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Advances in Cleaner Production - Biagio F. Giannetti 2015-03-05
Cleaner Production is an emerging field of research that comprises concepts and methodologies from different disciplines in a problem-oriented manner. Research efforts are often concentrated in a variety of sectoral domains; and, for understanding the global change which embraces a variety of processes on several scales, a variety of

environmental and sustainability aspects can be addressed. This book brings contributions from researchers that participated in editions of the International Workshop Advances in Cleaner Production (www.advancesincleanerproduction.net) held in São Paulo, Brazil. The book includes contributions from researchers from various countries for the development of Cleaner Production. Divided into three sections, the book addresses national experiences for the implementation of CP programs, research related to the metrics used to assess the effects of CP initiatives in the production sector and discussions that emerge before and after the implementation of these programs. Methodological approaches presented can be useful in the design and management of production systems, for policy development, environmental risk reduction, and prevention/mitigation strategies.

Pyrolysis of Biomass - Shurong Wang 2016-12-05
With the development of societies fossil energy is no longer the only energy resource, and increasing attention had been paid to alternative energy. Biomass is considered to be one of the alternatives due to efficiency and low cost. This book presents biomass pyrolysis behavior for three main components: Cellulose, Hemicellulose and Lignin, and discusses the influence of mineral salts , zeolite catalysts and metal oxide on their pyrolysis.

Biotechnology: Prospects and Applications - R.K. Salar 2014-02-06
Biotechnology: Prospects and Applications covers the review of recent developments in biotechnology and international authorship presents global issues that help in our understanding of the role of biotechnology in solving important scientific and societal problems for the benefit of mankind and environment. A balanced coverage of basic molecular

biology and practical applications, relevant examples, colored illustrations, and contemporary applications of biotechnology provide students and researchers with the tools and basic knowledge of biotechnology. In our effort to introduce students and researchers to cutting edge techniques and applications of biotechnology, we dedicated specific chapters to such emerging areas of biotechnology as Emerging Dynamics of Brassinosteroids Research, Third generation green energy, Bioremediation, Metal Organic Frameworks: New smart materials for biological application, Bioherbicides, Biosensors, Fetal Mesenchymal Stem Cells and Animal forensics. Biotechnology: Prospects and Applications will be highly useful for students, teachers and researchers in all disciplines of life sciences, agricultural sciences, medicine, and biotechnology in universities, research stations and biotechnology companies. The book features broader aspects of the role of biotechnology in human endeavor. It also presents an overview of prospects and applications while emphasizing modern, cutting-edge, and emerging areas of biotechnology. Further, it provides the readers with a comprehensive knowledge of topics in food and agricultural biotechnology, microbial biotechnology, environmental biotechnology and animal biotechnology. The chapters have been written with special reference to the latest developments in above broader areas of biotechnology that impact the biotechnology industry. A list of references at the end of each chapter is provided for the readers to learn more about a particular topic. Typically, these references include basic research, research papers, review articles and articles from the popular literature.

Refining Biomass Residues for Sustainable Energy and Bioproducts - R. Praveen Kumar 2019-11-08

The utilization of various types

of biomass residue to produce products such as biofuels and biochemicals means biorefinery technology using biomass residues may become a one-stop solution to the increasing need for sustainable, non-fossil sources of energy and chemicals. Refining Biomass Residues for Sustainable Energy and Bioproducts: Technology, Advances, Life Cycle Assessment and Economics focuses on the various biorefineries currently available and discusses their uses, challenges, and future developments. This book introduces the concept of integrated biorefinery systems, as well as their operation and feedstock sourcing. It explores the specificities, current developments, and potential end products of various types of residue, from industrial and municipal to agricultural and marine, as well as residue from food industries. Sustainability issues are discussed at length, including life cycle assessment, economics, and cost analysis of different biorefinery models. In addition, a number of global case studies examine successful experiences in different regions. This book is an ideal resource for researchers and practitioners in the field of bioenergy and waste management who are looking to learn about technologies involved in residue biorefinery systems, how to reduce their environmental impacts, and how to ensure their commercial viability. Explores a range of different biorefinery categories, such as industrial, agricultural, and marine biomass residues Includes a Life Cycle Assessment of biorefinery models, in addition to costs and market analysis. Features case studies from around the world and is written by an international team of authors

Source Separation and Decentralization for Wastewater Management - Tove A. Larsen 2013-02-01

Is sewer-based wastewater treatment really the optimal technical solution in urban water management? This paradigm is increasingly being

questioned. Growing water scarcity and the insight that water will be an important limiting factor for the quality of urban life are main drivers for new approaches in wastewater management. Source Separation and Decentralization for Wastewater Management sets up a comprehensive view of the resources involved in urban water management. It explores the potential of source separation and decentralization to provide viable alternatives to sewer-based urban water management. During the 1990s, several research groups started working on source-separating technologies for wastewater treatment. Source separation was not new, but had only been propagated as a cheap and environmentally friendly technology for the poor. The novelty was the discussion whether source separation could be a sustainable alternative to existing end-of-pipe systems, even in urban areas and industrialized countries. Since then, sustainable resource management and many different source-separating technologies have been investigated. The theoretical framework and also possible technologies have now developed to a more mature state. At the same time, many interesting technologies to process combined or concentrated wastewaters have evolved, which are equally suited for the treatment of source-separated domestic wastewater. The book presents a comprehensive view of the state of the art of source separation and decentralization. It discusses the technical possibilities and practical experience with source separation in different countries around the world. The area is in rapid development, but many of the fundamental insights presented in this book will stay valid. Source Separation and Decentralization for Wastewater Management is intended for all professionals and researchers interested in wastewater management, whether or not they are

