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Realizing the Energy Potential of Methane Hydrate for the United States

National Academies Press Natural gas, composed mostly of methane, is the cleanest of all the fossil fuels, emitting 25-50% less carbon dioxide than either oil or coal for each unit of energy produced. In recent years, natural gas supplied approximately 20-25% of all energy consumed in the United States. Methane hydrate is a potentially enormous and as yet untapped source of methane. The Department of Energy's Methane Hydrate Research and Development Program has been tasked since 2000 to implement and coordinate a national methane hydrate research effort to stimulate the development of knowledge and technology necessary for commercial production of methane from methane hydrate in a safe and environmentally responsible way. Realizing the Energy Potential of Methane Hydrate for the United States evaluates the program's research projects and management processes since its congressional re-authorization in 2005, and presents recommendations for its future research and development initiatives.

Natural Gas Hydrates

Energy Resource Potential and Associated Geologic Hazards, AAPG Memoir 89

AAPG Hardcover plus CD

Handbook on the Geographies of Energy

Edward Elgar Publishing This extensive Handbook captures a range of expertise and perspectives on the changing geographies and landscapes of energy production, distribution, and use. Combining established and emerging scholarship from across disciplines, the expert contributions provide a broad overview of research frontiers for the changing geographies of energy worldwide. Interdisciplinary in nature and broad in scope, it serves to answer a range of questions and provide the reader with conceptual and methodological foundations.

No Standard Oil

Managing Abundant Petroleum in a Warming World

Oxford University Press "The next decade will be decisive in the fight against climate change. It will be impossible to hold the planet to a 1.5o C temperature rise without controlling methane and CO2 emissions from the oil and gas sector. Contrary to popular belief, the world will not run out of these resources anytime soon. Instead, oil and gas are becoming more climate-intensive to supply using technologies like fracking oil and liquefying gas-even as we continue to use these abundant resources to fuel our cars, heat our homes, and

produce consumer goods like shampoo, pajamas, and paint. Policymakers, financial investors, environmental advocates, and citizens need to understand what oils and fossil fuels are doing to our climate to inform decisionmaking. In No Standard Oil, Deborah Gordon shows that no two oils or gases are environmentally alike. Each has a distinct, quantifiable climate impact. While all oils and gases pollute, some are much worse for the climate than others. In clear, accessible language, Gordon explains the results of the Oil Climate Index Plus Gas (OCI+), an innovative, open-source model that estimates global oil and gas greenhouse gas emissions. Gordon identifies the oils and gases from every region of the globe-along with the specific production, processing, and refining activities-that are the most damaging to the planet, and proposes innovative solutions to reduce their climate footprints. Global climate stabilization cannot afford to wait for oil and gas to run out. No Standard Oil shows how we can take immediate, practical steps to cut greenhouse gas emissions in the crucial oil and gas sector while making sustainable progress in transitioning to a carbon-free energy future"--

Exploration and Production of Oceanic Natural Gas Hydrate

Critical Factors for Commercialization

Springer This book describes aspects of the natural gas hydrate (NGH) system that offer opportunities for the innovative application of existing technology and development of new technology that could dramatically lower the cost of NGH exploration and production. It is written for energy industry professsionals and those concerned with energy choices and efficiencies at a university graduate level. The NGH resource is compared with physical, environmental, and commercial aspects of other gas resources. The authors' theme is that natural gas can provide for base and peak load energy demands during the transition to and possibly within a renewable energy future. This is possibly the most useful book discussing fossil fuels that will be a reference for environmentalists and energy policy institutions, and for the environmental and energy community.

Supporting American Jobs and the Economy Through Expanded Energy Production

Challenges and Opportunities of Unconventional Resources Technology : Hearing Before the Subcommittee on Energy and Environment, Committee on Science, Space, and Technology, House of Representatives, One Hundred Twelfth Congress, Second Session, Thursday, May 10, 2012

Ending the Energy Stalemate

A Bipartisan Strategy to Meet America's Energy Challenges

Proposed fiscal year 2006 budget request for the Department of Energy

hearing before the Committee on Energy and Natural Resources, United States Senate, One Hundred Ninth Congress, first session, to receive testimony regarding the president's proposed fiscal year 2006 budget for the Department of Energy, March 3, 2005

