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SPRINGER SERIES ON BIOFILMS

Marine and Industrial Biofouling



Springer

Marine And Industrial Biofouling Springer Series On Biofilms

Toshiyuki Takahashi



Marine And Industrial Biofouling Springer Series On Biofilms:

Marine and Industrial Biofouling Hans-Curt Flemming, P. Sriyutha Murthy, R. Venkatesan, Keith E. Cooksey, 2008-12-11 Biofouling is a costly problem and it is encountered in a wide spectrum of technical systems ranging from the shipping industry power industry water purification automobile industry paint and pharmaceuticals to the microelectronics and food industries Micro and macroorganisms attach to surfaces and accumulate there forming biofilms that cause interferences a fundamentally natural process Usually a medical paradigm is applied kill biofilms and the problem is solved This leads to excessive biocide use However the success of this strategy is very limited furthermore it leads to equipment damage and environmental pollution Simply trying to kill the fouling organisms is clearly not seen as a successful strategy while cleaning is put forward as much more important In this book strategies to prevent adhesion to mitigate the extent and effects of biofouling and to detect and remove fouling layers are presented Holistic approaches to the fouling process are elaborated taking into account options such as nutrient limitation repellent and easy to clean surfaces for fouling layer limitation and replacing biocides with more environmentally friendly methods in other words learning how to live with fouling biofilms without suffering the damage they can do Aquatic Ecosystems and Microbial Biofilms Siddhardha Busi, Ram Prasad, 2024-10-01 Aquatic Ecosystems and Microbial Biofilms Significance Dynamics Prevention and Control provides a systematic introduction and review of state of the art information on microbial biofilms in aquatic ecosystems and their control The book is designed and developed to understand the microbial biofilms in aquatic ecosystems their role and the control strategies The contents of the book are well discussed to get state of art knowledge on various topics such as the role of biofilms in marine ecosystems microbial biofilms and drinking water systems biofilms in biofouling and biocorrosion beneficial aspects of biofilms such as biogeochemical cycling wastewater treatment and in biodeterioration of organic materials This book also provides comprehensive knowledge and in depth scientific information on the role of biofilms and their contribution to antibiotic resistance and also advanced technologies to understand biofilms such as metagenomics The book offers comprehensive coverage of the most essential topics including Microbial biofilms in aquatic ecosystems New horizons to understand the role of biofilms in biofouling and corrosion and their control measures Beneficial role of aquatic biofilms such as in biogeochemical cycling wastewater treatment and biodeterioration of organic materials Various strategies to collaborate interdisciplinary schemes worldwide to design and develop new methods for cleaner drinking water and information on advanced techniques such as metagenomics to understand the diversity and functional role of aquatic biofilms This book serves as a reference book for scientific investigators who would like to study biofilms in aquatic ecosystems as well as researchers developing methodology in this field to study biofilm formation in aquatic ecosystems their advantages and disadvantages and control strategies Legacy and Emerging Contaminants in Water and Wastewater Paromita Chakraborty, Daniel Snow, 2022-06-03 This volume provides a collection of research findings on the distribution and risk

associated with emerging contaminants ECs in water and wastewater across the globe and effective remediation techniques and technologies The book covers various monitoring techniques for ECs in water and wastewater and its related impacts on the ambient environment and offers valuable information on cost effective monitoring techniques and sustainable treatment technologies for ECs The authors detail the risks and biological effects of ECs and legacy persistent organic pollutants POPs in freshwater and marine systems including their adverse interactions with aquatic organisms while also discussing the associated impacts on human health The book comprehensively covers current research outcomes on treatment methods cost effectiveness and infrastructure needs for effective removal of ECs It will be of interest to students researchers and scholars in environmental science and engineering water and wastewater toxicology environmental biotechnology soil sciences and microbial ecology

Biofilm Highlights Hans-Curt Flemming, Jost Wingender, Ulrich Szewzyk, 2011-08-02 Living in biofilms is the common way of life of microorganisms transiently immobilized in their matrix of extracellular polymeric substances EPS interacting in many ways and using the matrix as an external digestion and protection system This is how they have organized their life in the environment in the medical context and in technical systems and has helped make them the oldest most successful and ubiquitous form of life In this book hot spots in current biofilm research are presented in critical and sometimes provocative chapters This serves a twofold purpose to provide an overview and to inspire further discussions Above all the book seeks to stimulate lateral thinking

A Treatise on Corrosion Science, Engineering and Technology U. Kamachi Mudali, Toleti Subba Rao, S. Ningshen, Radhakrishna G. Pillai, Rani P. George, T. M. Sridhar, 2022-05-04 This volume elaborates on various corrosion processes in different applications and their prevention strategies It comprehensively covers the principles of corrosion engineering issues methods of corrosion protection and defines corrosion processes and control in select aggressive end industrial environments The contents especially focus on corrosion issues in nuclear aerospace marine high temperature bioimplants automobile and addresses the application of advanced materials to mitigate them A special section on corrosion prevention strategies with innovative solutions to resolve corrosion issues in various environments is the highlight of this book This volume will be a useful guide for those in research academia and industry particularly to know state of art in corrosion control and prevention for various practical applications