familiar with source separation. Editors: Tove A. Larsen, Kai M. Udert and Judit Lienert, Eawag - Swiss Federal Institute of Aquatic Science and Technology, Switzerland. Contributors: Yuval Alfiya, Technion - Israel Institute of Technology, Faculty of Civil and Environmental Engineering; Prof. Dr. M. Bruce Beck, University of Georgia, Warnell School of Forestry and Natural Resources; Dr. Christian Binz, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Innovation Research in Utility Sectors (Cirus); Prof. em. Dr. Markus Boller, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Department of Urban Water Management (SWW); Prof. Dr. Eran Friedler, Technion – Israel Institute of Technology, Faculty of Civil and Environmental Engineering; Zenah Bradford-Hartke, The University of New South Wales, School of Chemical Engineering and UNESCO Centre for Membrane Science and Technology; Dr. Shelley Brown-Malker, Very Small Particle Company Ltd; Bert Bundervoet, Ghent University, Laboratory Microbial Ecology and Technology (LabMET); Prof. Dr. David Butler, University of Exeter, Centre for Water Systems; Dr. Christopher A. Buzie, Hamburg University of Technology, Institute of Wastewater Management and Water Protection; Dr. Dana Cordell, University of Technology, Sydney (UTS), Institute for Sustainable Futures (ISF); Dr. Vasileios Diamantis, Democritus University of Thrace, Department of Environmental Engineering; Prof. Dr. Jan Willem Erisman, Louis Bolk Institute; VU University Amsterdam, Department of Earth Sciences; Barbara Evans, University of Leeds, School of Civil Engineering; Prof. Dr. Malin Falkenmark, Stockholm International Water Institute; Dr. Ted Gardner, Central Queensland University, Institute for Resource Industries and Sustainability; Dr. Heiko Gebauer, Eawag,

Swiss Federal Institute of Aquatic Science and Technology, Innovation Research in Utility Sectors (Cirus); Prof. em. Dr. Willi Gujer, Swiss Federal Institute of Technology Zürich (ETHZ), Department of Civil, Environmental and Geomatic Engineering (BAUG); Prof. Dr. Bruce Jefferson, Cranfield University, Cranfield Water Science Institute; Prof. Dr. Paul Jeffrey, Cranfield University, Cranfield Water Science Institute; Sarina Jenni, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Process Engineering Department (Eng); Prof. Dr. Håkan Jönsson, SLU - Swedish University of Agricultural Sciences, Department of Energy and Technology; Prof. Dr. Ïsik Kabdasli, Ïstanbul Technical University, Civil Engineering Faculty; Prof. Dr. Jörg Keller, The University of Queensland, Advanced Water Management Centre (AWMC); Prof. Dr. Klaus Kömmerer, Leuphana Universität Lüneburg, Institute of Sustainable and Environmental Chemistry; Dr. Katarzyna Kujawa-Roeleveld, Wageningen University, Agrotechnology and Food Sciences Group; Dr. Tove A. Larsen, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Department of Urban Water Management (SWW); Michele Laureni, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Process Engineering Department (Eng); Prof. Dr. Gregory Leslie, The University of New South Wales, School of Chemical Engineering and UNESCO Centre for Membrane Science and Technology; Dr. Harold Leverenz, University of California at Davis, Department of Civil and Environmental Engineering; Dr. Judit Lienert, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Department of Environmental Social Sciences (ESS); Prof. Dr. Jürg Londong, Bauhaus-Universität Weimar, Department of Urban Water Management and Sanitation; Dr. Christoph Lüthi, Eawag, Swiss Federal Institute of

Aquatic Science and Technology, Water and Sanitation in Developing Countries (Sandec); Prof. Dr. Max Maurer, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Department of Urban Water Management (SWW); Swiss Federal Institute of Technology Zürich (ETHZ), Department of Civil, Environmental and Geomatic Engineering; Prof. em. Dr. Gustaf Olsson, Lund University, Department of Measurement Technology and Industrial Electrical Engineering (MIE); Prof. Dr. Ralf Otterpohl, Hamburg University of Technology, Institute of Wastewater Management and Water Protection; Dr. Bert Palsma, STOWA, Dutch Foundation for Applied Water Research; Dr. Arne R. Panesar, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH; Prof. Dr. Bruce E. Rittmann, Arizona State University, Swette Center for Environmental Biotechnology; Prof. Dr. Hansruedi Siegrist, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Process Engineering Department (Eng); Dr. Ashok Sharma, Commonwealth Scientific and Industrial Research Organisation, Australia, Land and Water Division; Prof. Dr. Thor Axel Stenström, Stockholm Environment Institute, Bioresources Group; Norwegian University of Life Sciences, Department of Mathematical Science and Technology; Dr. Eckhard Störmer, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Innovation Research in Utility Sectors (Cirus); Bjartur Swart, STOWA, Dutch Foundation for Applied Water Research; MWH North Europe; Prof. em. Dr. George Tchobanoglous, University of California at Davis, Department of Civil and Environmental Engineering; Elizabeth Tilley, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Department of Water and Sanitation in Developing Countries (Sandec); Swiss Federal Institute of Technology Zürich (ETHZ),

Centre for Development and Cooperation (NADEL); Prof. Dr. Bernhard Truffer, Eawag, Swiss Federal Institute of Aquatic Science and Technology; Innovation Research in Utility Sectors (Cirus); Prof. Dr. Olcay Tünay, Ïstanbul Technical University, Civil Engineering Faculty; Dr. Kai M. Udert, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Process Engineering Department (Eng); Prof. em. Dr. Willy Verstraete, Ghent University, Laboratory Microbial Ecology and Technology (LabMET); Prof. Dr. Björn Vinnerås, SLU - Swedish University of Agricultural Sciences, Department of Energy and Technology; Prof. Dr. Urs von Gunten, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Department of Water Resources and Drinking Water (W+T); Ecole Polytechnique Fédérale de Lausanne (EPFL),School of Architecture, Civil and Environmental Engineering (ENAC); Prof. em. Dr. Peter A. Wilderer, Technische Universität München, Institute for Advanced Study; Prof. Dr. Jun Xia, Chinese Academy of Sciences (CAS), Center for Water Resources Research and Key Laboratory of Water Cycle and Related Surface Processes; Prof. Dr. Grietje Zeeman, Wageningen University, Agrotechnology and Food Sciences Group

