aim of delivering on the goals of efficiency, quality and profit

Natural Gas: A Basic Handbook, Second Edition provides the reader with a quick and accessible introduction to a fuel source/industry that is transforming the energy sector. Written at an introductory level, but still appropriate for engineers and other technical readers, this book provides an overview of natural gas as a fuel source, including its origins, properties and composition. Discussions include the production of natural gas from traditional and unconventional sources, the downstream aspects of the natural gas industry, including processing, storage, and transportation, and environmental issues and emission controls strategies. This book presents an ideal resource on the topic for engineers new to natural gas, for advisors and consultants in the natural gas industry, and for technical readers interested in learning more about this clean burning fuel source and how it is shaping the energy industry. Updated to include newer sources like shale gas Includes new discussions on natural gas hydrates and flow assurance Covers environmental issues Contain expanded coverage of liquefied natural gas (LNG)

The immediate product extracted from oil and gas wells consists of mixtures of oil, gas, and water that is difficult to transport, requiring a certain amount of field processing. This reference analyzes principles and procedures related to the processing of reservoir fluids for the separation, handling, treatment, and production of quality petroleum oil and gas products. It details strategies in equipment selection and system design, field development and operation, and process simulation and control to increase plant productivity and safety and avoid losses during purification, treatment, storage, and export. Providing guidelines for developing efficient and economical treatment systems, the book features solved design examples that demonstrate the application of developed design equations as well as review problems and exercises of key engineering concepts in petroleum field development and operation.

There is a renaissance that is occurring in chemical and process engineering, and it is crucial for today's scientists, engineers, technicians, and operators to stay current. With so many changes over the last few decades in equipment and processes, petroleum refining is almost a living document, constantly needing updating. With no new refineries being built, companies are spending their capital re-tooling and adding on to existing plants. Refineries are like small cities, today, as they grow bigger and bigger and more and more complex. A huge percentage of a

refinery can be changed, literally, from year to year, to account for the type of crude being refined or to integrate new equipment or processes. This book is the most up-to-date and comprehensive coverage of the most significant and recent changes to petroleum refining, presenting the state-of-the-art to the engineer, scientist, or student. Useful as a textbook, this is also an excellent, handy go-to reference for the veteran engineer, a volume no chemical or process engineering library should be without. Written by one of the world's foremost authorities, this book sets the standard for the industry and is an integral part of the petroleum refining renaissance. It is truly a must-have for any practicing engineer or student in this area.

Volume 1 of the book discusses such topics as absorption, chromatography, crystallization, microcapsules, adsorbable methods, chemical complexing, parametric pumping, molecular sieve adsorption, enzyme membrane systems, immobilized solvent membranes and liquid surfactant membranes.

Equipment and process trouble-shooting techniques.

This book derives from a workshop held in Sweden to examine the environmental implications of the dramatic increase in carbon dioxide levels in the atmosphere in the last 50 years and to find ways of mitigating greenhouse gas emissions. This multi-disciplinary approach makes it essential reading not only for chemists but for all engineers, biologists and environmentalists concerned with this crucially important issue.

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