Alternative Energy Sources and Technologies

Process Design and Operation

Springer Presenting a comprehensive analysis of the use of alternative sources of energy and technologies to produce fuels and power, this book describes the energy value chain from harvesting the raw material, (i.e solar, wind, biomass or shale gas) followed by analysis of the processing steps into power, fuels and/or chemicals and finally the distribution of the products. Featuring an examination of the techno-economic processes and integration opportunities which can add value to by-products or promote the use of different sources of energy within the same facility, this book looks at the tools that can make this integration possible as well as utilising a real world case study. The case study of the operation of “El hierro” island is used as an example of the current effort towards more efficient use of the resources available. Tackling head on the open challenges of the supply, the variability of the source and its prediction, the description of novel processes that are being developed and evaluated for their transformation as well as how we can distribute them to the consumer and how we can integrate the new chemicals, fuels and power within the current system and infrastructure, the book takes a process based perspective with such an approach able to help us in the use and integration of these sources of energy and novel technologies.

Charting the Future of Methane Hydrate Research in the United States

National Academies Press Methane hydrate is a natural form of clathrate - a chemical substance in which one molecule forms a lattice around a "guest" molecule with chemical bonding. In this clathrate, the guest molecule is methane and the lattice is formed by water to form an ice-like solid. Methane hydrate has become the focus of international attention because of the vast potential for human use worldwide. If methane can be produced from hydrate, a reasonable assumption given that there are no obvious technical or engineering roadblocks to commercial production, the nation's natural gas energy supply could be extended for many years to come. This report reviews the Department of Energy's (DOE) Methane Hydrate Research and Development Program, the project selection process, and projects funded to date. It makes recommendations on how the DOE program could be improved. Key recommendations include focusing DOE program emphasis and research in 7 priority areas; incorporating greater scientific oversight in the selection, initiation, monitoring, and assessment of major projects funded by the DOE; strengthening DOE's contribution to education and training through funding of fellowships, and providing project applicants with a set of instructions and guidelines outlining requirements for timely and full disclosure of project results and consequences of noncompliance.

Offshore Hydrocarbon Production

Hearing Before the Committee on Energy and Natural Resources, United States Senate, One Hundred Ninth Congress, First Session ... April 19, 2005

Natural Gas

Fuel for the 21st Century

John Wiley & Sons Natural gas is the world’s cleanest fossil fuel; it generates less air pollution and releases less CO2 per unit of useful energy than liquid fuels or coals. With its vast supplies of conventional resources and nonconventional stores, the extension of long-distance gas pipelines and the recent expansion of liquefied natural gas trade, a truly global market has been created for this clean fuel. Natural Gas: Fuel for the 21st Century discusses the place and prospects of natural gas in modern high-energy societies. Vaclav Smil presents a systematic survey of the qualities, origins, extraction, processing and transportation of natural gas, followed by a detailed appraisal of its many preferred, traditional and potential uses, and the recent emergence of the fuel as a globally traded commodity. The unfolding diversification of sources, particularly hydraulic fracturing, and the role of natural gas in national and global energy transitions are described. The book concludes with a discussion on the advantages, risks, benefits and costs of natural gas as a leading, if not dominant, fuel of the 21st century. This interdisciplinary text will be of interest to a wide readership concerned with global energy affairs including professionals and academics in energy and environmental science, policy makers, consultants and advisors with an interest in the rapidly-changing global energy industry.

The Natural Gas Revolution

At the Pivot of the World's Energy Future

FT Press Robert W. Kolb reveals how new gas resources are transforming the global energy industry, redistributing economic and geopolitical power in stunning ways. Kolb’s The Natural Gas Revolution explains the new promise of natural gas to stimulate economies and enrich human life — and objectively assesses the major environmental risks that accompany fracking, horizontal drilling, and today’s massive new LNG infrastructures. He places natural gas in broader context, clearly and carefully explaining what it will really mean to global economics, geopolitics, investors, the environment, and consumers. He explains the key technologies that have enabled access to huge new natural gas sources, and illuminates the remarkable implications of larger, more widely distributed, and more environmentally-friendly hydrocarbon resources. You’ll find thoughtful and objective answers to questions such as: Will natural gas permit a more orderly transition to solar and other renewables? Will “fracking” and horizontal drilling poison the aquifers cities depend on for clean drinking water? Will “fracking” increase earthquake risks? Next, Kolb explains how the natural gas revolution is roiling world energy markets, predicts their response to today’s wild price imbalances, and identifies surprising implications — for example, a potentially faster transition to cleaner transportation. He concludes by identifying nations and regions that may achieve unexpected energy independence from current suppliers — and even become exporters. This book will be indispensable to anyone interested in the latest developments in energy, international relations, and global business: citizens, investors, and policymakers alike.