Advances in Carbon Management Technologies - Subhas K. Sikdar 2021-02-01

Volume 2 of Advances in Carbon Management Technologies has 21 chapters. It presents the introductory chapter again, for framing the challenges that confront the proposed solutions discussed in this volume. Section 4 presents various ways biomass and biomass wastes can be manipulated to provide a low-carbon footprint of the generation of power, heat and co-products, and of recovery and reuse of biomass wastes for beneficial purposes. Section 5 provides potential carbon management solutions in urban and manufacturing

environments. This section also provides state-of the-art of battery technologies for the transportation sector. The chapters in section 6 deals with electricity and the grid, and how decarbonization can be practiced in the electricity sector. The overall topic of advances in carbon management is too broad to be covered in a book of this size. It was not intended to cover every possible aspect that is relevant to the topic. Attempts were made, however, to highlight the most important issues of decarbonization from technological viewpoints. Over the years carbon intensity of products and processes has decreased, but the proportion of energy derived from fossil fuels has been stubornly stuck at about 80%. This has occurred despite very rapid development of renewable fuels, because at the same time the use of fossil fuels has also increased. Thus, the challenges are truly daunting. It is hoped that the technology choices provided here will show the myriad ways that solutions will evolve. While policy decisions are the driving forces for technology development, the book was not designed to cover policy solutions.

Mathematical Modelling and Computer Simulation of Activated Sludge Systems - Jacek Makinia 2020-03-02 Mathematical Modelling and Computer Simulation of Activated Sludge Systems – Second Edition provides, from the process engineering perspective, a comprehensive and up-to-date overview regarding various aspects of the mechanistic (“white box”) modelling and simulation of advanced activated sludge systems performing biological nutrient removal. In the new edition of the book, a special focus is given to nitrogen removal and the latest developments in modelling the innovative nitrogen removal processes. Furthermore, a new section on micropollutant removal has been added. The focus of modelling has been shifting in the last years to models that can describe the performance of a whole plant

(plant-wide modelling). The expanded part of this new edition introduces models describing the most important processes interrelated with the mainstream activated sludge systems as well as models describing the energy balance, operating costs and environmental impact. The complex process evaluation, including minimization of energy consumption and carbon footprint, is in line with the present and future wastewater treatment goals. By combining a general introduction and a textbook, this book serves both intermediate and more experienced model users, both researchers and practitioners, as a comprehensive guide to modelling and simulation studies. The book can be used as a supplemental material at graduate and post-graduate levels of wastewater engineering/modelling courses.

Handbook of Climate Change Mitigation - Wei-Yin Chen 2011-12-21

There is a mounting consensus that human behavior is changing the global climate and its consequence could be catastrophic. Reducing the 24 billion metric tons of carbon dioxide emissions from stationary and mobile sources is a gigantic task involving both technological challenges and monumental financial and societal costs. The pursuit of sustainable energy resources, environment, and economy has become a complex issue of global scale that affects the daily life of every citizen of the world. The present mitigation activities range from energy conservation, carbon-neutral energy conversions, carbon advanced combustion process that produce no greenhouse gases and that enable carbon capture and sequestion, to other advanced technologies. From its causes and impacts to its solutions, the issues surrounding climate change involve multidisciplinary science and technology. This handbook will provide a single source of this information. The book will be divided into the following sections: Scientific Evidence of Climate Change

and Societal Issues, Impacts of Climate Change, Energy Conservation, Alternative Energies, Advanced Combustion, Advanced Technologies, and Education and Outreach.

Advances in Environmental Pollution Management: Wastewater Impacts and Treatment Technologies - Vinod Kumar 2020-12-05

Advances in Environmental Pollution Management: Wastewater Impacts and Treatment Technologies has been designed to bind novel knowledge of wastewater pollution-induced impacts on various aspects of our environment. The book also contains novel methods and tools for the monitoring and treatment of produced wastewater.

Hansen Solubility Parameters - Charles M. Hansen 2007-06-15

Hansen solubility parameters (HSPs) are used to predict molecular affinities, solubility, and solubility-related phenomena. Revised and updated throughout, Hansen Solubility Parameters: A User's Handbook, Second Edition features the three Hansen solubility parameters for over 1200 chemicals and correlations for over 400 materials including polymers, inorganic salts, and biological materials. To update his groundbreaking handbook with the latest advances and perspectives, Charles M. Hansen has invited five renowned experts to share their work, theories, and practical applications involving HSPs. New discussions include a new statistical thermodynamics approach for confirming existing HSPs and how they fit into other thermodynamic theories for polymer solutions. Entirely new chapters examine the prediction of environmental stress cracking as well as absorption and diffusion in polymers. Highlighting recent findings on interactions with DNA, the treatment of biological materials also includes skin tissue, proteins, natural fibers, and cholesterol. The book also covers the latest

applications of HSPs, such as ozone-safe “designer” solvents, protective clothing, drug delivery systems, and petroleum applications. Presenting a comprehensive survey of the theoretical and practical aspects of HSPs, Hansen Solubility Parameters, Second Edition concludes with a detailed discussion on the necessary research, future directions, and potential applications for which HSPs can provide a useful means of prediction in areas such as biological materials, controlled release applications, nanotechnology, and self-assembly.

Statistical Highlights of U.S. Agriculture - 2000

Green Materials for Wastewater Treatment - Mu. Naushad 2019-07-03

This book reviews health hazards associated with wastewater use and water pollutants. Chapters present applications of green materials made of agricultural waste, activated carbon and magnetic materials for wastewater treatment. The removal of toxic metals using algal biomass and the removal of toxic dyes using chitosan composite materials are also discussed. The book includes reviews on the removal of phenols, pesticides, and on the use of ionic liquid-modified activated carbon for the treatment of textile wastewater.

