# Materials Engineer Exam Reviewer Rentek

A comprehensive examination of the large number of possible pathways for converting biomass into fuels and power through thermochemical processes Bringing together a widely scattered body of information into a single volume, this book provides complete coverage of the many ways that thermochemical processes are used to transform biomass into fuels, chemicals and power. Fully revised and updated, this new edition highlights the substantial progress and recent developments that have been made in this rapidly growing field since publication of the first edition and incorporates up-to-date information in each chapter. Thermochemical Processing of Biomass: Conversion into Fuels, Chemicals and Power, 2nd Edition incorporates two new chapters covering: condensed phased reactions of thermal deconstruction of biomass and life cycle analysis of thermochemical processing systems. It offers a new introductory chapter that provides a more comprehensive overview of thermochemical technologies. The book also features fresh perspectives from new authors covering such evolving areas as solvent liquefaction and hybrid processing. Other chapters cover combustion, gasification, fast pyrolysis, upgrading of syngas and bio-oil to liquid transportation fuels, and the economics of thermochemically producing fuels and power, and more. Features contributions by a distinguished group of European and American researchers offering a broad and unified description of thermochemical processing options for biomass Combines an overview of the current status of thermochemical biomass conversion as well as engineering aspects to appeal to the broadest audience Edited by one of Biofuels Digest's "Top 100 People" in bioenergy for six consecutive years Thermochemical Processing of Biomass: Conversion into Fuels, Chemicals and Power, 2nd Edition will appeal to all academic researchers, process chemists, and engineers working in the field of biomass conversion to fuels and chemicals. It is also an excellent book for graduate and advanced undergraduate students studying biomass, biofuels, renewable resources, and energy and power generation.

Praise for the previous edition: “Contains something for everyone involved in lubricant technology” — Chemistry & Industry This completely revised third edition incorporates the latest data available and reflects the knowledge of one of the largest companies active in the business. The authors take into account the interdisciplinary character of the field, considering aspects of engineering, materials science, chemistry, health and safety. The result is a volume providing chemists and engineers with a clear interdisciplinary introduction and guide to all major lubricant applications, focusing not only on the various products but also on specific application engineering criteria. A classic reference work, completely revised and updated (approximately 35% new material) focusing on sustainability and the latest developments, technologies and processes of this multi billion dollar business Provides chemists and engineers with a clear interdisciplinary introduction and guide to all major lubricant applications, looking not only at the various products but also at specific application engineering criteria All chapters are updated in terms of environmental and operational safety. New guidelines, such as REACH, recycling alternatives and biodegradable base oils are introduced Discusses the integration of micro- and nano-tribology and lubrication systems Reflects the knowledge of Fuchs Petrolub SE, one of the largest companies active in the lubrication business 2 Volumes wileyonlinelibrary.com/ref/lubricants

This publication provides information on forest products markets and related policies in Europe, North America and the Commonwealth of Independent States. It begins with an overview chapter, followed by analysis of government and industry policies and market-based implements affecting forest products markets. The third chapter is on institutional forestland ownership. Five chapters are based on annual country-supplied statistics, describing: wood raw materials, sawn softwood, sawn hardwood, wood-based panels, and paper, paperboard and woodpulp. Additional chapters discuss markets for wood energy, value-added wood products, and housing. Production, trade and consumption are analyzed and relevant material on specific markets included.

