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 ICDSME 2019
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Biological Wastewater Treatment in Warm Climate Regions IWA Publishing

This book reports on the treatment of waters and wastewaters with contaminants of emerging concern such as pharmaceutically active compounds. It shows how to prevent the contamination of the environment with such pollutants in the content of effluents. This book reviews various physico-chemical and biological methods that have been developed in order to deal with the polluted effluents. It also evaluates the already developed technologies regarding the sustainability criteria. The chapters discuss technical aspects and put the spotlight on the sustainability aspects of the water and wastewater treatment technologies.

Advanced Treatment Technologies for Urban Wastewater Reuse CRC Press

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-based Hybrid Processes for Wastewater Treatment Livre de Lyon

Sustainable Technologies for Water and Wastewater Treatment discusses relevant sustainable technologies for water and wastewater treatment pertaining to a nanoscale approach to water treatment and desalination, membrane-based technologies for water recovery and reuse, the energy and water nexus, degradation of organic pollutants, nascent technologies, bio and bio-inspired materials for water reclamation and integrated systems, and an overview of wastewater treatment plants. The book focuses on advanced topics including in situ generation of hydroxyl radicals, which can aid in the indiscriminate oxidation of any contaminant present in wastewater, making advanced oxidation processes commercially viable. Features: A comprehensive review of current and novel water and wastewater treatment technologies from a sustainability perspective All the sustainable technologies, such as desalination, wastewater treatment, advanced oxidation processes, hydrodynamic cavitation, membrane-based technologies, sonosorption, and electrospun fibers Discussion on reference materials for important research accomplishments in the area of water and environmental engineering Theoretical aspects covering principles and instrumentation A summary on sustainability, including life cycle assessment (LCA), energy balance and large-scale implementation of advanced techniques This book is aimed at professionals, graduate students, and researchers in civil, chemical, environmental engineering, and materials science.

Pollution Control for Clean Environment—Volume 1 IWA Publishing

Recent Researches and Practices in Engineering Sciences, Livre de Lyon

ICDSME 2019 Walter de Gruyter GmbH & Co KG

Over 90% of bacterial biomass exists in the form of biofilms. The ability of bacteria to attach to surfaces and to form biofilms often is an important competitive advantage for them over bacteria growing in suspension. Some biofilms are "good" in natural and engineered systems; they are

responsible for nutrient cycling in nature and are used to purify waters in engineering processes. Other biofilms are "bad" when they cause fouling and infections of humans and plants. Whether we want to promote good biofilms or eliminate bad biofilms, we need to understand how they work and what works to control them. *Mathematical Modeling of Biofilms* provides guidelines for the selection and use of mathematical models of biofilms. The whole range of existing models - from simple analytical expressions to complex numerical models - is covered. The application of the models for the solution of typical problems is demonstrated, and the performance of the models is tested in comparative studies. With the dramatic evolution of the computational capacity still going on, modeling tools for research and practice will become more and more significant in the next few years. This report provides the foundation to understand the models and to select the most appropriate one for a given use. *Mathematical Modeling of Biofilms* gives a state-of-the-art overview that is especially valuable for educating students, new biofilm researchers, and design engineers. Through a series of three benchmark problems, the report demonstrates how to use the different models and indicates when simple or highly complex models are most appropriate. This is the first report to give a quantitative comparison of existing biofilm models. The report supports model-based design of biofilm reactors. The report can be used as basis for teaching biofilm-system modeling. The report provides the foundation for researchers seeking to use biofilm modeling or to develop new biofilm models. Scientific and Technical Report No.18

Omics for Environmental Engineering and Microbiology Systems Elsevier

The book discusses ways to overcome the side effects of using hydrocarbon-based products as energy sources. Hydrocarbons produce raw crude oil waste of around 600,000 metric tons per annum, with a range of uncertainty of 200,000 metric tons per year. The various chapters in this book focus on approaches to reduce these wastes through the application of potential microbes, in a process called bioremediation. The book is a one-stop reference resource on the methods, mechanisms and application of the bio-composites, in the laboratory and field. Focusing on resolving a very pressing environmental issue, it not only provides details of existing challenges, but also offers deeper insights into the possibility of solving problems using hydrocarbon bioremediation. *Biofilm Reactors WEF MOP 35* IWA Publishing (International Water Assoc)

Covers development of new novel reactor configurations for wastewater treatment Describes handling and removal of emerging contaminants like pharmaceutical compounds, endocrine disruptors and disinfection by-products Deliberates combination of wastewater and micro pollution Contains in-depth discussion on faecal sludge treatment and disposal Highlights new economically feasible techniques to enhance biogas recovery from treatment plant sludges