Fermentation Processes: Emerging and Conventional Technologies - Mohamed Koubaa 2021-02-11

Explores the use of conventional and novel technologies to enhance fermentation processes Fermentation Processes reviews the application of both conventional and emerging technologies for enhancing fermentation conditions, examining the principles and mechanisms of fermentation processes, the microorganisms used in bioprocesses, their implementation in industrial fermentation, and more. Designed for scientists and industry professionals alike, this authoritative and up-to-date volume describes how

non-conventional technologies can be used to increase accessibly and bioavailability of substrates by microorganisms during fermentation, which in turn promotes microbial growth and can improve processes and productivity across the agri-food, nutraceutical, pharmaceutical, and beverage industries. The text begins by covering the conventional fermentation process, discussing cell division and growth kinetics, current technologies and developments in industrial fermentation processes, the parameters and modes of fermentation, various culture media, and the impact of culture conditions on fermentation processes. Subsequent chapters provide in-depth examination of the use of emerging technologies—such as pulsed electric fields, ultrasound, high-hydrostatic pressure, and microwave irradiation—for biomass fractionation and microbial stimulation. This authoritative resource: Explores emerging technologies that shorten fermentation time, accelerate substrate consumption, and increase microbial biomass Describes enhancing fermentation at conventional conditions by changing oxygenation, agitation, temperature, and other medium conditions Highlights the advantages of new technologies, such as reduced energy consumption and increased efficiency Discusses the integration and implementation of conventional and emerging technologies to meet consumer and industry demand Offers perspectives on the future direction of fermentation technologies and applications Fermentation Processes: Emerging and Conventional Technologies is ideal for microbiologists and bioprocess technologists in need of an up-to-date overview of the subject, and for instructors and students in courses such as bioprocess technology, microbiology, new product development, fermentation, food processing, biotechnology, and bioprocess

engineering.

Application of Liquid Biofuels to Internal Combustion Engines - Soo-Young No 2020-02-17

This book provides a comprehensive overview of the application of liquid biofuels to internal combustion (IC) engines. Biofuels are one of the most promising renewable and sustainable energy sources. Particularly, liquid biofuels obtained from biomass could become a valid alternative to the use of fossil fuels in the light of increasingly stringent environmental constraints. In this book, the discussion is limited to liquid biofuels obtained from triglycerides and lignocellulose among the many different kinds of biomass. Several liquid biofuels from triglycerides, straight vegetable oil, biodiesel produced from inedible vegetable oil, hydrotreated vegetable oil, and pyrolytic oil have been selected for discussion, as well as biofuels from lignocellulose bio-oil, alcohols such as methanol, ethanol and butanol, and biomass-to-liquids diesel. This book includes three chapters on the application of methanol, ethanol and butanol to advanced compression ignition (CI) engines such as LTC, HCCI, RCCI and DF modes. Further, the application of other higher alcohols and other drop-in fuels such as DMF, MF, MTHF, and GVL are also discussed. The book will be a valuable resource for graduate students, researchers and engine designers who are interested in the application of alcohols and other biofuels in advanced CI engines, and also useful for alternative energy planners selecting biofuels for CI engines in the future.

Biodiesel - Ayhan Demirbas 2007-12-20

Biodiesel: A Realistic Fuel Alternative for Diesel Engines describes the production and characterization of biodiesel. The book also presents current experimental research work in the field, including techniques to reduce biodiesel's high viscosity. Researchers in renewable energy, as well as fuel engineers, will discover a

myriad of new ideas and promising possibilities.

Organic Waste Recycling: Technology, Management and Sustainability - Chongrak Polprasert 2017-06-15

This fourth edition of Organic Waste Recycling is fully updated with new material to create a comprehensive and accessible textbook: - New chapter on constructed wetlands for wastewater and faecal sludge stabilization. - New sections on: waste recycling vs. climate change and water; faecal sludge and its characteristics; hydrothermal carbonization technology; up-to-date environmental criteria and legislation and environmental risk assessment. - New case studies with emphasis on practices in both developed and developing countries have been included, along with more exercises at the end of chapters to help the readers understand the technical principles and their application. - Novel concepts and strategies of waste management are presented. - Up-to-date research findings and innovative technologies of waste recycling program are provided. This textbook is intended for undergraduate and graduate students majoring in environmental sciences and engineering as well as researchers, professionals and policy makers who conduct research and practices in the related fields. It is essential reading for experts in environmental science and engineering and sustainable waste reuse and recycling in both developed and developing countries.

Sugarcane-based Bioethanol - Banco Nacional de Desenvolvimento Econômico e Social (Brazil) 2008

Fossil Free Fuels - Maniruzzaman Bin A. Aziz 2019-10-24

Many approaches have been undertaken to mitigate global climate change, including the movement away from fossil fuels. Fossil Free Fuels: Trends in Renewable Energy examines several key topics, such as the utilization of biofuels as a

sustainable renewable resource, recycling and untapped waste-to-energy products, and other carbon-neutral strategies in various industries, such as the transportation, construction, and manufacturing sectors. It provides recent updates on the latest technologies, modeling, design, and technical aspects, as well as several practical case studies. The current world energy scenario is examined and various solutions to larger environmental problems are outlined in terms of the shift to more alternative energy sources. Features: Minimizes technical jargon in a straightforward style for a wider audience Discusses sustainable options for different industries, such as the use of green materials in the construction sector, biofuels for transportation, and many more Includes numerous illustrations, tables, and figures to aid in understanding This book serves as a practical reference for engineers, researchers, environmental consultants working in renewable energy industries, and students.

Ecosystem Services and River Basin Ecohydrology - Luis Chicharo 2015-07-17

This book provides an integrated analysis of the methodologies and main processes occurring at the entire river basin, from upstream until the coast, by merging the biological and hydrological processes with the social and economic components, thus providing an integrated framework for river basin management, integrating the ecohydrology approach with the ecosystem services concept.