The majority of professors have never had a formal course in education, and the most common method for learning how to teach is on-the-job training. This represents a challenge for disciplines with ever more complex subject matter, and a lost opportunity when new active learning approaches to education are yielding dramatic improvements in student learning and retention. This book aims to cover all aspects of teaching engineering and other technical subjects. It presents both practical matters and educational theories in a format useful for both new and experienced teachers. It is organized to start with specific, practical teaching applications and then leads to psychological and educational theories. The "practical orientation" section explains how to develop objectives and then use them to enhance student learning, and the "theoretical orientation" section discusses the theoretical basis for learning/teaching and its impact on students. Written mainly for PhD students and professors in all areas of engineering, the book may be used as a text for graduate-level classes and professional workshops or by professionals who wish to read it on their own. Although the focus is engineering education, most of this book will be useful to teachers in other disciplines. Teaching is a complex human activity, so it is impossible to develop a formula that guarantees it will be excellent. However, the methods in this book will help all professors become good teachers while spending less time preparing for the classroom. This is a new edition of the well-received volume published by McGraw-Hill in 1993. It includes an entirely revised section on the Accreditation Board for Engineering and Technology (ABET) and new sections on the characteristics of great teachers, different active learning methods, the application of technology in the classroom (from clickers to intelligent tutorial systems), and how people learn.

This book outlines the most updated clinical guidelines that are vital for the prevention infections and care of patients with joint infections following a replacement surgery, one of the highest volume medical interventions globally. Sections address the diagnosis, management approaches and prevention of prosthetic joint infections. Written by experts in

the field, this text provides a brief overview of the literature and current recommendations in each of the specified areas. Given the rapidly evolving state-of-play in this clinical area, this compendium grows increasingly important to clinicians in their management decisions. Prosthetic Joint Infections is a valuable resource for infectious disease specialists, epidemiologists, surgeons, and orthopedic specialists who may work with patients with prosthetic joint infections.

Frank Kreith and Mark Bohn's PRINCIPLES OF HEAT TRANSFER is known and respected as a classic in the field! The sixth edition has new homework problems, and the authors have added new Mathcad problems that show readers how to use computational software to solve heat transfer problems. This new edition features own web site that features real heat transfer problems from industry, as well as actual case studies.

The Forest Products Annual Market Review 2017-2018 provides a comprehensive analysis of markets in the UNECE region and reports on the main market influences outside the UNECE region. It covers the range of products from the forest to the end-user: from roundwood and primary processed products to value-added and housing. Statistics-based chapters analyse the markets for wood raw materials, sawn softwood, sawn hardwood, wood-based panels, paper, paperboard and woodpulp. Other chapters analyse policies, trade barriers affecting forest products, and markets for wood energy. Underlying the analysis is a comprehensive collection of data. The Review highlights the role of sustainable forest products in international markets. Policies concerning forests and forest products are discussed, as well as the main drivers and trends. The Review also analyses the effects of the current economic situation on forest products markets.

James V. Bono, MD, and Richard D. Scott, MD, two leading authorities in the field, edited this invaluable how-to book on corrective surgery for failed total knee arthroplasty. The text has an in-depth, comprehensive approach geared for orthopedic surgeons, sports medicine specialists, and residents. All fundamental aspects of revision total knee arthroplasty and its complications are covered. More than 350 illustrations–60 in full color–complement well-written explanations of general principles, surgical procedures, and special considerations. Top experts in orthopedics offer clinical pearls on topics such as diagnosis and evaluation, pre-op planning and component selection, surgical approach, revision technique, post-op complications, and salvage. Radiologists also detail the use of imaging for evaluation. Economics and reimbursement are addressed as well. Readers will find that this thorough and accurate book is an unprecedented guide that unravels the complexity of revision total knee arthroplasty.

Due to the complexity, and heterogeneity of the smart grid and the high volume of information to be processed, artificial intelligence techniques and computational intelligence appear to be some of the enabling technologies for its future development and success. The theme of the book is “Making pathway for the grid of future” with the emphasis on trends in Smart Grid, renewable interconnection issues, planning-operation-control and reliability of grid, real time monitoring and protection, market, distributed generation and power distribution issues, power electronics applications, computer-IT and signal processing applications, power apparatus, power engineering education and industry-institute collaboration. The primary objective of the book is to review the current state of the art of the most relevant artificial intelligence techniques applied to the different issues that arise in the smart grid development.