Marine OMICS Se-Kwon Kim, 2016-11-18 This book provides comprehensive coverage on current trends in marine omics of various relevant topics such as genomics lipidomics proteomics foodomics transcriptomics metabolomics nutrigenomics pharmacogenomics and toxicogenomics as related to and applied to marine biotechnology molecular biology marine biology marine microbiology environmental biotechnology environmental science aquaculture pharmaceutical science and bioprocess engineering

Pulp and Paper Industry Pratima Bajpai, 2015-04-09 Pulp and Paper Industry Microbiological Issues in Papermaking features in depth and thorough coverage of microbiological issues in papermaking and their consequences and the current state of the different alternatives for prevention treatment and control of biofilm slime considering the impact of

the actual technological changes in papermaking on the control programmes The microbial issues in paper mill systems chemistry of deposits on paper machines the strategies for deposit control and methods used for the analysis of biofouling are all dealt in this book along with various growth prevention methods The traditional use of biocides is discussed taken into account the new environmental regulations regarding their use Finally discusses the trends regarding the future of the microbiological control in papermaking systems In depth coverage of microbiological issues in papermaking and their consequences Discusses eco efficient processes green processes for biofilm slime control Offers a thorough review of the current literature with links to the primary literature Comprehensive indexing Author is an authority in the pulp and paper industry

Functional Nanostructured Materials and Membranes for Water Treatment Mikel Duke,Dongyuan Zhao,Rafael Semiat,2013-03-14 Membranes have emerged over the last 30 years as a viable water treatment technology Earth s population is growing and the need for alternative ways to generate potable water is rising The recent advent of nanotechnology opens the door to improving processes in membrane technology which is a promising step on the way to solving the earth s potable water problem Current performance is enhanced and new concepts are possible by engineering on the nanoscale This book presents key areas of nanotechnology such as fouling tolerant and robust membranes enhanced destruction of pollutants and faster monitoring of water quality Functional Nanostructured Materials and Membranes for Water Treatment is part of the series on Materials for Sustainable Energy and Development edited by Prof G Q Max Lu The series covers advances in materials science and innovation for renewable energy clean use of fossil energy and greenhouse gas mitigation and associated environmental technologies

New and Future Developments in Microbial Biotechnology and Bioengineering: Microbial Biofilms Mukesh Kumar Yadav,Bhim Pratap Singh,2019-10-10 New and Future Developments in Microbial Biotechnology and Bioengineering Microbial Biofilms is divided into three sections microbial adhesion biofilms in medical settings microbial adhesion biofilms in agriculture and microbial adhesion biofilm in the environment and industry Chapters cover adhesion and biofilm formation by pathogenic microbes on tissue and on indwelling medical devices including sections on human infections microbial communication during biofilm mode of growth host defense and antimicrobial resistance and more Other sections cover the biofilms of agriculturally important and environmental friendly microbes including biofilm formation on plants in soil and in aquatic environments Finally the latest scientific research on microbial adhesion and biofilm formation in the environment and in industry is covered Provides an overview on the growth structure cell to cell interactions and control dispersal of bacterial and fungal of in vitro and in vivo biofilms Presents an overview on the microbial adhesion biofilm formation and structures of single species and multi species biofilms on human tissues medical devices agriculture environment and chemical industries Includes chapters on microbial biofilms of pathogenic microbes on human tissues and in medical indwelling devices Covers factors affecting microbial biofilm adhesion and formation

Challenges and Innovations in Ocean In Situ Sensors Eric Delory,Jay Pearlman,2018-09-21 Challenges and