Green Illusions - Ozzie Zehner 2012

We don’t have an energy crisis. We have a consumption crisis. And this book, which takes aim at cherished assumptions regarding energy, offers refreshingly straight talk about what’s wrong with the way we think and talk about the problem. Though we generally believe we can solve environmental problems with more energy—more solar cells,

wind turbines, and biofuels—alternative technologies come with their own side effects and limitations. How, for instance, do solar cells cause harm? Why can't engineers solve wind power's biggest obstacle? Why won't contraception solve the problem of overpopulation lying at the heart of our concerns about energy, and what will? This practical, environmentally informed, and lucid book persuasively argues for a change of perspective. If consumption is the problem, as Ozzie Zehner suggests, then we need to shift our focus from suspect alternative energies to improving social and political fundamentals: walkable communities, improved consumption, enlightened governance, and, most notably, women's rights. The dozens of first steps he offers are surprisingly straightforward. For instance, he introduces a simple sticker that promises a greater impact than all of the nation's solar cells. He uncovers why carbon taxes won't solve our energy challenges (and presents two taxes that could). Finally, he explores how future environmentalists will focus on similarly fresh alternatives that are affordable, clean, and can actually improve our well-being. Watch a book trailer.

Waste to Wealth - Reeta Rani Singhania 2017-12-07

This book focuses on value addition to various waste streams, which include industrial waste, agricultural waste, and municipal solid and liquid waste. It addresses the utilization of waste to generate valuable products such as electricity, fuel, fertilizers, and chemicals, while placing special emphasis on environmental concerns and presenting a multidisciplinary approach for handling waste. Including chapters authored by prominent national and international experts, the book will be of interest to researchers, professionals and policymakers alike.

Innovative Wastewater Treatment & Resource Recovery Technologies: Impacts on Energy, Economy

and Environment - Juan M. Lema 2017-06-15
This book introduces the 3R concept applied to wastewater treatment and resource recovery under a double perspective. Firstly, it deals with innovative technologies leading to: Reducing energy requirements, space and impacts; Reusing water and sludge of sufficient quality; and Recovering resources such as energy, nutrients, metals and chemicals, including biopolymers. Besides targeting effective C,N&P removal, other issues such as organic micropollutants, gases and odours emissions are considered. Most of the technologies analysed have been tested at pilot- or at full-scale. Tools and methods for their Economic, Environmental, Legal and Social impact assessment are described. The 3R concept is also applied to Innovative Processes design, considering different levels of innovation: Retrofitting, where novel units are included in more conventional processes; Re-Thinking, which implies a substantial flowsheet modification; and Re-Imagining, with completely new conceptions. Tools are presented for Modelling, Optimising and Selecting the most suitable plant layout for each particular scenario from a holistic technical, economic and environmental point of view.

Membrane Technologies for Biorefining - Alberto Figoli 2016-02-19
Membrane Technologies for Biorefining highlights the best practices needed for the efficient and environmentally-compatible separation techniques that are fundamental to the conversion of biomass to fuels and chemicals for use as alternatives to petroleum refining. Membrane technologies are increasingly of interest in biorefineries due to their modest energy consumption, low chemical requirements, and excellent separation efficiency. The book provides researchers in academia and industry with an authoritative overview of the

different types of membranes and highlights the ways in which they can be applied in biorefineries for the production of chemicals and biofuels. Topics have been selected to highlight both the variety of raw materials treated in biorefineries and the range of biofuel and chemical end-products. Presents the first book to focus specifically on membrane technologies in biorefineries Provides a comprehensive overview of the different types of membranes and highlight ways in which they can be applied in biorefineries for the production of chemicals and biofuels Topics selected highlight both the variety of raw materials treated using membranes in biorefineries and the range of biofuel and chemical end-products

Cleaner Combustion - Frédérique Battin-Leclerc 2013-09-06

This overview compiles the on-going research in Europe to enlarge and deepen the understanding of the reaction mechanisms and pathways associated with the combustion of an increased range of fuels. Focus is given to the formation of a large number of hazardous minor pollutants and the inability of current combustion models to predict the formation of minor products such as alkenes, dienes, aromatics, aldehydes and soot nano-particles which have a deleterious impact on both the environment and on human health. Cleaner Combustion describes, at a fundamental level, the reactive chemistry of minor pollutants within extensively validated detailed mechanisms for traditional fuels, but also innovative surrogates, describing the complex chemistry of new environmentally important bio-fuels. Divided into five sections, a broad yet detailed coverage of related research is provided. Beginning with the development of detailed kinetic mechanisms, chapters go on to explore techniques to obtain reliable experimental data, soot and polycyclic aromatic hydrocarbons, mechanism reduction and uncertainty

analysis, and elementary reactions. This comprehensive coverage of current research provides a solid foundation for researchers, managers, policy makers and industry operators working in or developing this innovative and globally relevant field.

Biodiesel Fuels Based on Edible and Nonedible Feedstocks, Wastes, and Algae - Ozcan Konur 2021-05-06

This second volume of the Handbook of Biodiesel and Petrodiesel Fuels presents a representative sample of the population papers in the field of feedstock-specific biodiesel fuels. The research on feedstocks for biodiesel fuels has first focused on the edible oils as first-generation biodiesel fuels. However, the public concerns about the competition with foods based on these feedstocks and adverse impact on the ecological diversity and deforestation have resulted in the exploration of nonedible-oil-based biodiesel fuels as second-generation biodiesel fuels in the first instance. Due to the ecological and cost benefits of treating wastes, waste oil-based biodiesel fuels as third-generation biodiesel fuels have emerged. Furthermore, following a series of influential review papers, the research has focused on the algal oil-based biodiesel fuels in recent years. Since the cost of feedstocks in general constitutes 85% of the total biodiesel production costs, the research focused more on improving biomass and lipid productivity in these research fields. Furthermore, since water, CO2, and nutrients (primarily N and P) have been major ingredients for the algal biomass and lipid production, the research has also intensified in the use of wastewaters and flue gases for algal biomass production to reduce the ecological burdens and the production costs. Part 1 presents a representative sample of the population papers in the field of edible oil-based biodiesel fuels covering major research fronts. It covers soybean oil-based biodiesel