The shareholder letters of corporate leaders are a rich source of business and investing wisdom. There is no more authoritative resource on subjects ranging from leadership and management to capital allocation and company culture. But with thousands of shareholder letters written every year, how can investors and students of the corporate world sift this vast swathe to unearth the best insights? Dear Shareholder is the solution! In this masterly new collection, Lawrence A. Cunningham, business expert and acclaimed editor of The Essays of Warren Buffett, presents the finest writers in the genre of the shareholder letter, and the most significant excerpts from their total output. Skillfully curated, edited and arranged, these letters showcase the ultimate in business and investment knowledge from an all-star team. Dear Shareholder holds letters by more than 20 different leaders from 16 companies. These leaders include Warren Buffett (Berkshire Hathaway), Tom Gayner (Markel), Kay Graham and Don Graham (The Washington Post and Graham Holdings), Roberto Goizueta (Coca-Cola), Ginni Rometty (IBM), and Prem Watsa (Fairfax). Topics covered in these letters include the long-term focus, corporate culture and commitment to values, capital allocation, buybacks, dividends, acquisitions, management, business strategy, and executive compensation. As we survey the corporate landscape in search of outstanding companies run by first-rate managers, shareholder letters are a valuable resource. The letters also contain a wealth of knowledge on the core topics of effective business management. Let Dear Shareholder be your guide.

Aimed at presenting a systematic design of biorefineries, the book initiates with an overview about relevance and applications explained through origin of raw materials, transformation routes and products. Then, concepts as hierarchy, sequencing and integration are considered which helps in generating a sustainable and strategic design of biorefineries. Further, framework for biorefineries based on techno-economic, environmental and social aspects is analyzed with examples to show the applications. Finally, some mass, energy and economic indices are considered to assess the biorefinery sustainability and key challenges for future development of biorefineries. Key Features Presents current state-of the-art of the biorefineries design and analyses for in depth understanding of biofuels and biomaterials Explores conceptual design of processes Concepts discussed with strong engineering approach, including design strategies and techno-economic analyses Includes bio-based materials, natural products and food products in the biorefinery concept Presentation of structured method to calculate indices of performance of biorefineries

Energy security, economic prosperity and environmental protection are challenges for all countries. They are particularly pressing in the transportation sector which still relies almost exclusively on oil. The use of hydrogen as an energy carrier and fuel cells as motive devices in transportation and energy distribution systems are possible solutions. This book provides an analysis of policy responses and hurdles and business opportunities. Information regarding the latest R&D, policy initiatives and private sector plans are assessed from the perspective of the rapidly changing global energy system in the next half century.

Natural gas is playing an increasing role in meeting world energy demands because of its abundance, versatility, and its clean burning nature. As a result, lots of new gas exploration, field development and production activities are under way, especially in places where natural gas until recently was labeled as “stranded . Because a significant portion of natural gas reserves worldwide are located across bodies of water, gas transportation in the form of LNG or CNG becomes an issue as well. Finally natural gas is viewed in comparison to the recently touted alternatives. Therefore, there is a need to have a book covering all the unique aspects and challenges related to natural gas from the upstream to midstream and downstream. All these new issues have not been addressed in depth in any existing book. To bridge the gap, Xiuli Wang and Michael Economides have written a new book called Advanced Natural Gas Engineering. This book will serve as a reference for all engineers and professionals in the energy business. It can also be a textbook for students in petroleum and chemical engineering curricula and in training departments for a large group of companies.

This book offers comprehensive coverage of the design, analysis, and operational aspects of biomass gasification, the key technology enabling the production of biofuels from all viable sources--some examples being sugar cane and switchgrass. This versatile resource not only explains the basic principles of energy conversion systems, but also provides valuable insight into the design of biomass

gasifiers. The author provides many worked out design problems, step-by-step design procedures and real data on commercially operating systems. After fossil fuels, biomass is the most widely used fuel in the world. Biomass resources show a considerable potential in the long term if residues are properly handled and dedicated energy crops are grown. Includes step-by-step design procedures and case studies for Biomass Gasification Provides worked process flow diagrams for gasifier design. Covers integration with other technologies (e.g. gas turbine, engine, fuel cells)