Towards a European Energy Union

European Energy Strategy in International Law

Cambridge University Press This book outlines the legal regime underpinning the European Energy Union, which provides secure, sustainable and affordable energy.

Interior, Environment, and Related Agencies Appropriations for 2009

Hearings Before a Subcommittee of the Committee on Appropriations, House of Representatives, One Hundred Tenth Congress, Second Session

Future Directions for the U.S. Geological Survey's Energy Resources Program

National Academies Press Reliable, affordable, and technically recoverable energy is central to the nation's economic and social vitality. The United States is both a major consumer of geologically based energy resources from around the world and - increasingly of late - a developer of its own energy resources. Understanding the national and global availability of those resources as well as the environmental impacts of their development is essential for strategic decision making related to the nation's energy mix. The U.S. Geological Survey Energy Resources Program is charged with providing unbiased and publicly available national- and regional-scale assessments of the location, quantity, and quality of geologically based energy resources and with undertaking research related to their development. At the request of the Energy Resources Program (ERP), this publication considers the nation's geologically based energy resource challenges in the context of current national and international energy outlooks. Future Directions for the U.S. Geological Survey's Energy Resources Program examines how ERP activities and products address those challenges and align with the needs federal and nonfederal consumers of ERP products. This study contains recommendations to develop ERP products over the next 10-15 years that will most effectively inform both USGS energy research priorities and the energy needs and priorities of the U.S. government.

Fundamentals of Natural Gas Processing

CRC Press Fundamentals of Natural Gas Processing explores the natural gas industry from the wellhead to the marketplace. It compiles information from the open literature, meeting proceedings, and experts to accurately depict the state of gas processing technology today and highlight technologies that could become important in the future. This book cov

Energy: Natural Gas

The Production and Use of Natural Gas, Natural Gas Imports and Exports, EPAct Project, Liquefied Natural Gas (LNG) Import Terminals and Infrastructure Security,

Underground Working Gas Storage, Fischer-Tropsch Fuels from Coal, Natural Gas, and Biomass, Gas Hydrates, Gas Shales, Hydraulic Fracturing, Alaska Natural Gas Pipelines

The Capitol Net Inc This edition examines the production and use of natural gas, natural gas imports and exports, storage, and other pertinent topics.

America's Energy Future

Technology and Transformation

National Academies Press For multi-user PDF licensing, please contact customer service. Energy touches our lives in countless ways and its costs are felt when we fill up at the gas pump, pay our home heating bills, and keep businesses both large and small running. There are long-term costs as well: to the environment, as natural resources are depleted and pollution contributes to global climate change, and to national security and independence, as many of the world's current energy sources are increasingly concentrated in geopolitically unstable regions. The country's challenge is to develop an energy portfolio that addresses these concerns while still providing sufficient, affordable energy reserves for the nation. The United States has enormous resources to put behind solutions to this energy challenge; the dilemma is to identify which solutions are the right ones. Before deciding which energy technologies to develop, and on what timeline, we need to understand them better. America's Energy Future analyzes the potential of a wide range of technologies for generation, distribution, and conservation of energy. This book considers technologies to increase energy efficiency, coal-fired power generation, nuclear power, renewable energy, oil and natural gas, and alternative transportation fuels. It offers a detailed assessment of the associated impacts and projected costs of implementing each technology and categorizes them into three time frames for implementation.

Nanostructured Materials for Next-Generation Energy Storage and Conversion

Fuel Cells

Springer The energy crisis and pollution have posed significant risks to the environment, transportation, and economy over the last century. Thus, green energy becomes one of the critical global technologies and the use of nanomaterials in these technologies is an important and active research area. This book series presents the progress and opportunities in green energy sustainability. Developments in nanoscaled electrocatalysts, solid oxide and proton exchange membrane fuel cells, lithium ion batteries, and photovoltaic techniques comprise the area of energy storage and conversion. Developments in carbon dioxide (CO2) capture and hydrogen (H2) storage using tunable structured materials are discussed. Design and characterization of new nanoscaled materials with controllable particle size, structure, shape, porosity and band gap to enhance next generation energy systems are also included. The technical topics covered in this series are metal organic frameworks, nanoparticles, nanocomposites, proton exchange membrane fuel cell catalysts, solid oxide fuel cell electrode design, trapping of carbon dioxide, and hydrogen gas storage.