fuels, palm oil-based biodiesel fuels, and rapeseed oil-based biodiesel fuels as case studies besides an overview paper. Part 2 presents a representative sample of the population papers in the field of nonedible oil-based biodiesel fuels covering major research fronts. It covers Jatropha oil-based biodiesel fuels, polanga oil-based biodiesel fuels, and moringa oil-based biodiesel fuels as case studies besides an overview paper. Part 3 presents a representative sample of the population papers in the field of waste oil-based biodiesel fuels covering major research fronts. It covers wastewater sludge-based biodiesel fuels, waste cooking oil-based biodiesel fuels, and microbial oil-based biodiesel fuels as case studies besides an overview paper. Part 4 presents a representative sample of the population papers in the field of algal oil-based biodiesel fuels covering major research fronts. It covers algal biomass production in general, algal biomass production in wastewaters, algal lipid production, hydrothermal liquefaction of algal biomass, algal lipid extraction, and algal biodiesel production besides an overview paper. This book will be useful to academics and professionals in the fields of Energy Fuels, Chemical Engineering, Physical Chemistry, Biotechnology and Applied Microbiology, Environmental Sciences, and Thermodynamics. Ozcan Konur is both a materials scientist and social scientist by training. He has published around 200 journal papers, book chapters, and conference papers. He has focused on the bioenergy and biofuels in recent years. In 2018, he edited 'Bioenergy and Biofuels', that brought together the work of over 30 experts in their respective field. He also edited 'Handbook of Algal Science, Technology, and Medicine' with a strong section on the algal biofuels in 2020.

Biodiesel Production Technologies - Jorge Mario Marchetti 2010

Biodiesel production is a very modern and technological area that is wining relevance and

market due to its benefits, such as that it is biodegradable, a renewable and alternative source of fuel with less pollutants and less particle pollution. Different studies have been carried out using various oils as raw material, different alcohol as well as different catalysts, homogeneous ones such as sodium hydroxide, potassium hydroxide, sulphuric acid and supercritical fluids, and heterogeneous ones such as solid resins and enzymes as well as new technologies that are being developed every day. This book discusses the global energy situation in regard to the biodiesel industry, as well as a specific focus on operational conditions, kinetics model and economic comparison in order to see if they could be used as profitable alternatives.

Sustainable Downstream Processing of Microalgae for Industrial Application - Kalyan Gayen 2019-09-05

Microalgae can be future resource for industrial biotechnology In current energy crisis era, microalgae are under tremendous research focus for the production of biodiesel due to their high photosynthetic efficiency, growth rate and high lipid content compared to territorial plants. However, the large-scale production of algal biomass and downstream processing of harvested algae towards bio-fuels are facing several challenges from economic viability perspective. Apart from bio-fuels, the microalgae synthesize number of bio-molecules such as pigments (e.g., chlorophyll, carotenoid), protein (e.g., lectin, phycobiliprotein), and carbohydrates (e.g., agar, carrageenan, alginate, fucodian) which are available in the various forms of microalgal products. Therefore, developing a strategy for large-scale production and use of algal biomass for the co-production of these value-added macromolecules is thus imperative for the improvement of the economics of algal biorefinery. In the above context, this book covers

three major areas (i) commercial-scale production of bio-molecules from microalgae, (ii) sustainable approach for industrial-scale operation, and (iii) optimization of downstream processes. Each of these sections is composed of several chapters written by the renowned academicians/industry experts. Furthermore, in this book, a significant weightage is given to the industry experts (around 50%) to enrich the industrial perspectives. We hope that amalgamate of fundamental knowledge from academicians and applied research information from industry experts will be useful for forthcoming implementation of a sustainable integrated microalgal biorefinery. This book highlights following. Explores biomolecules from microalgae and their applications Discusses microalgae cultivations and harvesting Examines downstream processing of biomolecules Explores sustainable integrated approaches for industrial scale operations Examines purification techniques specific for microalgal proteins, Omega 3 fatty Acids, carbohydrates, and pigments

Advances in Carbon Management Technologies - Subhas K. Sikdar 2021-02-01

Volume 2 of Advances in Carbon Management Technologies has 21 chapters. It presents the introductory chapter again, for framing the challenges that confront the proposed solutions discussed in this volume. Section 4 presents various ways biomass and biomass wastes can be manipulated to provide a low-carbon footprint of the generation of power, heat and co-products, and of recovery and reuse of biomass wastes for beneficial purposes. Section 5 provides potential carbon management solutions in urban and manufacturing environments. This section also provides state-of the-art of battery technologies for the transportation sector. The chapters in section 6 deals with electricity and the grid, and how decarbonization can be

practiced in the electricity sector. The overall topic of advances in carbon management is too broad to be covered in a book of this size. It was not intended to cover every possible aspect that is relevant to the topic. Attempts were made, however, to highlight the most important issues of decarbonization from technological viewpoints. Over the years carbon intensity of products and processes has decreased, but the proportion of energy derived from fossil fuels has been stubornly stuck at about 80%. This has occurred despite very rapid development of renewable fuels, because at the same time the use of fossil fuels has also increased. Thus, the challenges are truly daunting. It is hoped that the technology choices provided here will show the myriad ways that solutions will evolve. While policy decisions are the driving forces for technology development, the book was not designed to cover policy solutions.

Bioenergy Research: Revisiting Latest Development - Manish Srivastava 2021-03-22

This volume is second part of the five-part set on bioenergy research. This book provides new insight about the latest development in bioenergy research. It presents the various bioenergy options which are further explored for practical viability, their progress and utility in the industry. The main objective of the book is to provide insights into the opportunities and required actions for the development of an economically viable bioenergy industry for practical replacement of fossil fuels. This book is of interest to teachers, researchers, scientists, capacity builders and policymakers. Also the book serves as additional reading material for undergraduate and graduate students of environmental sciences. National and international bioenergy scientists, policy makers will also find this to be a useful read. Other four volumes of this set explore basic concepts, commercial

opportunities, waste to energy and integrated solution for bioenergy concerns.