Winner of the 2017 JPBM Communications Award for Expository and Popular Books. “A delightful meta-biography--playful indeed--of a brilliant iconoclast.” --James Gleick, author of The Information John Horton Conway is a singular mathematician with a lovely loopy brain. He is Archimedes, Mick Jagger, Salvador Dali, and Richard Feynman all rolled into one--he boasts a rock star's charisma, a slyly bent sense of humor, a polymath's promiscuous curiosity, and an insatiable compulsion to explain everything about the world to everyone in it. At Cambridge, Conway wrestled with "Monstrous Moonshine," discovered the aptly named surreal numbers, and invented the cult classic Game of Life--more than just a cool fad, Life demonstrates how simplicity generates complexity and provides an analogy for mathematics and the entire universe. As a "mathemagician" at Princeton, he used ropes, dice, pennies, coat hangers, even the occasional Slinky, as props to extend his winning imagination and share his many nerdish delights. He granted Roberts full access to his idiosyncrasies and intellect both, though not without the occasional grumble: "Oh hell," he'd say. "You're not going to put that in the book. Are you?!?"

This report was produced by the Working Group on biofuels of the International Panel for Sustainable Resource Managemet. it provides an overview of the key problems and perspectives toward sustainable production and use of biofuels. it is based on an extensive literature study, taking into account recent major reviews. The focus is on so-called first generation biofuels while considering further lines of development. In the overall context of enhancing resource productivity, options for more efficient and sustainable production and use of biomass are examined. In particular, "modern biomass use" for energetic purposes, such as biomass used for (co-)generation of heat and power and liquid biofuels for transport, are addressed and related To The use of biomass for food and material purposes. Whereas improving the efficiency of biomass production plays a certain role towards enhancing sustainability, progress will ultimately depend on a more efficient use of biotic (and abiotic) resources (incl. For instance an increased fuel economy of car fleets), although a full consideration of all relevant strategies towards this end (e.g changing diets high in animal based foods and reducing food losses) is beyond the scope of this report.

The demand for energy consumption is increasing rapidly. To avoid the impending energy crunch, more producers are switching from oil to natural gas. While natural gas engineering is well documented through many sources, the computer applications that provide a crucial role in engineering design and analysis are not well published, and emerging technologies, such as shale gas drilling, are generating more advanced applications for engineers to utilize on the job. To keep producers updated, Boyun Guo and Ali Ghalambor have enhanced their best-selling manual, Natural Gas Engineering Handbook, to continue to provide upcoming and practicing engineers the full scope of natural gas engineering with a computer-assisted approach. This must-have handbook includes: A focus on real-world essentials rather than theory Illustrative examples throughout the text Working spreadsheet programs for all the engineering calculations on a free and easy to use companion site Exercise problems at the end of every chapter, including newly added questions utilizing the spreadsheet programs Expanded sections covering today’s technologies, such as multi-fractured horizontal wells and shale gas wells

The new Xam Idea for Class XII Physics 2020-21 has been thoroughly revised, diligently designed, and uniquely formatted in accordance with CBSE requirements and NCERT guidelines. The features of the new Xam Idea are as follows: 1. The book has been thoroughly revised as per the new CBSE Examination Paper design. 2. The book is divided into two Sections: Part–A and Part–B. 3. Part–A includes the following: · Each Chapter is summarised in ‘Basic Concepts’. · Important NCERT Textbook and NCERT Exemplar questions have been incorporated. · Previous Years’ Questions have been added under different sections according to their marks. · Objective Type Questions have been included as per new CBSE guidelines. These include Multiple Choice Questions, Very Short Answer Questions, and Fill in the Blanks carrying 1 mark each. · Short Answer Questions carrying 2 marks each and Long Answer Questions carrying 3 marks and 5 marks have also been added. · At the end of every chapter, Self-Assessment Test has been given to test the extent of grasp by the student. 4. Part–B includes the following: · CBSE Sample Question Paper 2020 with complete solution. · Blueprint as per latest CBSE Sample Question Paper and Examination Paper 2020. · Unsolved Model Question Papers for ample practice by the student. · Solved CBSE Examination Papers 2020 (55/1/1), (55/1/2) and (55/1/3). · Solved sets of remaining four regions’ CBSE Examination Papers are given in QR code.