Environmental Fate and Effects of Pulp and Paper McGraw Hill Professional

This book highlights advances in sustainable wastewater treatment technologies, particularly biological wastewater treatment, cavitation-based treatment, hybrid water treatment, membrane technologies, advanced oxidation processes, and adsorption. The book focuses on a variety of advanced treatment techniques that are useful for the degradation of organic components, dyes, heavy metals effluent, etc. in wastewater. Industrial wastewater consists of variety of discharges based on the type of industry, such as the dairy/food industries, which generate more fats and high BOD value with variation in the pH value, while the electroplating industry may expel more inorganic matter and dissolved solids. The oil extraction industries will have more solvents contained in the effluent, and dyes and textiles industry create a higher organic load with high TDS. Hence, every type of manufacturing industry needs a different method for the treatment of its effluents. Looking at the use of intensified chemical processes in order to make cleaner environment, *Innovative Technologies for the Treatment of Industrial Wastewater* explores the new and innovative methods for pollutant removal that will prove useful for a variety of industries. Conventional wastewater treatment processes require a significant amount of energy and involve expensive equipment and

maintenance. Sustainable wastewater treatment technologies, however, involve less generation of energy and employ more economically feasible treatment methods, requiring less equipment and fewer maintenance costs. Looking at the use of intensified chemical processes in order to make a cleaner environment, this volume explores new and innovative methods for pollutant removal that will prove useful for a variety of industries. This book highlights advances in sustainable wastewater treatment technologies, particularly biological wastewater treatment, cavitation-based treatment, hybrid water treatment, membrane technologies, advanced oxidation processes, and adsorption.

Mathematical Modeling of Biofilms CRC Press

Water is the most valuable resource for all human development. With increasing global population the demand for water increases whereas the sources of clean water are decreasing. Recycling and reuse of wastewater has become an imperative which demands the development of new, efficient and environmentally friendly treatment methods. *Current Trends and Future Developments in (Bio-) Membranes: Recent Achievements in Wastewater and Water Treatments* provides a comprehensive coverage of the existing wastewater treatment including, but not exclusively, membrane-based methods. The book presents most common used methods compares and evaluates them depending on their particular application. It illustrates many aspects of the various treatment systems used in water and wastewater purification and lists the advantages of membrane-based methods to non-membrane based technologies. This book focuses on introducing, applications, advantages/disadvantages, evaluating of membrane-based technologies and comparing it with other non-membrane based systems. It also analyses the various limitations of each method. Hence, the book is a key reference text for R&D managers in industry interested in the development of water/waste treatment technologies as well as academic researchers and postgraduate students working in the wider area of the strategic treatment, separation and purification processes. - Provides the state-of-the-art of water and wastewater treatments by various technologies - Describes novel and emerging technologies for waste/water treatment - Discusses a number of case studies of popular applications - Offers an economic evaluation of various technologies

Biofilms in the Food and Beverage Industries Elsevier

Bioremediation using microbes is a sustainable technology for biodegradation of target compounds, and an omics approach gives more clarity on these microbial communities. This book provides insights into the complex behavior of microbial communities and identifies enzymes/metabolites and their degradation pathways. It describes the application of microbes and their derivatives for the bioremediation of potentially toxic and novel compounds. It highlights the existing technologies along with industrial practices and real-life case studies. Features: Includes recent research and development in the areas of omics and microbial bioremediation. Covers the broad environmental pollution control approaches such as metagenomics, metabolomics, fluxomics, bioremediation, and biodegradation of industrial wastes. Reviews metagenomics and waste management, and recycling for environmental cleanup. Describes the metagenomic methodologies and best practices, from sample collection to data analysis for taxonomies. Explores various microbial degradation pathways and detoxification mechanisms for organic and inorganic contaminants of wastewater with their gene expression. This book is aimed at graduate students and researchers in environmental engineering, soil remediation, hazardous waste management, environmental modeling, and wastewater treatment.

Recent Researches and Practices in Engineering Sciences CRC Press

Computational Fluid Dynamics (CFD) is an important design tool in engineering and also a substantial research tool in various physical sciences as well as in biology. The objective of this book is to provide university students with a solid foundation for understanding the numerical methods employed in today's CFD and to familiarise them with modern CFD codes by hands-on experience. It is also intended for engineers and scientists starting to work in the field of CFD or for those who apply CFD codes. Due to the detailed index, the text can serve as a reference handbook too. Each chapter includes an extensive bibliography, which provides an excellent basis for further studies.