Nutritional Biochemistry - Chad Cox 2015-06-01

This title includes a number of Open Access chapters. Nutrition is becoming ever more central to our understanding of metabolic processes. Nutritional biochemistry offers insight into the mechanisms by which diet influences human health and disease. This book focuses on five aspects of this complex field of study: nutritional genomics, clinical nutrition and biochemistry, vitamins and minerals, macronutrients and energy, and cell function and metabolism. Collected in this research compendium are recent studies within each of these topics. Each chapter contributes to a well-rounded and up-to-date picture of nutritional biochemistry. Appropriate for graduate-level and post-doctorate students, this book will stimulate further study into this important field of research.

Domestic Wastewater Treatment in Developing Countries - Duncan Mara 2013-06-17

Affordable and effective domestic wastewater treatment is a critical issue in public health and disease prevention around the world, particularly so in developing countries which often lack the financial and technical resources necessary for proper treatment facilities. This practical guide provides state-of-the-art coverage of methods for domestic wastewater treatment and provides a foundation to the practical design of wastewater treatment and re-use systems. The emphasis is on low-cost, low-energy, low-maintenance, high-performance 'natural' systems that contribute to environmental sustainability by producing effluents that can be safely and profitably used in agriculture for crop irrigation and/or in aquaculture, for fish and aquatic vegetable pond fertilization. Modern design methodologies, with worked design examples, are described for waste stabilization ponds,

wastewater storage and treatment reservoirs; constructed wetlands, upflow anaerobic sludge blanket reactors, biofilters, aerated lagoons and oxidation ditches. This book is essential reading for engineers, academics and upper-level and graduate students in engineering, wastewater management and public health, and others interested in sustainable and cost-effective technologies for reducing wastewater-related diseases and environmental damage.

Protein Functionality in Food Systems - Navam S. Hettiarachchy 1994-05-10

This volume examines the contributions of proteins to the technological and organoleptic characteristics of food. It provides a solid basis for understanding the principles of food protein functionality and offers information to help develop unique food products using proteins as novel ingredients. Properties such as solubility, viscosity, gelation, emulsification and loam formation are discussed.

Biofuels: Advances in Research and Applications - George R. Carey 2020-04-08

Biofuels: Advances in Research and Applications first explores previously studied supercritical processes for the production of biodiesel. Two of the main drawbacks of said processes are discussed: the high energy requirements and the hazards due to the conditions under which the processes are operated. The authors present a review of the experimental excess enthalpy of mixtures of dibutyl ether or butanol, with representative hydrocarbons. The most relevant functional groups of gasoline hydrocarbon types are considered: heptane, iso-octane, 1-hexene, cyclohexane, methylcyclohexane, benzene, and toluene. Continuing, this compilation briefly explores the production of biofuel from different edible and non-edible feedstock, mentioning the various types of homogeneous and heterogeneous acid or base catalysts applied for reactions. The benefits and drawbacks of biodiesel as

compared to diesel fuel are also described. Several yeasts are examined for their capability to produce xylanolytic enzymes that degrade xylan, the major polysaccharide in the hemicellulose structure. The production of hydrolytic enzymes for the enzymatic hydrolysis process is reported by optimizing lignocellulose degradation and increasing the yield of simple sugars.

Contemporary Environmental Issues and Challenges in Era of Climate Change - Pooja Singh 2019-11-16

Over the last few decades, unprecedented global population growth has led to increased demand for food and shelter. At the same time, extraction of natural resources beyond the Earth's resilience capacity has had a devastating effect on ecosystems and environmental health. Furthermore, climate change is having a significant impact in a number of areas, including the global hydrological cycle, ecosystem functioning, coastal vulnerability, forest ecology, food security, and agricultural sustainability. According to the Intergovernmental Panel on Climate Change (IPCC), only immediate and sustained action will prevent climate change causing irreversible and potentially catastrophic damage to our environment. This book presents various scientific views and concepts, research, reviews, and case studies on contemporary environmental issues in changing climate scenarios and highlights different adaptation measures. Increasing awareness of modern-day patterns of climate change, it addresses questions often raised by environmental scientists, researchers, policymakers and general readers.

Biocatalysis for Green Chemistry and Chemical Process Development - Junhua (Alex) Tao 2011-06-09

This book describes recent progress in enzyme-driven green syntheses of industrially important molecules. The first three introductory chapters overview recent technological

advances in enzymes and cell-based transformations, and green chemistry metrics for synthetic efficiency. The remaining chapters are directed to case studies in biotechnological production of pharmaceuticals (small molecules, natural products and biologics), flavors, fragrance and cosmetics, fine chemicals, value-added chemicals from glucose and biomass, and polymeric materials. The book is aimed to facilitate the industrial applications of this powerful and emerging green technology, and catalyze the advancement of the technology itself.

Waste-To-Energy - Abd El-Fatah Abomohra 2022

This book addresses the needs of students, researchers, as well as engineers and other professionals or readers interested in recent advances of biofuel and efficient waste management. In the context of energy consumption, over 85% of the total consumed energy comes from non-renewable fossil resources. Developing new renewable energy resources, especially biofuel production from wastes, has received increasing attention. The book is organized into three sections, namely Section I: Conventional waste management; Section II: From waste to green energy; and Section III: Case studies and future perspectives. Each section presents topic-specific chapters, which contain comprehensive and advanced knowledge of the subjects. Overall, the book covers the recent advances, breakthroughs, challenges, and future perspectives of waste-to-energy approach using different kinds of wastes as a feedstock for alternative biofuels and other integrated approaches such as wastewater treatment, plastic degradation, and CO2 sequestration in a cost-effective and eco-friendly way. In addition, different routes of waste recycling for enhanced biofuel production and case studies are presented with environmental and economic analysis. The presented case studies and

future perspectives under Section III complement the chapters as they are authored by experts from bioenergy businesses who actually encounter real-world problems.

