

Water Treatment Jain And Jain

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Outlook Profit - 2008-10-03

Microbial Biofilms in Bioremediation and Wastewater Treatment - Y.V. Nancharaiiah 2019-10-18
Biofilms represent the natural living style of microbial communities and play a pivotal role in biogeochemical cycles and natural attenuation. Biofilms can be engineered for biodegradation and biotransformation of organic and inorganic contaminants, for both in situ bioremediation and ex situ treatment in bioreactors. This book focuses on microbial biofilms and their potential technological applications for sustainable development. It covers recent advances in biofilm technologies for contaminant remediation coupled to recovery of resources and serves as a complete reference on the science and technology behind biofilm mediated bioremediation and wastewater treatment.

Nanotechnology in Water and Wastewater Treatment - Amimul Ahsan 2018-11-15

Nanotechnology in Water and Waste Water Treatment: Theory and Applications explores the unique physicochemical and surface properties of nanoparticles and highlights the advantages they provide for engineering applications. Applications covered include the generation of fresh water from surface water and seawater, the prevention of the contamination of the environment, and the creation of effective and efficient methods for remediation of polluted waters. Each chapter covers a different nanotechnology-based approach and examines the basic principles, practical applications, recent breakthroughs and associated limitations. This book is ideal for researchers and professionals in the fields of nanotechnology, water treatment and desalination. In addition, it is also ideal for postgraduate students, industry and government professionals, managers and policymakers. Gathers together the latest research and developments in the field from journal articles and conference proceedings Discusses and evaluates the most economical and low cost treatment technologies Presents information from related fields on the applicability, strengths and weaknesses of particular nanomaterials in key applications, thus allowing for the continuation and expansion of research in a range of fields

Innovative Materials and Methods for Water Treatment - Marek Bryjak 2016-02-17

Due to increasing demand for potable and irrigation water, water suppliers have to use alternative resources. They either have to regenerate wastewater or deal with contaminated surface water. This book brings together the experiences of various experts in preparing of innovative materials that are selective for arsenic and chromium removal, and in

Israel and China - L. Friedfeld 2015-07-31

The relationship between Israel and Asia, which has evolved from strong historical ties symbolized by the Silk Road, today encompasses strategic partnerships in technology what we call the Innovation Highway. Israel and China are perfect partners in this new era of globalization. They share strong and complementary competitive advantages with Israel contributing technology and innovation and China providing robust financial and manufacturing capability. Landmark business transactions and other economic factors have given Israel a prominent position on the Asian investor road map. This book analyzes the strategic relationships, supported by deep historical, cultural and spiritual links, between Israel, China, and other Asian countries, bringing together Israels expertise in innovation and Asias global position as a center of business. These are highlighted and explained, together with the bilateral activity of Asian

companies in Israel and Israeli companies in Asia.

Waste Biorefinery - Thallada Bhaskar 2021-02-24

Waste Biorefinery: Value Addition through Resources Utilization provides scientific and technical information surrounding the most advanced and innovative processing technologies used for the conversion of biogenic waste to biofuels, energy products and biochemicals. The book covers recent developments and achievements in the field of biochemical, thermo-chemical and hybrid methods and the necessities and potentials generated by different kinds of residual streams, including biomass in presumably more decentralized biorefineries. An assortment of case-studies from developing and developed countries illustrate the topics presented, covering energy, chemicals, fuels, food for animal recovery from different waste matrices, and more. Finally, the advantages and limitations of different technologies are discussed, considering local energy demand, government policies, environmental impacts and education in bioenergy. This book will serve as an excellent resource for science graduates, chemical engineers, environmental engineers, biotechnologists and industrial experts in these areas. Provides information on the most advanced and innovative processes for biomass conversion Covers information on biochemical and thermochemical processes and product developments surrounding the principles of biorefining Presents information on the integration of processes and technologies for the production of biofuels, energy products and biochemicals