Comprehensive Water Quality and Purification Elsevier

In recent years, there have been emerging concerns regarding the fate and effects of pulp and paper mill effluents on the environment. Countries throughout the world are focusing attention on the implementation of regulatory and monitoring programs. In response, industry has begun to implement a variety of process and treatment technologies designed to minimize or eliminate the potential impacts. *Environmental Fate and Effects of Pulp and Paper Mill Effluents* explores the most active and critical current research and experimentation from around the world. This comprehensive overview examines the identity and origin of chemicals in pulp mill effluents, environmental fate of chemicals from pulp and paper mills, bioaccumulation of substances from pulp mills to fish and wildlife, field and laboratory studies of biochemical and whole organism responses associated with pulp and paper effluents, integrated monitoring and future research, and policy directions of this rapidly evolving field. Written by prominent scientists from around the world with contributions from industry, government, and academia, this important new book provides a balanced global perspective of the recent scientific findings and the challenges being faced in the immediate future.

Activated Sludge and Aerobic Biofilm Reactors Springer Nature

Advances in Biological Wastewater Treatment Systems covers different recent advanced technologies, including green technologies, for biological wastewater treatment and wastewater reuse. The technologies involve novel biological processes and/or modified processes coupled with nano materials for improving the performance of the existing treatment processes. The book also describes treatment strategies for the current pollution from complex organic matter, nutrients, toxic substances, micro plastics and emerging micro pollutants in different water resources. The treatment processes describe the recent developed technologies for wastewater treatment and reuse such as biological nutrient removal, bioreactors, photobioreactors, membrane bioreactors, wetlands, algae-bacteria process, natural treatments, integrated/hybrid bio systems, etc. The novel bio systems include aerobic, anaerobic, facultative operation modes with various of types of microorganisms. - Provides updated information on biological nutrient removal from wastewater - Includes anaerobic and aerobic wastewater treatment processes - Provides state-of-art information on design and operation of novel systems, including membrane bioreactors - Describes hybrid treatment processes

Sustainable Technologies for Water and Wastewater Treatment Springer Science & Business Media

Strategic Perspectives in Solid Waste and Wastewater Management explores conventional and advanced biotechnologies for waste management, including socio-economic aspects, techno-economic feasibility, models and modeling tools, and a detailed life-cycle assessment approach in solid waste (SW) and wastewater (WW). These innovative technologies are highly applicable to current real-world situations. The enormous increase in the quantum and diversity of SW and WW - including waste materials generated due to human activity and their potentially harmful effects on the environment and public health - have led to increasing awareness about an urgent need to adopt novel technologies for appropriate management of both SW and WW. While there is an obvious need to minimize the generation of wastes and to reuse and recycle them, the technologies for managing such wastes can play a vital role in mitigating problems. Besides recovery of substantial energy, these technologies can lead to a considerable reduction in the overall waste quantities

requiring final disposal, which can be better managed for safe disposal in a controlled manner while meeting pollution control standards. - Outlines appropriate technologies for solid waste and wastewater management systems and their applications - Presents and evaluates the Best Available Technology (BAT) and includes global case studies - Provides methods for evaluating the way to use appropriate technological systems to develop the best technically and economically feasible projects worldwide - Offers an excellent resource for university students to use for their research and dissertations

10th International Symposium on Process Systems Engineering - PSE2009 CRC Press

This volume offers a detailed overview of currently applied and tested wastewater treatment technologies and the integration of advanced processes to remove trace organic contaminants and microorganisms. It discusses the potential of enhanced biological treatment to produce effluent suitable for reuse, new processes for urban wastewater disinfection and the reduction of antibiotic resistant bacteria, as well as the effect of advanced oxidation processes on wastewater microbiome and chemical contaminants. It also presents membrane bioreactors, moving bed bioreactors, light and solar driven technologies, ozonation and immobilised heterogeneous photocatalysis and provides an evaluation of the potential of constructed wetlands integrated with advanced oxidation technologies to produce wastewater safe for reuse. Furthermore, the volume discusses water reuse issues and standards, the status of membrane bioreactors applications, and the treatment of reverse osmosis concentrate for enhanced water recovery during wastewater treatment. Finally, it presents recent developments in potable water reuse and addresses various important issues in this framework, like the proper protection of public health, reliability and monitoring. This volume is of interest to experts, scientists and practitioners from various fields of research, including analytical and environmental chemistry, toxicology and environmental and sanitary engineering, as well as treatment plant operators and policymakers.