The “bioelectronic nose”, the device which has a similar function to the human smell sensing system, can be realized by combining the olfactory cells or receptors with nanotechnology. In the last two decades, much has been learned about the smell sensing mechanism in biological systems. With knowledge about the biological olfactory system and the techniques for the expression of biological receptor proteins, we are able to utilize biological materials and systems to mimic the biological olfactory system. In addition to the advances in biological and biotechnological area, nanotechnology has progressed to a great degree. The bioelectronic nose is a good example of the integration of biotechnology and nanotechnology. This book describes basic biological sciences of the olfactory system, biotechnology for the production of olfactory biological elements, and nanotechnology for the development of various sensing devices. The purpose of this book is to provide the reader with a concept, basic sciences, fundamental technologies, applications, and perspectives of the bioelectronic nose.

Carbon Dioxide Utilisation: Closing the Carbon Cycle explores areas of application such as conversion to fuels, mineralization, conversion to polymers, and artificial photosynthesis as well as assesses the potential industrial suitability of the various processes. After an introduction to the thermodynamics, basic reactions, and physical chemistry of carbon dioxide, the book proceeds to examine current commercial and industrial processes, and the potential for carbon dioxide as a green and sustainable resource. While carbon dioxide is generally portrayed as a "bad" gas, a waste product, and a major contributor to global warming, a new branch of science is developing to convert this "bad" gas into useful products. This book explores the science behind converting CO2 into fuels for our cars and planes, and for use in plastics and foams for our homes and cars, pharmaceuticals, building materials, and many more useful products. Carbon dioxide utilization is a rapidly expanding area of research that holds a potential key to sustainable, petrochemical-free chemical production and energy integration. Accessible and balanced between chemistry, engineering, and industrial applications Informed by blue-sky thinking and realistic possibilities for future technology and applications Encompasses supply chain sustainability and economics, processes, and energy integration

#1 WALL STREET JOURNAL BESTSELLER * NEW YORK TIMES BESTSELLER New York Times finance editor David Enrich's explosive exposé of the most scandalous bank in the world, revealing its shadowy ties to Donald Trump, Putin's Russia, and Nazi Germany “A jaw-dropping financial thriller” —Philadelphia Inquirer On a rainy Sunday in 2014, a senior executive at Deutsche Bank was found hanging in his London apartment. Bill Broeksmit had helped build the 150-year-old financial institution into a global colossus, and his sudden death was a mystery, made more so by the bank’s efforts to deter investigation. Broeksmit, it turned out, was a man who knew too much. In Dark Towers, award-winning journalist David Enrich reveals the truth about Deutsche Bank and its epic path of devastation. Tracing the bank’s history back to its propping up of a default-prone American developer in the 1880s, helping the Nazis build Auschwitz, and wooing Eastern Bloc authoritarians, he shows how in the 1990s, via a succession of hard-charging executives, Deutsche made a fateful decision to pursue Wall Street riches, often at the expense of ethics and the law. Soon, the bank was manipulating markets, violating

international sanctions to aid terrorist regimes, scamming investors, defrauding regulators, and laundering money for Russian oligarchs. Ever desperate for an American foothold, Deutsche also started doing business with a self-promoting real estate magnate nearly every other bank in the world deemed too dangerous to touch: Donald Trump. Over the next twenty years, Deutsche executives loaned billions to Trump, the Kushner family, and an array of scandal-tarred clients, including convicted sex offender Jeffrey Epstein. Dark Towers is the never-before-told saga of how Deutsche Bank became the global face of financial recklessness and criminality—the corporate equivalent of a weapon of mass destruction. It is also the story of a man who was consumed by fear of what he'd seen at the bank—and his son's obsessive search for the secrets he kept.