Wastewater Treatment - Maulin P. Shah 2022-02-16

Wastewater Treatment: Molecular Tools, Techniques, and Applications provides an insight about the application of different tools and technology for exploring microbial structure-function relationships that involved in WWTPs. From the present day consequence of alarming usable water crisis throughout the globe, an immediate action on water cycle is necessary. Along with other options the waste water recycling is one major opportunity to combat the future scarcity. The book aims to provide a comprehensive view of advanced emerging technologies for wastewater treatment, heavy metal removal, pesticide degradation, dye removal, waste management, microbial transformation of environmental contaminants, etc. It also describes different application of Omic tools in Waste water treatment plants (WWTPs),describes the role of microorganisms in WWTPs, points out the reuse of treated wastewater through emerging technologies, also includes the recovery of resources from wastewater and emphasizes on cutting edge molecular tools for WWTPs. We hope the content of the book will be very much usefull for the community who are directly associated in wastewater management research, people who are associated with environmental awarness programme and the students of UG and PG courses. Features: This book highlights the importance of molecular genomics, molecular biology techniques to sort out the problems faced by industrialist who operates wastewater treatment plant with the ever-increasing number of environmental pollutants. Describes application of different Omic tools in Wastewater treatment plants (WWTPs) Describes the role of microorganisms in WWTPs Points out the reuse of treated wastewater through emerging technologies. Includes the recovery of resources from wastewater Emphasizes on cutting edge molecular tools This book targets engineers, scientists and managers who require an excellent introduction and basic knowledge to the principles of molecular biology or molecular genomics in the area of wastewater treatment. Different professionals working or interested in the Environmental Microbiology or Bioremediation or Environmental

Genomics field. Students on Environmental Biotechnology/Microbiology.

Environmental Applications of Microbial Nanotechnology - Pardeep Singh 2022-11-01

Environmental Applications of Microbial Nanotechnology: Emerging Trends in Environmental Remediation discusses emerging trends and recent advancements in environmental remediation. The book provides environmental applications of microbial nanotechnology that helps readers understand novel microbial systems and take advantage of recent advances in microbial nanotechnologies. It highlights established research and technology on microbial nanotechnology's environmental applications, moves to rapidly emerging aspects and then discusses future research directions. The book provides researchers in academia and industry with a high-tech start-up that will revolutionize the modern environmental applications of microbial nanotechnology research. Provides the fundamentals of microbial nanotechnology in relation to environmental applications Addresses challenging impacts of microbial nanotechnology on the environment, human health, safety and sustainability Provides principles and advanced trends and approaches for environmental remediation Features real-time applications with case studies that illustrate how microbial nanotechnology influences modern sciences and technology

Microbial Synthesis of Chalcogenide Nanoparticles - Joyabrata Mal 2018-04-27

Recent years have seen a growing interest in the application of chalcogenide nanoparticles (NPs), e.g. Se, Te, CdSe and CdTe NPs, in various industrial sectors including energy, petroleum refining and in the field of biology and medicine. Moreover, due to the high toxicity of chalcogen oxyanions, their release into the environment is of great concern. Thus, emphasis was given in this study on the development of a novel microbial synthesis process of chalcogenide NPs by combining biological treatment of Se/Te containing wastewaters with biorecovery in the form of Se NPs, Te NPs and CdSe NPs. Enrichment of Se-oxyanion reducing microorganisms was carried out to simultaneously remove selenite (Se(IV)) and cadmium (Cd(II)) from wastewaters by combining bioremediation of toxic Se-rich wastewater with the biorecovery of Se as CdSe NPs. The results showed compositional changes in the extracellular polymeric substances (EPS) matrix of the anaerobic granular sludge upon exposure to Cd(II) and Se(IV) and identified the roles of EPS fractions in the biogenesis of CdSe NPs. Besides, it was found that the EPS on the surface of the biogenic Se NPs play a major role in lowering the bioavailability and toxicity of biogenic Se(0) compared to chemogenic Se(0) NPs. An upflow anaerobic sludge blanket (UASB) reactor was used for the first time to continuously remove tellurite from wastewater and recover biogenic Te(0).

Water Supply Engineering - Dr. B.C. Punmia 1995

Development in Wastewater Treatment Research and Processes - Maulin P. Shah 2021-10-16

Development in Waste Water Treatment Research and Processes: Innovative Microbe-Based Applications for Removal of Chemicals and Metals in Wastewater Treatment Plants focuses on the exploitation of various biological treatment technologies and their use to treat toxic and hazardous contaminants present in industrial effluent and restore the contaminated sites, a topic which lacks discussion in existing titles on the global market. This book encompasses advanced technologies and updated information as well as future directions for young researchers and scientists who are working in the field of wastewater treatment or effluent treatment plants and biodegradation of environmental contaminants for environmental safety and sustainable development. Provides wide information to readers on state-of-the-art applications of microbes for wastewater/industrial effluent treatment and environmental protection Summarizes our current knowledge on the use of various microbes, even the use of dead biomass for dye decolorization and degradation Explores different aspects of biological methods for contaminant removal and better advanced biotechnological applications