Current Trends and Future Developments on (Bio-) Membranes CRC Press

The main focus of this book is the transport mechanics of sediment particles coated with microbial biofilm, which is called bio-sediment. The book also addresses the question of how to measure and simulate the considerable variation in the properties of natural sediment associated with microbial biofilm, ranging from the micro-scale surface morphology to the macro-scale sediment transport. Nowadays most studies to elucidate the mechanisms of sediment transport have concentrated on physical-chemical sediment properties, little work explicitly coupled sediment dynamics and the environmental effects under the influence of micro-ecosystem, thus leaving a serious gap in water and sediment sciences as well as water ecological research. With respect to physical-chemical sediment properties, this book has been undertaken to evaluate and quantify the effect of biological factors - biofilm on sediment transport mechanics. The chapters cover topics including development of bio-sediment and its properties; model of biofilm growth on sediment substratum; bedform and flow resistance of bio-sediment bed; incipient velocity and settling velocity of bio-sediment; bedload and suspended load transport for bio-sediment; numerical simulation of bio-sediment transport. Besides, the measurement technology, analysis method and expression approach introduced in this book combine the characteristics of hydraulic, environmental and microbial research, having more immediate innovation. This book will be of interest to researchers, managers, practitioners, policy and decision makers, international institutions, governmental and non-governmental organizations, educators, as well as graduate and undergraduate students in the field of hydraulics and river dynamics. It will help to understand the relevance of sediment transport and biofilm growth under the role of aqueous micro-ecosystem, to introduce better tools for the simulation and prediction of bio-sediment transport, and to provide a scientific basis and application foundation for the research of interaction between sediment particles and ecological and environmental factors.

Frontiers in Wastewater Treatment and Modelling CRC Press

This book contains the proceedings of the 10th of a series of international symposia on process systems engineering (PSE) initiated in 1982. The special focus of PSE09 is how PSE methods can support sustainable resource systems and emerging technologies in the areas of green engineering.

* Contains fully searchable CD of all printed contributions * Focus on sustainable green engineering * 9 Plenary papers, 21 Keynote lectures by leading experts in the field

Current Developments in Biotechnology and Bioengineering CRC Press

Kinetics of Wastewater Treatment contains the proceedings of a post-conference seminar held at the Technical University of Denmark, Copenhagen in 1978. Separating 10 papers presented in the seminar as chapters, this book begins with the conceptual basis of calcium phosphate precipitation in a denitrifying biofilm. The influence of pH and calcium ions upon phosphorus transformations in biological wastewater treatment plants; sewage treatment by activated sludge; orthokinetic flocculation of phosphate precipitates in a multicomponent reactor with non-ideal flow; and kinetics of phosphorus transformations in aerobic and anaerobic environments are then described. This text also looks into the chemical floc formation in wastewater treatment; temperature dependency of microbial reactions; the influence of some environmental factors on floc kinetics; kinetics of biological flocs; and two step precipitation of calcium phosphates.

Handbook of Industrial and Hazardous Wastes Treatment IWA Publishing

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, electrodialysis, and diffusion dialysis - Considers hybrid membrane systems expanded to cover zero liquid discharge, salt recovery, and removal of trace contaminants

Innovative Wastewater Treatment & Resource Recovery Technologies: Impacts on Energy, Economy and Environment IWA Publishing (International Water Assoc)

The Future of Effluent Treatment Plants: Biological Treatment Systems is an advanced and updated version of existing biological technologies that includes their limitations, challenges, and potential application to remove chemical oxygen demand (COD), refractory chemical oxygen demand, biochemical oxygen demand (BOD), color removal and environmental pollutants through advancements in microbial bioremediation. The book introduces new trends and advances in environmental bioremediation with thorough discussions of recent developments. In addition, it illustrates that the application of these new emerging innovative technologies can lead to energy savings and resource recovery. The importance of respiration, nitrogen mineralization, nitrification, denitrification and biological phosphorus removal processes in the development of a fruitful and applicable solution for the removal of toxic pollutants from wastewater treatment plants is highlighted. Equally important is the knowledge and theoretical modeling of water movement

through wastewater ecosystems. Finally, emphasis is given to the function of constructed wetlands and activated sludge processes. - Considers different types of industrial wastewater - Focuses on

biological wastewater treatments - Introduces new trends in bioremediation - Addresses the future of WWTPs

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