Production Processes of Renewable Aviation Fuel: Present Technologies and Future Trends presents the available production processes for renewable aviation fuel, including the application of intensification and energy integration strategies. Despite biofuels have gained a lot of interest in the last years, renewable aviation fuel is one of the less studied. In the last ten years, there has been an incredible growth in the number of patents and articles related with its production processes. Several transformation pathways have been proposed, and new ones have been outlined. The book contains the main information about the production processes of renewable aviation fuel, considering international standards, available technologies, and recent scientific contributions. It also outlines the motivation for the development of renewable aviation fuel, and its main processing pathways from the different renewable raw materials. In addition, the application of intensification and energy integration strategies is presented, along with the identified future trends in this area Includes the motivation for the development of renewable aviation fuel and applicable standards Describes the processing pathways from biomass to produce renewable aviation fuel Presents the application of intensification and energy integration strategies for the production of renewable aviation fuel The future trends in the production processes of renewable aviation fuel are discussed

Large U.S. coal reserves and viable technology make promising a domestic industry producing liquid fuels from coal. Weighing benefits, costs, and environmental issues, a productive and robust U.S. strategy is to promote a limited amount of early commercial experience in coal-to-liquids production and to prepare the foundation for managing associated greenhouse-gas emissions, both in a way that reduces uncertainties and builds future capabilities.

This book outlines the methodologies, approaches and tools for modelling chemicals in a Life Cycle Assessment (LCA) perspective, and also covers the main advantages and drawbacks of applying LCA to chemical processes. In the first part of this book, authors pay close attention to the limitations of modelling the environmental and social impacts of chemical processes, providing valuable insights to the problems of the Life Cycle Inventory (LCI) analysis for chemical processes. In the second part of this book, readers will learn about the LCA application to chemical processes in the laboratory and industrial scale. In each chapter of this book, readers will also find specific case studies on the modelling and application of LCA in the chemical industry.

Fischer-Tropsch Technology is a unique book for its state-of-the-art approach to Fischer Tropsch (FT) technology. This book provides an explanation of the basic principles and terminology that are required to understand the application of FT technology. It also contains comprehensive references to patents and previous publications. As the first publication to focus on theory and application, it is a contemporary reference source for students studying chemistry and chemical engineering. Researchers and engineers active in the development of FT technology will also find this book an invaluable source of information. * Is the first publication to cover the theory and application for modern Fischer Tropsch technology * Contains comprehensive knowledge on all aspects relevant to the application of Fischer Tropsch technology * No other publication looks at past, present and future applications

A leading hedge-fund industry insider reveals the secrets and lessons of such top investors as John Paulson, David Tepper and Bill Ackman, sharing tangible, analytical insight into the psychology of trading while providing coverage of a range of strategy types, from Long/Short and Value to Distressed and Commodities.

NEW YORK TIMES BESTSELLER Shortlisted for the Financial Times/McKinsey Business Book of the Year Award The unbelievable story of a secretive mathematician who pioneered the era of the algorithm--and made $23 billion doing it. Jim Simons is the greatest money maker in modern financial history. No other investor--Warren Buffett, Peter Lynch, Ray Dalio, Steve Cohen, or George Soros--can touch his record. Since 1988, Renaissance's signature Medallion fund has generated average annual returns of 66 percent. The firm has earned profits of more than $100 billion; Simons is worth twenty-three billion dollars. Drawing on unprecedented access to Simons and dozens of current and former employees, Zuckerman, a veteran Wall Street Journal investigative reporter, tells the gripping story of how a world-class mathematician and former code breaker mastered the market. Simons pioneered a data-driven, algorithmic approach that's sweeping the world. As Renaissance became a market force, its executives began influencing the world beyond finance. Simons became a major figure in scientific research, education, and liberal politics. Senior executive Robert Mercer is more responsible than anyone else for the Trump presidency, placing Steve Bannon in the campaign and funding Trump's victorious 2016 effort. Mercer also impacted the campaign behind Brexit. The Man Who Solved the Market is a portrait of a modern-day Midas who remade markets in his own image, but failed to anticipate how his success would impact his firm and his country. It's also a story of what Simons's revolution means for the rest of us.