Innovations in Ocean In Situ Sensors Measuring Inner Ocean Processes and Health in the Digital Age highlights collaborations of industry and academia in identifying the key challenges and solutions related to ocean observations. A new generation of sensors is presented that addresses the need for higher reliability e.g. against biofouling, better integration on platforms in terms of size and communication and data flow across domains in situ space etc. Several developments are showcased using a broad diversity of measuring techniques and technologies. Chapters address different sensors and approaches for measurements including applications, quality monitoring and initiatives that will guide the need for monitoring. Integrates information across key marine and maritime sectors and supports regional policy requirements on monitoring programs. Offers tactics for enabling early detection and more effective monitoring of the marine environment and implementation of appropriate management actions. Presents new technologies driving the next generation of sensors allowing readers to understand new capabilities for monitoring and opportunities for another generation of sensors. Includes a global vision for ocean monitoring that fosters a new perspective on the direction of ocean measurements. Laser Induced Breakdown Spectroscopy (LIBS) Vivek K. Singh, Durgesh Kumar Tripathi, Yoshihiro Deguchi, Zhenzhen Wang, 2023-03-14. Laser Induced Breakdown Spectroscopy LIBS Essential resource covering the field of LIBS with respect to its fundamentals, established and novel applications and future prospects. Laser Induced Breakdown Spectroscopy LIBS presents in two comprehensive volumes a thorough discussion of the basic principles of the method including important recently available data which can lead to a better characterization of the LIBS plasma. This extensive work contains detailed discussions on the lasers, spectrometers and detectors that can be used for LIBS apparatuses and describes various instrumentation ranging from basic setups to more advanced configurations. As a modern resource, the work includes the newest advances and capabilities of LIBS instruments featuring the recent developments of Dual Pulse LIBS, Femtosecond LIBS and Micro LIBS as well as their applications. Throughout the contributions, discuss the analytical capabilities of the method in terms of detection limits, accuracy and precision of measurements for a variety of samples. Lastly, an extensive range of applications is presented including food technology, environmental science, nuclear reactors, nanoscience and nanotechnology and biological and biomedical developments. Sample topics covered within the work include diagnostics of laser induced plasma, LIBS plasma and its characteristics, factors affecting the LIBS plasma, methods of enhancing LIBS sensitivity and LTE/non-LTE plasmas, Instrumental developments in LIBS, light collection system and spectral detection systems, handheld LIBS, deep sea LIBS and industrial sorters and analyzers, Femtosecond laser ablation, laser-matter interaction, laser absorption, energy transport, ablation mechanisms and threshold and plasma characterization, Micro analysis and LIBS imaging, microjoule laser sources, scaling LIBS to microjoule energies, micrometer scaling, advanced applications and future prospects. Spectroscopic and analytical scientists working with LIBS will find this wide-ranging reference immensely helpful in developing LIBS instrumentation and applications. Researchers and students in natural sciences and related

programs of study will be able to use the work to acquire foundational knowledge on the method and learn about cutting edge advancements being made in the field Myconanotechnology Mahendra Rai, Patrycja Golinska, 2023-03-10

Myconanotechnology is a highly interdisciplinary science emerging at a fast pace and has garnered the attention of nanotechnologists mycologists biomedical experts and agriculture scientists among others For the last decade there has been tremendous progress in this field owing to its wider and more effective applications In this book the authors have attempted to discuss different evolving trends in medicine food agriculture veterinary environment and textiles Globally contributed by eminent authors and experts the present book contains valuable chapters on the diverse aspects of Myconanotechnology and thus would be essential reading for academicians This book will cater to the need of postgraduate and research students in fungal biology microbiology chemistry nanotechnology biotechnology and pharmacology Biomimetics Bharat

Bhushan, 2018-11-03 This book presents an overview of the general field of biomimetics and biologically inspired hierarchically structured surfaces It deals with various examples of biomimetics which include surfaces with roughness induced super phobicity philicity self cleaning antifouling low drag low high reversible adhesion drag reduction in fluid flow reversible adhesion surfaces with high hardness and mechanical toughness vivid colors produced structurally without color pigments self healing water harvesting and purification and insect locomotion and stinging The focus in the book is on the Lotus Effect Salvinia Effect Rose Petal Effect Superoleophobic philic Surfaces Shark Skin and Skimmer Bird Effect Rice Leaf and Butterfly Wing Effect Gecko Adhesion Insects Locomotion and Stinging Self healing Materials Nacre Structural Coloration and Nanofabrication This is the first book of this kind on bioinspired surfaces and the third edition represents a significant expansion from the previous two editions **Springer Handbook of Nanotechnology** Bharat

Bhushan, 2017-11-05 This comprehensive handbook has become the definitive reference work in the field of nanoscience and nanotechnology and this 4th edition incorporates a number of recent new developments It integrates nanofabrication nanomaterials nanodevices nanomechanics nanotribology materials science and reliability engineering knowledge in just one volume Furthermore it discusses various nanostructures micro nanofabrication micro nanodevices and biomicro nanodevices as well as scanning probe microscopy nanotribology and nanomechanics molecularly thick films industrial applications and nanodevice reliability societal environmental health and safety issues and nanotechnology education In this new edition written by an international team of over 140 distinguished experts and put together by an experienced editor with a comprehensive understanding of the field almost all the chapters are either new or substantially revised and expanded with new topics of interest added It is an essential resource for anyone working in the rapidly evolving field of key technology including mechanical and electrical engineers materials scientists physicists and chemists *Impact and Management of Marine Biofouling* Yigit Kemal Demirel, Eugene Georgiades, Marlene Lejars, Kelli Zargiel Hunsucker, 2022-08-04