Emerging Contaminants in the Environment - Hemen Sarma 2022-01-08

Emerging Contaminants in the Environment: Challenges and Sustainable Practices covers all aspects of emerging contaminants in the environment, from basic understanding to different types of emerging contaminants and how these threaten organisms, their environmental fate studies, detection methods, and sustainable practices of dealing with contaminants. Emerging contaminant remediation is a pressing need due to the ever-increasing pollution in the environment, and it has gained a lot of scientific and public attention due to its high effectiveness and sustainability. The discussions in the book on the bioremediation

of these contaminants are covered from the perspective of proven technologies and practices through case studies and real-world data. One of the main benefits of this book is that it summarizes future challenges and sustainable solutions. It can, therefore, become an effective guide to the elimination (through sustainable practices) of emerging contaminants. At the back of these explorations on sustainable bioremediation of emerging contaminants lies the set of 17 goals articulated by the United Nations in its 2030 Agenda for Sustainable Development, adopted by all its member states. This book provides academics, researchers, students, and practitioners interested in the detection and elimination of emerging contaminants from the environment, with the latest advances by leading experts in emerging contaminants the field of environmental sciences. Covers most aspects of the most predominant emerging contaminants in the environment, including in soil, air, and water Describes the occurrence of these contaminants, the problems they cause, and the sustainable practices to deal with the contaminants Includes data from case studies to provide real-world examples of sustainable practices and emerging contaminant remediation

Applying Nanotechnology for Environmental Sustainability - Joo, Sung Hee 2016-08-04

Nanomaterials have been used for years in industries such as consumer products, textile production, and biomedicine, yet the literature outlining their use in environmental causes is limited. The safety, toxicity, transportation, and removal of this technology must be addressed as nanotechnology and nanomaterial use is expected to grow. Applying Nanotechnology for Environmental Sustainability addresses the applications of nanomaterials in the field of environmental conservation and sustainability, and analyses the potential risks associated with their use. It elucidates the scientific concepts and emerging technologies in nanoscience and nanotoxicity by offering a wide range of innovative topics and reviews regarding its use. This publication is essential for environmental engineers, researchers, consultants, students, regulators, and professionals in the field of nanotechnology.

Medical Marginality in South Asia - David Hardiman 2013-05-07

Examining the world of popular healing in South Asia, this book looks at the way that it is marginalised by the state and medical establishment while at the same time being very important in the everyday lives of the poor. It describes and analyses a world of 'subaltern therapeutics' that both interacts with and resists state-sanctioned and elite forms of medical practice. The relationship is seen as both a historical as well as ongoing one. Focusing on those who exist and practice in the shadow of statist medicine, the book discusses the many ways in which they try to heal a range of maladies, and how they experience their marginality. The contributors also provide a history of such therapeutics, in the process challenging the widespread belief that such 'traditional' therapeutics are relatively static and unchanging. In focusing on these problems of transition, they open up one of the central concerns of subaltern historiography. This is an important contribution to the history of medicine and society, and subaltern and South Asian studies.

Selected Water Resources Abstracts - 1990

Sustainable Water Engineering - Ramesha Chandrappa 2014-06-16

Ensuring safe and plentiful supplies of potable water (both now and for future generations) and developing sustainable treatment processes for wastewater are among the world's greatest engineering challenges. However, sustainability requires investment of money, time and knowledge. Some parts of the world are already working towards this goal but many nations have neither the political will nor the resources to tackle even basic provision and sanitation. Combining theory and practice from the developing and developed worlds with high- and low-tech, high- and low-cost solutions, this book discusses fundamental and advanced aspects of water engineering and includes: water resource issues including climate change, water scarcity, economic and financial aspects requirements for sustainable water systems fundamentals of treatment and process design industrial water use and wastewater treatment sustainable effluent disposal sustainable construction principles With integrated theory, design and operation specifications for each treatment process, this book addresses the extent to which various treatment methods work in theory as well as how cost effective they are in practice. It provides a nontechnical guide on how to recover and reuse water from effluent, which is suitable for those in water resource management, environmental planning, civil and chemical engineering.