Gulf of Mexico Origin, Waters, and Biota

Volume 3, Geology

Texas A&M University Press Volume 3 of Gulf of Mexico Origin, Waters, and Biota; a series edited by John W. Tunnell Jr., Darryl L. Felder, and Sylvia A. Earle A continuation of the landmark scientific reference series from the Harte Research Institute for Gulf of Mexico Studies, Gulf of Mexico Origin, Waters, and Biota, Volume 3, Geology provides the most up-

to-date, systematic, cohesive, and comprehensive description of the geology of the Gulf of Mexico Basin. The six sections of the book address the geologic history, recent depositional environments, and processes offshore and along the coast of the Gulf of Mexico. Scientific research in the Gulf of Mexico region is continuous, extensive, and has broad-based influence upon scientific, governmental, and educational communities. This volume is a compilation of scientific knowledge from highly accomplished and experienced geologists who have focused most of their careers on gaining a better understanding of the geology of the Gulf of Mexico. Their research, presented in this volume, describes and explains the formation of the Gulf Basin, Holocene stratigraphic and sea-level history, energy resources, coral reefs, and depositional processes that affect and are represented along our Gulf coasts. It provides valuable synthesis and interpretation of what is known about the geology of the Gulf of Mexico. Five years in the making, this monumental compilation is both a lasting record of the current state of knowledge and the starting point for a new millennium of study.

An Ocean Blueprint for the 21st Century

Final Report

Accompanying DVD contains 2 segments: the first shows the developmental process into making the report, the second shows a summary of the findings and recommendations of the report.

Energy Studies

Third Edition

World Scientific Publishing Company How is the future world energy demand to be met? The rates of use of the fossil fuels — coal, oil and natural gas — are increasing all over the world. The remaining stocks are finite and are not renewable. This book considers the various options of renewable energy, including water energy, wind energy and biomass, solar thermal and solar photovoltaic energy. And should the nuclear option remain open? The work also examines the environmental implications and economic viability of all fossil and renewable sources, introduces more distant future options of geothermal energy and nuclear fusion, and discusses a near-future energy strategy.

Powering Our Future

An Energy Sourcebook for Sustainable Living

iUniverse With nearly all of the world's energy consumption dependent on non-renewable resources,Powering Our Future challenges consumers to support changes that will create sustainable energy in the future. The four biggest energy sources-oil, natural gas, coal, and uranium-currently power our earth. What would happen to global societies if we experienced severe shortages of one or more of these resources? Such a glimpse into the future may become reality sooner than we think. Oil production is soon expected to begin a rapid descent, with natural gas in close pursuit. Powering Our Future is an educational tool that opens the door to a future fueled by sustainable, renewable energy. Consumers will learn: How our world has become dependent on four nonrenewable resources. How each resource impacts us politically, economically, and environmentally. How renewable resources such as hydrogen, wind power, solar energy, biofuels, and more are waiting in the wings. How the transition to a sustainable future will take place, offering economically stable and environmentally safe choices. Powering Our Future is a solution-oriented guide that will empower you to make more informed choices as a voter, a contributor to a global economy, and a citizen of the earth.

Recent Advances in Promoters for Gas Hydrate Formation

Frontiers Media SA

International Science in the National Interest at the U.S. Geological Survey

National Academies Press Science at the U.S. Geological Survey (USGS) is intrinsically global, and from early in its history, the USGS has successfully carried out international projects that serve U.S. national interests and benefit the USGS domestic mission. Opportunities abound for the USGS to strategically pursue international science in the next 5-10 years that bears on growing worldwide problems having direct impact on the United States--climate and ecosystem changes, natural disasters, the spread of invasive species, and diminishing natural resources, to name a few. Taking a more coherent, proactive agency approach to international science--and building support for international projects currently in progress-would help the USGS participate in international science activities more effectively.