Green Diesel - Mohammad Aslam 2022

This book covers the entire spectrum of green diesel and their applications in existing CI engines. This book discusses how a green diesel is a better fuel than biodiesel and petrodiesel and more suitable fuels for sustainable future development. The book begins with a concise overview of the fundamentals of the green diesel properties, preparation, and characterization of green diesel using hydroprocessing technology. The book covers recent developments in the domain of green diesel derived particularly from the second-/third-generation feedstocks. Various topics covered in this book include the catalysts involved in the processing of green diesel, characterization of the products as per ASTM/EN protocols. In addition, the book also illustrates characteristic features of green diesel and how it is different from biodiesel and petrodiesel. Other chapters cover performance and emission characteristics of green diesel in CI engines and techno-economic analysis. Moreover, the current status of green diesel industries is also incorporated. This book is of particular interest to graduate students and academic or industrial researchers/professionals working in the area of green diesel/green energy, bioenergy and mechanical, automobile, and chemical engineering. This book makes a forceful foundation for the establishment of green diesel refineries/biorefineries for a sustainable, cleaner, and greener future.

Biorefinery - Juan-Rodrigo Bastidas-Oyanedel 2019-04-15

This book discusses the biorefinery of biomass feedstocks. In-depth chapters highlight the scientific and technical aspects and present a techno-economic analysis of

such systems. By using a TEA approach, the authors present feasible pathways for conversion of biomass (both residual biomass, energy crops and algae biomass), showing the different possibilities for the production of biochemical materials, biofuels, and fertilizers. The concepts presented in this book will link companies, investors, and governments by providing a framework that will help reduce pollutants and create a biomass related economy that incorporates the newest developments and technologies in the area.

Water and Energy - Gustaf Olsson 2015-06-14

Rapid and important developments in the area of energy - water nexus over the last two to three years have been significant. This new edition of Water and Energy: Threats and Opportunities is timely and continues to highlight the inextricable link between water and energy, providing an up-to-date overview of the subject with helpful detailed summaries of the technical literature. Water and Energy has been up-dated throughout and major changes are: new chapters on global warming and fossil fuels, including shale gas and fracking; the consequences of the Deepwater Horizon accident in the Mexican Gulf and the Niger Delta oil spills; new developments in hydropower; and continued competition between food, water and energy. Water and Energy Threats and Opportunities, 2e creates an awareness of the important couplings between water and energy. It shows how energy is used in all the various water cycle operations and demonstrates how water is used and misused in all kinds of energy production and generation.Population increase, climate change and an increasing competition between food and fuel production create enormous pressures on both water and energy availability. Since there is no replacement for water, water security looks more crucial than energy security.

This is true not only in developing countries but also in the most advanced countries. For example, the western parts of the USA suffer from water scarcity that provides a real security threat. Part One of the book describes the water-energy nexus, the conflicts and competitions and the couplings between water security, energy security, and food security. Part Two captures how climate change, population increase and the growing food demand will have major impact on water availability in many countries in the world. Part Three describes water for energy and how energy production and conversion depend on water availability. As a consequence, all planning has to take both water and energy into consideration. The environmental (including water) consequences of oil and coal exploration and refining are huge, in North America as well as in the rest of the world. Furthermore, oil leak accidents have hit America, Africa, Europe as well as Asia. The consequences of hydropower are discussed and the competition between hydropower generation, flood control and water storage is illustrated. The importance of water for cooling thermal power plants is described, as this was so tragically demonstrated at the Fukushima nuclear plants in 2011. Climate change will further emphasize the strong coupling between water availability and the operation of power plants. Part Four analyses energy for water - how water production and treatment depend on energy. The book shows that a lot can be done to improve equipment, develop processes and apply advanced monitoring and control to save energy for water operations. Significant amounts of energy can be saved by better pumping, the reduction of leakages, controlled aeration in biological wastewater treatment, more efficient biogas production, and by improved desalination processes. There are 3

PowerPoint presentations available for Water and Energy - threats and opportunities, 2e. About the author Gustaf Olsson, Professor Em. in Industrial Automation, Lund University, Sweden Since 2006, Gustaf has been Professor Emeritus at Lund University, Sweden. Gustaf has devoted his research to control and automation in water systems, electrical power systems and process industries. From 2006 to 2008 he was part time professor in electrical power systems at Chalmers University of Technology, Sweden. He is guest professor at the Technical University of Malaysia (UTM) and at the Tsinghua University in Beijing, China and he is an honorary faculty member of the Exeter University in UK. Between 2005 and 2010 he was the editor-in-chief of the journals Water Science and Technology and Water Science and Technology/Water Supply, (IWA Publishing). From 2007 to 2010, he was a member of the IWA Board of Directors and in 2010 he received the IWA Publication Award. In 2012 he was the awardee of an Honorary Doctor degree at UTM and an Honorary Membership of IWA. Gustaf has guided 23 PhDs and a few hundred MSc students through their exams and has received the Lund University pedagogical award for distinguished achievements in the education". The Lund University engineering students elected him as the teacher of the year He has spent extended periods as a guest professor and visiting researcher at universities and companies in the USA, Australia and Japan and has been invited as a guest lecturer in 19 countries outside Sweden. He has authored nine books published in English, Russian, German and Chinese and and contributed with chapters in another 19 books as well as more than 170 scientific publications.

Algal Biofuels - Sanjay Kumar Gupta 2017-02-26

This edited volume focuses on comprehensive state-of-the-art information about the practical

aspects of cultivation, harvesting, biomass processing and biofuel production from algae. Chapters cover topics such as synthetic ecological engineering approaches towards sustainable production of biofuel feedstock, and algal biofuel production processes using wastewater. Readers will also discover more about the role of biotechnological engineering in improving ecophysiology, biomass and lipid yields. Particular attention is given to opportunities of commercialization of algal biofuels that provides a realistic assessment of various techno-economical aspects of pilot scale algal biofuel production. The authors also explore the pre-treatment of biomass, catalytic conversion of algal lipids and hydrothermal liquefaction with the biorefinery approach in detail. In a nut shell, this volume will provide a wealth of information based on a realistic evaluation of contemporary developments in algal biofuel research with an emphasis on pilot scale studies. Researchers studying and working in the areas of environmental science, biotechnology, genetic engineering and biochemistry will find this work instructive and informative.