Taking greater advantage of powerful computing capabilities over the last several years, the development of fundamental information and new models has led to major advances in nearly every aspect of chemical engineering. Albright's Chemical Engineering Handbook represents a reliable source of updated methods, applications, and fundamental concepts that will continue to play a significant role in driving new research and improving plant design and operations. Well-rounded, concise, and practical by design, this handbook collects valuable insight from an exceptional diversity of leaders in their respective specialties. Each chapter provides a clear review of basic information, case examples, and references to additional, more in-depth information. They explain essential principles, calculations, and issues relating to topics including reaction engineering, process control and design, waste disposal, and electrochemical and biochemical engineering. The final chapters cover aspects of patents and intellectual property, practical communication, and ethical considerations that are most relevant to engineers. From fundamentals to plant operations, Albright's Chemical Engineering Handbook offers a thorough, yet succinct guide to day-to-day methods and calculations used in chemical engineering applications. This handbook will serve the needs of practicing professionals as well as students preparing to enter the field.

Skyrocketing energy costs have spurred renewed interest in coal gasification. Currently available information on this subject needs to be updated, however, and focused on specific coals and end products. For example, carbon capture and sequestration, previously given little attention, now has a prominent role in coal conversion processes. This book approaches coal gasification and related technologies from a process engineering point of view, with topics chosen to aid the process engineer who is interested in a complete, coal-to-products system. It provides a perspective for engineers and scientists who analyze and improve components of coal conversion processes. The first topic describes the nature and availability of coal. Next, the fundamentals of gasification are described, followed by a description of gasification technologies and gas cleaning processes. The conversion of syngas to electricity, fuels and chemicals is

then discussed. Finally, process economics are covered. Emphasis is given to the selection of gasification technology based on the type of coal fed to the gasifier and desired end product: E.g., lower temperature gasifiers produce substantial quantities of methane, which is undesirable in an ammonia synthesis feed. This book also reviews gasification kinetics which is informed by recent papers and process design studies by the US Department of Energy and other groups, and also largely ignored by other gasification books. • Approaches coal gasification and related technologies from a process engineering point of view, providing a perspective for engineers and scientists who analyze and improve components of coal conversion processes • Describes the fundamentals of gasification, gasification technologies, and gas cleaning processes • Emphasizes the importance of the coal types fed to the gasifier and desired end products • Covers gasification kinetics, which was largely ignored by other gasification books Provides a perspective for engineers and scientists who analyze and improve components of the coal conversion processes Describes the fundamentals of gasification, gasification technologies, and gas cleaning processes Covers gasification kinetics, which was largely ignored by other gasification books

Presently, energy and the environment are closely related issues throughout the world. The indiscriminate use of fossil fuels has resulted in adverse effects on the environment (i.e, excessive production of greenhouse gases, pollution of underground and superficial waters, soil contamination). The international reserves of crude oil are declining, and some pessimistic references refer to an important detriment in the annual oil availability for 2050. Because of these facts, the necessity to develop novel sources of energy, especially fuels from sustainable sources, is mandatory. Such alternative sources of energy (i.e. wind, solar, biomass, hydraulic) are potential renewable sources capable of changing the paradigm of productive activities around the world. In many cases, the energy production processes include resources commonly available or even the use of materials that are considered waste (i.e., wastewaters, agriculture residues, urban solid wastes). Despite all the desirable characteristics involved, the processes included in the generation of renewable energy may not only positively impact the environment, but may also cause harm on surrounding areas. However, to our knowledge, relatively few works have been published carrying out this type of environmental cost-benefit analysis.