The Role of Negative Emission Technologies in Addressing Our Climate Goals

Frontiers Media SA

World Atlas of Submarine Gas Hydrates in Continental Margins

Springer Nature This world atlas presents a comprehensive overview of the gas-hydrate systems of our planet with contributions from esteemed international researchers from academia, governmental institutions and hydrocarbon industries. The book illustrates, describes and discusses gas hydrate systems, their geophysical evidence and their future prospects for climate change and continental margin geohazards from passive to active margins. This includes passive volcanic to non-volcanic margins including glaciated and non-glaciated margins from high to low latitudes. Shallow submarine gas hydrates allow a glimpse into the past from the Last Glacial Maximum (LGM) to modern environmental conditions to predict potential changes in future stability conditions while deep submarine gas hydrates remained more stable. This demonstrates their potential for rapid reactions for some gas hydrate provinces to a warming world, as well as helping to identify future prospects for environmental research. Three-dimensional and high-resolution seismic imaging technologies provide new insights into fluid flow systems in continental margins, enabling the identification of gas and gas escape routes to the seabed within gas hydrate environments, where seabed habitats may flourish. The volume contains a method section detailing the seismic imaging and logging while drilling techniques used to characterize gas hydrates and related dynamic processes in the sub seabed. This book is unique, as it goes well beyond the geophysical monograph series of natural gas hydrates and textbooks on marine geophysics. It also emphasizes the potential for gas hydrate research across a variety of disciplines. Observations of bottom simulating reflectors (BSRs) in 2D and 3D seismic reflection data combined with velocity analysis, electromagnetic investigations and gas-hydrate stability zone (GHSZ) modelling, provide the necessary insights for academic interests and hydrocarbon industries to understand the potential extent and volume of gas hydrates in a wide range of tectonic settings of continental margins. Gas hydrates control the largest and most dynamic reservoir of global carbon. Especially 4D, 3D seismic but also 2D seismic data provide compelling sub-seabed images of their dynamical behavior. Sub-seabed imaging techniques increase our understanding of the controlling mechanisms for the distribution and migration of gas before it enters the gas-hydrate stability zone. As methane hydrate stability depends mainly on pressure, temperature, gas composition and pore water chemistry, gas hydrates are usually found in ocean margin settings where water depth is more than 300 m and gas migrates upward from deeper geological formations. This highly dynamic environment may precondition the stability of continental slopes as evidenced by geohazards and gas expelled from the sea floor. This book provides new insights into variations in the character and existence of gas hydrates and BSRs in various geological environments, as well as their dynamics. The potentially dynamic behavior of this natural carbon system in a warming world, its current and future impacts on a variety of Earth environments can now be adequately evaluated by using the information provided in the world atlas. This book is relevant for students, researchers, governmental agencies and oil and gas professionals. Some familiarity with seismic data and some basic understanding of geology and tectonics are recommended.

Berkshire Encyclopedia of Sustainability 2/10

The Business of Sustainability

Berkshire Publishing Group The Business of Sustainability is a core resource for policy makers, members of the development community, entrepreneurs, and corporate executives, as well as business and economics students and their professors. It contains rich analysis of how sustainability is being factored into industries across the globe, with enlightening case studies of businesses serving as agents of change. Contributing authors provide a groundbreaking body of research-based knowledge. They explain that the concept of sustainability is being re-framed to be positive about business instead of being tied to the old notion of a trade-off between business and society (that is, if business wins, society and the environment must lose), and they explore how economic development can contribute to building our common future.

Sources of Power

How Energy Forges Human History

ABC-CLIO A landmark book rolls out a bold, new, energy-based theory of human history based on a simple, yet powerful law: whoever controls the world's effective energy supplies during a given energy age will inevitably dominate the economic, political, and cultural history of that age.

Natural Gas and Hydrogen

Infobase Publishing Describes the technology and scale of the infrastructure that has evolved to produce, transport, and consume natural gas. It emphasizes the business of natural gas production and the energy futures markets that have evolved as vehicles for both speculation and risk management.

U. S. Fossil Fuel Resources

Terminology, Reporting, and Summary

DIANE Publishing Terminology: Proved Reserves and Undiscovered Resources: The Importance of Terminology: The Example of the Bakken Formation; Conventional Versus Unconventional Oil and Natural Gas Deposits; (4) Authoritative Data Sources for U.S. Fossil Fuel Reserves and Resources (R&R); (5) U.S. Oil and Natural Gas R&R: Proved Reserves; Undiscovered Oil and Natural Gas R&R; Sub-Economic Oil and Natural Gas R&R; Shale Oil; Shale Gas; Methane Hydrates; Heavy Oil; (6) U.S. Coal R&R; (7) Expressing Fossil Fuels as Barrels of Oil Equivalent; (8) Overview of Global Fossil Fuel R&R; (9) U.S. Production and Consumption of Oil, Natural Gas, and Coal; Key Terms Used in Oil Statistics. Illus.