Drinking Water Treatment - Chittaranjan Ray 2011-06-16

Sustainable technologies for water supply are urgently needed if water has to be supplied to billions of less fortunate people with inadequate access to water. These technologies must be simple, less expensive, less energy intensive, and easy to maintain for their adaptation among the poor masses. Four appropriate technologies are discussed here: solar pasteurization, membrane desalination, natural filtration (riverbank filtration), and solar distillation. Solar pasteurization can be a useful means of producing water at remote, but sunny locations where fuel may not be easily available for boiling water. Membrane desalination will remain as a viable means of drinking water production for individual households to large communities. Various membrane filtration techniques as well as the means to “democratize” membrane filtration have been presented. Riverbank filtration is a “natural” filtration technique where drinking water is produced by placing wells on the banks of rivers. The riverbed/bank material and the underlying aquifer act as natural filters to remove pollutants from river water. Solar distillation can be a viable method of drinking water production for individual households to small communities without the input of external energy. Sustainability framework and technology transfer are discussed through transdisciplinary analysis.

Recent Advances in Microbial Degradation - . Inamuddin 2021-07-07

Microbes play a major role in the degradation of various pollutants. Therefore, microbes find potential application in the area of energy and environmental technology. The book provides in-depth literature on the topics of environmental and industrial importance. It is compiled to explore the application of microbe used in the degradation of aflatoxin, polymers, biomass into fuel, disinfectants, food products, xenobiotic compounds, lipids, steroids, organic pollutants, proteins, oil waste, and wastewater pollutants. This book will be of interest to teachers, researchers, scientists, and capacity builders. Also, the book serves as additional reading material for undergraduate and graduate students of microbiology and environmental sciences. National and international remediation and restoration scientists, policymakers will also find this to be a useful read.

Scaling Up of Microbial Electrochemical Systems - Dipak Ashok Jadhav 2022-02-08

Scaling Up of Microbial Electrochemical Systems: From Reality to Scalability is the first book of its kind to focus on scaling up of microbial electrochemical systems (MES) and the unique challenges faced when moving towards practical applications using this technology. This book emphasizes an understanding of the current limitations of MES technology and suggests a way forward towards onsite applications of MES for practical use. It includes the basics of MES as well as success stories and case studies of MES in the direction of practical applications. This book will give a new direction to energy researchers, scientists and policymakers working on field applications of microbial electrochemical systems—microbial fuel cells, microbial electrolysis cells, microbial electrosynthesis cells, and more. Promotes the advancement of microbial electrochemical systems, from lab scale to field applications Illustrates the challenges of scaling up using successive case studies Provides the basics of MES technology to help deepen understanding of the subject Addresses lifecycle analysis of MES technology to allow comparison with other conventional methods

Engineering Chemistry - Jain Pc 2004

This book on Engineering Chemistry has been entirely rewritten in order to make it up-to-date and modern, both in approach and content. All diagrams have been redrawn or replaced by new ones. To meet the requirements of the latest syllabi of the various universities of India, topics like transition metals, coordination compounds, crystal field theory, gaseous and liquid states, adsorption, flame photometry, fullerenes, composites, mechanism of some typical reactions, oils and fats, soaps and detergents, have been included or expanded upon. A large number of solved numerical examples drawn from various university examinations have been given at the end of theoretical part of each chapter. Questions have been drawn from latest examinations of various universities.

Membrane-based Hybrid Processes for Wastewater Treatment - Maulin P. Shah 2021-05-27

Membrane-Based Hybrid Processes for Wastewater Treatment analyzes and discusses the potential of membrane-based hybrid processes for the treatment of complex industrial wastewater, the recovery of valuable compounds, and water reutilization. In addition, recent and future trends in membrane technology are highlighted. Industrial wastewater contains a large variety of compounds, such as heavy metals, salts and nutrients, which makes its treatment challenging. Thus, the use of conventional water treatment

methods is not always effective. Membrane-based hybrid processes have emerged as a promising technology to treat complex industrial wastewater. Discusses the properties, mechanisms, advantages, limitations and promising solutions of different types of membrane technologies Addresses the optimization of process parameters Describes the performance of different membranes Presents the potential of Nanotechnology to improve the treatment efficiency of wastewater treatment plants (WWTPs) Covers the application of membrane and membrane-based hybrid treatment technologies for wastewater treatment Includes forward osmosis, electro dialysis, and diffusion dialysis Considers hybrid membrane systems expanded to cover zero liquid discharge, salt recovery, and removal of trace contaminants