An inside tour of the incredible—and probably dangerous—plans to counteract the effects of climate change through experiments that range from the plausible to the fantastic David Battisti had arrived in Cambridge expecting a bloodbath. So had many of the other scientists who had joined him for an invitation-only workshop on climate science in 2007, with geoengineering at the top of the agenda. We can't take deliberately altering the atmosphere seriously, he thought, because there’s no way we'll ever know enough to control it. But by the second day, with bad climate news piling on bad climate news, he was having second thoughts. When the scientists voted in a straw poll on whether to support geoengineering research, Battisti, filled with fear about the future, voted in favor. While the pernicious effects of global warming are clear, efforts to reduce the carbon emissions that cause it have fallen far short of what’s needed. Some scientists have started exploring more direct and radical ways to cool the planet, such as: Pouring reflective pollution into the upper atmosphere Making clouds brighter Growing enormous blooms of algae in the ocean Schemes that were science fiction just a few years ago have become earnest plans being studied by alarmed scientists, determined to avoid a climate catastrophe. In Hack the Planet, Science magazine reporter Eli Kintisch looks more closely at this array of ideas and characters, asking if these risky schemes will work, and just how geoengineering is changing the world. Scientists are developing geoengineering techniques for worst-case scenarios. But what would those desperate times look like? Kintisch outlines four circumstances: collapsing ice sheets, megadroughts, a catastrophic methane release, and slowing of the global ocean conveyor belt. As incredible and outlandish as many of these plans may seem, could they soon become our only hope for avoiding calamity? Or will the plans of brilliant and well-intentioned scientists cause unforeseeable disasters as they play out in the real world? And does the advent of geoengineering mean that humanity has failed in its role as steward of the planet—or taken on a new responsibility? Kintisch lays out the possibilities and dangers of geoengineering in a time of planetary tipping points. His investigation is required reading as the debate over global warming shifts to whether humanity should Hack the Planet.

Diversification provides a well-known way of getting something close to a free lunch: by spreading money across different kinds of investments, investors can earn the same return with lower risk (or a much higher return for the same amount of risk). This strategy, introduced nearly fifty years ago, led to such strategies as index funds. What if we were all missing out on another free lunch that's right under our noses? In Lifecycle Investing, Barry Nalebuff and Ian Ayres - two of the most innovative thinkers in business, law, and economics - have developed tools that will allow nearly any investor to diversify their portfolios over time. By using leveraging when young - a controversial idea that sparked hate mail when the authors first floated it in the pages of Forbes - investors of all stripes, from those just starting to plan to those getting ready to retire, can substantially reduce overall risk while improving their returns. In Lifecycle Investing, readers will learn.

While strides are being made in the research and development of environmentally acceptable and more sustainable alternative fuels—including efforts to reduce emissions of air pollutants associated with combustion processes from electric power generation and vehicular transportation—fossil fuel resources are limited and may soon be on the verge of depletion in the near future. Measuring the correlation between quality of life, energy consumption, and the efficient utilization of energy, the Handbook of Alternative Fuel Technologies, Second Edition thoroughly examines the science and technology of alternative fuels and their processing technologies. It focuses specifically on environmental, technoeconomic, and socioeconomic issues associated with the use of alternative energy sources, such as sustainability, applicable technologies, modes of utilization, and impacts on society. Written with research and development scientists and engineers in mind, the material in this handbook provides a detailed description and an assessment of available and feasible technologies, environmental health and safety issues, governmental regulations, and issues and agendas for R&D. It also includes alternative energy networks for production, distribution, and consumption. What’s New in This Edition: Contains several new chapters of emerging interest and updates various chapters throughout Includes coverage of coal gasification and liquefaction, hydrogen technology and safety, shale fuel by hydraulic fracturing, ethanol from lignocellulosics, biodiesel, algae fuels, and energy from waste products Covers statistics, current concerns, and future trends A single-volume complete reference, the Handbook of Alternative Fuel Technologies, Second Edition contains relevant information on chemistry, technology, and novel approaches, as well as scientific foundations for further enhancements and breakthroughs. In addition to its purposes as a handbook for practicing scientists and engineers, it can also be used as a textbook or as a reference book on fuel science and engineering, energy and environment, chemical process design, and energy and environmental policy.