Profit from the Peak

The End of Oil and the Greatest Investment Event of the Century

John Wiley & Sons Profit from the Peak contains the information you need to successfully navigate the end of our oil-based economy. It takes a hard look at the future of oil and gas, examines how you can effectively invest in these resources, and profit from energy alternatives that are poised to power the years ahead. Along the way, this book also explores the potential, and possible limitations, of each major energy source, while carefully cover the investing angles of each one.

Energy for the 21st Century

A Comprehensive Guide to Conventional and Alternative Sources

M.E. Sharpe A compendium of current knowledge about conventional and alternative sources of energy. It clarifies complex technical issues, enlivens history, and illuminates the policy dilemmas we face today. This revised edition includes new material on biofuels, an expanded section on sustainability and sustainable energy, and updated figures and tables throughout. There are also online instructor materials for those professors who adopt the book for classroom use.

Gas Hydrates

Immense Energy Potential and Environmental Challenges

Springer Science & Business Media Gas hydrates are both a huge energy resource and an environmental challenge. They have a significant impact on society because of their applications to the future of energy, protection of the environment and fuel transportation. Gas Hydrates opens up this fascinating, multidisciplinary field to non-specialists. It provides a scientific study of gas hydrates that considers their potential as an energy source while assessing the possible risk to the environment. The authors also examine the feasibility of using these natural compounds for storing and transporting gases such as methane and carbon dioxide. Diagrams and photos are used throughout Gas Hydrates to help readers understand the scientific and technical content. Each section has been designed so it can be read independently by academics and professionals in the oil and gas industry, as well as by all those with an interest in how hydrates combine to be an energy resource, an industrial challange and a geological hazard.

Energy from Gas Hydrates: Assessing the Opportunities and Challenges for Canada

Council of CanadianAcademies

The New Geopolitics of Natural Gas

Harvard University Press As the United States aggressively expands its exports of liquefied natural gas, it stands poised to become an energy superpower. This unanticipated reality is rewriting the conventional rules of intercontinental gas trade and realigning strategic relations among the United States, the European Union, Russia, China and beyond, as Agnia Grigas shows.

Natural Gas Hydrates in Flow Assurance

Gulf Professional Publishing With millions of kilometres of onshore and offshore oil and gas pipelines in service around the world, pipelines are the life’s blood of the world. Notorious for disrupting natural gas production or transmission, the formation of natural gas hydrates can cost a company hundreds of millions and lead to catastrophic equipment breakdowns and safety and health hazards. Written by an international group of experts, Natural Gas Hydrates in Flow Assurance provide an expert overview of the practice and theory in natural gas hydrates, with applications primarily in flow assurance. Compact and easy to use, the book provides readers with a wealth of materials which include the key lessons learned in the industry over the last 20 years. Packed with field case studies, the book is designed to provide hands-on training and practice in calculating hydrate phase equilibria and plug dissociation. In addition readers receive executable programs to calculate hydrate thermodynamics. Case studies of hydrates in flow assurance The key concepts underlying the practical applications An overview of the state of the art flow assurance industrial developments

Methane Gas Hydrate

Springer Science & Business Media Gas hydrates represent one of the world’s largest untapped reservoirs of energy and, according to some estimates, have the potential to meet global energy needs for the next thousand years. "Methane Gas Hydrate" examines this potential by focusing on methane gas hydrate, which is increasingly considered a significant source of energy. "Methane Gas Hydrate" gives a general overview of natural gas, before delving into the subject of gas hydrates in more detail and methane gas hydrate in particular. As well as discussing methods of gas production, it also discusses the safety and environmental concerns associated with the presence of natural gas hydrates, ranging from their possible impact on the safety of conventional drilling operations to their influence on Earth’s climate. "Methane Gas Hydrate" is a useful reference on an increasingly popular energy source. It contains valuable information for chemical engineers and researchers, as well as for postgraduate students.

Fuel Cells

Current Technology Challenges and Future Research Needs

Newnes "This book is a one of a kind, definitive reference source for technical students and researchers, government policymakers, and business leaders. It provides an overview of past and present initiatives to improve and commercialize fuel cell technologies. It provides context and analysis to help potential investors assess current fuel cell commercialization activities and future prospects. Most importantly, it gives top executive policymakers and company presidents with detailed policy recommendations as to what should be done to successfully commercialize fuel cell technologies."--pub. desc.