Biotreatment of Agricultural Wastewater - Mark E. Huntley 2018-01-18

Biotreatment of Agricultural Wastewater is based on a symposium held in Lake Arrowhead, California in 1986, supported by a coalition of federal, state, and local agencies, and sponsored by the engineering firm of Swanson/Oswald Associates (Lafayette, California) and the research and development firms of Aquasearch, Inc. and EcoTechnology Corp. (La Jolla, California). This book is a synopsis of topics covered by world renowned experts on the biology and aquaculture of algae and bacteria and on the engineering of industrial scale systems for biological wastewater treatment and economists that were gathered to evaluate historically proven systems and develop new and innovative approaches to the biological treatment of agriculture wastewater.

The Therapeutic Properties of Medicinal Plants - Megh R. Goyal 2019-12-18

This volume provides informative research on the scientific evidence of the health benefits that can be derived from medicinal plants and how their efficacies can be improved. It is divided into three sections that cover the phytochemistry of medicinal plants, disease management with medicinal plants, and novel research techniques in medicinal plants. The pharmacological benefits of several specific plants are discussed, addressing health issues such as metabolic and mental disorders, acute mountain sickness, polycystic ovarian syndrome, and specific diseases such as Huntington's. It also looks at the role of antioxidants in disease management. Additionally, the book covers recent problems of drug resistance and how medicinal plants can serve as antibiotic, anthelmintic, and antiparasitic drugs that will be helpful for human and animals.

Ozone for Water & Wastewater Treatment - Rip G. Rice 1975

3D Printing Technology for Water Treatment Applications - Jitendra Kumar Pandey 2022-10-30

3D Printing Technology for Water Treatment Applications provides a state-of-the-art presentation on the application of 3D printing technology in water treatment. The book discusses numerous processes and their scope for improvement through the use of 3D-printing technology, including pollutant separation from water and an overview of the advantages and disadvantages of different 3D printed technology over current technologies. In addition, the future outlook for device development using 3D printing water purification is explored. Finally, sustainability issues relating to 3D printing-based water purification processes are discussed, describing specific technologies such as 3D printed membranes. This book will serve as a vital resource for scientists, engineers and environmental professionals working in water treatment technologies. Takes an in-depth look at state-of-the-art water treatment methods Includes discussion of the application of 3D printed devices in areas such as water treatment, resource recovery and toxic ion removal Looks at current developments in the integration of adsorption technology with 3D printing technology

Recent Trends in Wastewater Treatment - Sughosh Madhav 2022-07-14

This volume discusses contemporary techniques, technologies, and solutions for industrial wastewater remediation and treatment. It covers biological, chemical, and physical aspects of wastewater treatment, with a background on the generation of wastewater associated with different industries, as well as a comparison of traditional treatment technologies with new advancements. The authors also describe the reuse and recovery of nutrients and precious metals from wastewater, and how such sustainable strategies can be incorporated into industrial wastewater planning and legislation. The book also contains practical and theoretical aspects of various industries and their wastewater management practices in a changing climate, with an emphasis on recent research examining the environmental impact of wastewater. The work will be of interest to students, teachers, and researchers studying wastewater pollution and remediation,

wastewater management-based NGOs, and people involved in the planning and legislation of industrial operations.

Nanotechnology, Food Security and Water Treatment - K M Gothandam 2018-01-08

This book reviews advanced nanotechnology in food, health, water and agriculture. In food, nanobiosensors display an unprecedented efficiency for the detection of allergens, genetically modified organisms and pathogens. In agriculture, nanofertilisers improve plant nutrition by releasing nutrients slowly and steadily. Nanomaterials synthesised using biomass such as fungi are further found remarkable to clean waters polluted by heavy metals. However, as newly introduced materials in the environment, nanoparticles may exhibit toxic effects, which are reviewed in this book. In the context of climate change, methods for water desalinisation are also presented.

Dynamical Modelling & Estimation in Wastewater Treatment Processes - D. Dochain 2001-12-01

Environmental quality is becoming an increasing concern in our society. In that context, waste and wastewater treatment, and more specifically biological wastewater treatment processes play an important role. In this book, we concentrate on the mathematical modelling of these processes. The main purpose is to provide the increasing number of professionals who are using models to design, optimise and control wastewater treatment processes with the necessary background for their activities of model building, selection and calibration. The book deals specifically with dynamic models because they allow us to describe the behaviour of treatment plants under the highly dynamic conditions that we want them to operate (e.g. Sequencing Batch Reactors) or we have to operate them (e.g. storm conditions, spills). Further extension is provided to new reactor systems for which partial differential equation descriptions are necessary to account for their distributed parameter nature (e.g. settlers, fixed bed reactors). The model building exercise is introduced as a step-wise activity that, in this book, starts from mass balancing principles. In many cases, different hypotheses and their corresponding models can be proposed for a particular process. It is therefore essential to be able to select from these candidate models in an objective manner. To this end, structure characterisation methods are introduced. Important sections of the book deal with the collection of high quality data using optimal experimental design, parameter estimation techniques for calibration and the on-line use of models in state and parameter estimators. Contents
Dynamical Modelling
Dynamical Mass Balance Model Building and Analysis
Structure Characterisation (SC)
Structural Identifiability
Practical Identifiability and Optimal Experiment Design for Parameter Estimation (OED/PE)
Estimation of Model Parameters
Recursive State and Parameter Estimation
Glossary
Nomenclature

Removal of Toxic Pollutants through Microbiological and Tertiary Treatment - Maulin P. Shah 2020-08-20

Removal of Toxic Pollutants through Microbiological and Tertiary Treatment: New Perspectives offers a current account of existing advanced oxidation strategies - including their limitations, challenges, and potential applications - in removing environmental pollutants through microbiological and tertiary treatment methods. The book introduces new trends and advances in environmental bioremediation technology, with thorough discussion of recent developments in the field. Updated information as well as future research directions in the field of bioremediation of industrial wastes is included. This book is an indispensable guide to students, researchers, scientists, and professionals working in fields such as microbiology, biotechnology, environmental sciences, eco-toxicology, and environmental remediation. The book also serves as a helpful guide for waste management professionals and those working on the biodegradation and bioremediation of industrial wastes and environmental pollutants for environmental sustainability. Introduces various treatment schemes, including microbiological and tertiary technologies for bioremediation of environmental pollutants and industrial wastes Includes pharmaceutical wastewater, oil refinery wastewater, distillery wastewater, tannery wastewater, textile wastewater, mine tailing wastes, plastic wastes, and more Describes the role of relatively new treatment technologies and their approaches in bioremediation, including molecular and protein engineering technologies, microbial enzymes, bio surfactants, plant-microbe interactions, and genetically engineered organisms Provides many advanced technologies in the field of bioremediation and phytoremediation, including electro-bioremediation technology, microbial fuel cell technology, nano-bioremediation technology, and phytotechnologies

Waste Water Engineering - Dr. B.C. Punmia 1998

Development in Wastewater Treatment Research and Processes - Susana Rodriguez-Couto 2021-09-11
Removal of Emerging Contaminants from Wastewater through Bio-nanotechnology showcases profiles of the nonregulated contaminants termed as “emerging contaminants, which comprise industrial and household persistent toxic chemicals, pharmaceuticals and personal care products (PPCPs), pesticides, surfactants and surfactant residues, plasticizers and industrial additives, manufactured nanomaterials and nanoparticles, microplastics, etc. that are used extensively in everyday life. The occurrence of “emerging contaminants in wastewater, and their behavior during wastewater treatment and production of drinking water are key issues in the reuse and recycling of water resources. This book focuses on the exploitation of Nano-biotechnology inclusive of the state-of-the-art remediate strategies to degrade/detoxify/stabilize toxic and hazardous contaminants and restore contaminated sites, which is not as comprehensively discussed in the existing titles on similar topics available in the global market. In addition, it discusses the potential environmental and health hazards and ecotoxicity associated with the widespread distribution of emerging contaminants in the water bodies. It also considers the life cycle assessment (LCA) of emerging (micro)-pollutants with suitable case studies from various industrial sources. Provides natural and ecofriendly solutions to deal with the problem of pollution Details underlying mechanisms of nanotechnology-associated microbes for the removal of emerging contaminants Describes numerous successful field studies on the application of bio-nanotechnology for eco-restoration of contaminated sites Presents recent advances and challenges in bio-nanotechnology research and applications for sustainable development Provides authoritative contributions on the diverse aspects of bio-nanotechnology by world’s leading experts

Advanced Water Treatment - Mika Sillanpaa 2020-01-08

Advanced Water Treatment: Adsorption discusses the application of adsorption in water purification. The book reviews research findings on the preparation of five different nano/microcellulose-based adsorbents, their characterization, the study of adsorption kinetics and isotherms, the determination of adsorption mechanisms, and an evaluation of adsorbents’ regeneration properties. The book describes modification microfibrillated cellulose (MFC), the use of succinic anhydride modified mercerized nanocellulose, and aminosilane and hydroxyapatite modified nanostructured MFC for the removal of heavy metals from aqueous solutions. Final sections describe the use of aminosilane, epoxy and hydroxyapatite modified MFC as a promising alternative for H₂S removal from aqueous solutions, along with new findings on the adsorption properties of carbonated hydroxyapatite modified MFC as multifunctional adsorbent for the removal of both cations and anions ions from water. Includes the most recent research on advanced water treatment by adsorption Provides the latest updates on novel adsorbents for water purification Describes REE removal using various adsorbents Covers a wide range of methods and their integration

Delivering Low-Carbon Biofuels with Bioproduct Recovery - Lakhveer Singh 2020-11-17

Delivering Low-Carbon Biofuels with Bioproduct Recovery: An Integrated Approach to Commercializing Bioelectrochemical Systems explores current pathways to produce both the bioenergy from bioelectroactive fuel cells (BEFC) and their valuable byproducts using bioelectrochemical systems (BES) approaches. The book focuses on key methods, current designs and established variants of biofuels processing approaches, also including case studies. Chapters review crucial aspects of bioreactor design methodologies, operating principles, bioreactor susceptibility and systems constraints. The book supports vulnerability and hotspot detection through simulation and modeling approaches. Concluding chapters establish drivers for realizable scale-up and commercialization of bioelectrochemical systems. Discusses all major commercially viable biofuels, along with their high-value byproducts Focuses on frontiers of low carbon biofuel technologies with commercialization and scale-up potential Supported by schematics that outline integration with bioelectrochemical systems (BES) approaches

Algal Technologies for Wastewater Treatment and Resource Recovery - Raul Muñoz 2019-07-26

Over 80% of globally produced wastewater receives little or no treatment before it is disposed into the environment. Therefore, it is urgent to develop new wastewater treatment technologies that are sustainable in the broad sense of the word, i.e. not only produce high quality effluents, but also minimise energy expenses, recover energy and nutrients, and apply technology that is appropriate in relation to the

availability of skilled personnel. This book compiles the main outcomes of recent efforts to improve the design of waste stabilisation ponds, and confirms the superior performance of high rate algal ponds as a result of process intensification. Anaerobic digestion devoted to biogas production continues to be the preferred strategy for the energy valorisation of the algal biomass, co-digestion with multiple high C/N ratio substrates gathering significant attention over the past years. The potential of algal biomass as a biosorbent for heavy metal removal (Cu, Ni, F) maintains its share in the research field of water bioremediation, while research on nutrient removal has focused on providing new insights on the mechanism of nitrogen and phosphorus removal from wastewater in algal-bacterial systems. Finally, it is worth noticing that breakthroughs in complementary fields of research such as nanotechnology or lighting technology are gradually being implemented in algal biotechnology, with new products such as nanoparticles for water disinfection or photobioreactors illuminated by low intensity LED panels. In Focus – a book series that showcases the latest accomplishments in water research. Each book focuses on a specialist area with papers from top experts in the field. It aims to be a vehicle for in-depth understanding and inspire further conversations in the sector.

Handbook of Nanomaterials for Wastewater Treatment - Bharat A. Bhanvase 2021-05-05

Handbook of Nanomaterials for Wastewater Treatment: Fundamentals and Scale up Issues provides coverage of the nanomaterials used for wastewater treatment, covering photocatalytic nanocomposite materials, nanomaterials used as adsorbents, water remediation processes, and their current status and challenges. The book explores the major applications of nanomaterials for effective catalysis and adsorption, also providing in-depth information on the properties and application of new advanced nanomaterials for wastewater treatment processes. This is an important reference source for researchers who need to solve basic and advanced problems relating to the use of nanomaterials for the development of wastewater treatment processes and technologies. As nanotechnology has the potential to substantially improve current water and wastewater treatment processes, the synthesis methods and physiochemical properties of nanomaterials and noble metal nanoparticles make their performance and mechanisms efficient for the treatment of various pollutants. Explains the properties of the most commonly used nanomaterials used for wastewater treatment Describes the major nanoscale synthesis and processing techniques for wastewater treatment Assesses the major challenges for using nanomaterials on a mass scale for wastewater treatment

Ozone in Water Treatment - Bruno Langlais 2019-07-16

With the advent of the Safe Drinking Water Act Amendments of 1986, many water utilities are reexamining their water treatment practices. Upcoming new regulations on disinfection and on disinfection by-products, in particular, are the primary driving forces for the big interest in ozone. It appears that ozone, with its strong disinfection capabilities, and apparently lower levels of disinfection by-products (compared to other disinfectants), may be the oxidant/disinfectant of choice. Many utilities currently using chlorine for oxidation may need to switch due to chlorine by-product concerns. Utilities using chloramines may need to use ozone to meet CT requirements. This book, prepared by 35 international experts, includes current technology on the design, operation, and control of the ozone process within a drinking water plant. It combines almost 100 years of European ozone design and operating experience with North American design/operations experience and the North American regulatory and utility operational environment. Topics covered include ozone chemistry, toxicology, design consideration, engineering aspects, design of retrofit systems, and the operation and economics of ozone technology. The book contains a "how to" section on ozone treatability studies, which explains what information can be learned using treatability studies, at what scale (bench, pilot, or demonstration plant), and how this information can be used to design full-scale systems. It also includes valuable tips regarding important operating practices, as well as

guidance on retrofits and the unique issues involved with retrofitting the ozone process. With ozone being one of the hottest areas of interest in drinking water, this book will prove essential to all water utilities, design engineers, regulators, and plant managers and supervisors.

Wastewater Treatment Residues as Resources for Biorefinery Products and Biofuels - Jose Antonio Olivares 2019-11-21

Wastewater Treatment Residues as Resources for Biorefinery Products and Energy reviews wastewater treatment processes and the use of residues. The viability of end use processes for residues, such as incineration, cement additives, agricultural fertilizers, and methane production are reviewed and analyzed, as are new processes for the use of residues within a fuels production system, such as pyrolysis, hydrothermal liquefaction and syngas. Specialized chapters discuss fractionation of biomass, the production of compounds from volatile fatty acids that conceptually proceed from the anaerobic acidogenesis of residues, and a final analysis of the overall productivity and viability that can be expected from these production schemes. Discusses processes for the production of high value-added products and energy development from sludge Provides value-added technologies for resource utilization in wastewater systems Outlines sustainability assessments and comparisons of technologies and processes

Modern Age Waste Water Problems - Mohammad Oves 2019-06-12

This book presents a picture of the advances in the research of theoretical and practical frameworks of wastewater problems and solutions. The book deals with a basic concept and principles of modern biological, chemical and technical approaches to remediate various hazardous pollutants from wastewater. The latest empirical research findings in wastewater treatment are comprehensively discussed. Examples of low-cost technologies are also included. The book is written for professionals, researchers, academics and students wanting to improve their understanding of the strategic role of environmental protection and advanced applied technologies.

Advanced Materials for Wastewater Treatment - Shahid Ul-Islam 2017-09-21

Over the past few decades, rapid industrialization, fast urban encroachment, and improved agricultural operations have introduced substantial amounts of potentially toxic organic substances into the atmosphere and into the aquatic and terrestrial environments. Advanced Materials for Wastewater Treatment brings together innovative methodologies and research strategies to remove toxic effluents from wastewaters. With contributions from leading scientists from all around the world, the book provides a comprehensive coverage of the current literature, up-to-date overviews of all aspects of toxic chemical remediation including the role of nanomaterials.

Bioelectrochemical Systems - Prasun Kumar 2021-02-08

This book is the second in a two-volume set devoted to bioelectrochemical systems (BESs) and the opportunities that they may offer in providing a green solution to growing energy demands worldwide. While the first volume explains principles and processes, in this volume established research professionals shed light on how this technology can be used to generate high-value chemicals and energy using organic wastes. Bioelectricity is generated in microbial fuel cells (MFCs) under oxygen-depleted conditions, where microbial bioconversion reactions transform organic wastes into electrons. Dedicated chapters focus on MFCs and state of the art advancements as well as current limitations. In addition, the book covers the use of microbial biofilm- and algae-based bioelectrochemical systems for bioremediation and co-generation of valuable chemicals. A thorough review of the performance of this technology and its possible industrial applications is presented. The book is designed for a broad audience, including undergraduates, postgraduates, energy researchers/scientists, policymakers, and anyone else interested in the latest developments in this field.