Handbook of Nanoceramic and Nanocomposite Coatings and Materials Abdel Salam Hamdy Makhlouf, Dieter

Scharnweber,2015-05-08 In this new handbook top researchers from around the world discuss recent academic and industrial advances in designing ceramic coatings and materials They describe the role of nanotechnology in designing high performance nanoceramic coatings and materials in terms of the unique advantages that can be gained from the nano scale including the latest techniques for the synthesis and processing of ceramic and composite coatings for different applications Focuses on the most advanced technologies for industry oriented nano ceramic and nano composite coatings including recent challenges for scaling up nano based coatings in industry Covers the latest evaluation methods for measuring coatings performance Discusses novel approaches for improving the performance of ceramic and composite coatings and materials via nanotechnology Provides the most recent and advanced techniques for surface characterization Handbook of Algal

Biofuels Mostafa El-Sheekh,Abd El-Fatah Abomohra,2021-12-02 Handbook of Algal Biofuels Aspects of Cultivation Conversion and Biorefinery comprehensively covers the cultivation harvesting conversion and utilization of microalgae and seaweeds for different kinds of biofuels The book addresses four main topics in the algal biofuel value chain First it explores algal diversity and composition covering micro and macroalgal diversity classification and composition their cultivation biotechnological applications current use within industry for biofuels and value added products and their application in CO2 sequestration wastewater treatment and water desalination Next the book addresses algal biofuel production presenting detailed guidelines and protocols for different production routes of biodiesel biogas bioethanol biobutanol biohydrogen jet fuel and thermochemical conversion methods Then the authors discuss integrated approaches for enhanced biofuel production This includes updates on the recent advances breakthroughs and challenges of algal biomass utilization as a feedstock for alternative biofuels process intensification techniques life cycle analysis and integrated approaches such as wastewater treatment with CO2 sequestration using cost effective and eco friendly techniques In addition different routes for waste recycling for enhanced biofuel production are discussed alongside economic analyses Finally this book presents case studies for algal biomass and biofuel production including BIQ algae house Renewable Energy Laboratory project Aquatic Species Program and the current status of algal industry for biofuel production Handbook of Algal Biofuels offers an all in one resource for researchers graduate students and industry professionals working in the areas of biofuels and phycology and will be of interest to engineers working in renewable energy bioenergy alternative fuels biotechnology and chemical engineering Furthermore this book includes structured foundational content on algae and algal biofuels for undergraduate and graduate students working in biology and life sciences Provides complete coverage of the biofuel production process from cultivation to biorefinery Includes a detailed discussion of process intensification lifecycle analysis and biofuel byproducts Describes key aspects of algal diversity and composition including their cultivation harvesting and advantages over conventional biomass **Biofilm-biomaterial interactions: understanding, preventing, and eradicating**

attachment in infection Jessica Amber Jennings,Lauren B. Priddy,Mark Smeltzer,2022-12-28 **Hydroids of the World**

Elena Kupriyanova, Yanan Sun, Eunice Wong, Harry A. ten Hove, 2023-07-03 Serpulid polychaetes are a unique and highly specialised group of marine segmented worms that have adapted to inhabiting self secreted calcareous tubes attached to a wide range of hard substrates These animals are found across all depths and habitats of the world's oceans and some form mutually beneficial associations with live corals The genus Hydroides is of special concern and importance as it is not only the largest but also one of the most ecologically and economically important groups of marine invertebrates because it includes notorious biofoulers and common bioinvaders that travel around the world hitchhiking on ships hulls This is the first fully illustrated guide to this notorious serpulid genus of calcareous tubeworms providing a comprehensive diagnostic treatment of all known species of the genus Hydroides This important reference provides reliable identification tools to distinguish Australian tubeworms from potential alien invaders that constantly arrive from overseas and threaten Australia's maritime transport trade and mariculture

Monitoring Artificial Materials and Microbes in Marine Ecosystems: Interactions and Assessment Methods Toshiyuki Takahashi, 2020-02-10 Marine ecosystems offer several benefits to human communities To make sustainable use of these benefits it is necessary to elucidate and conserve marine ecology and strive to maintain a sustainable natural resource management program For this reason understanding the diversity and behavior of both macro ecosystems and micro ecosystems are crucial Monitoring Artificial Materials and Microbes in Marine Ecosystems explores microbial roles and their interaction with artificial materials in marine environments After starting with simple topics for beginners chapters explore methods to detect microorganisms in marine ecosystems and interactions of marine organisms with artificial materials The sequential progression into advanced topics makes it easier to understand how to solve the reduction in marine ecosystem viability caused by adverse events Readers are provided with useful information for rehabilitating marine environments to make them sustainable for communities Topics are covered in 3 parts Part 1 is an introductory guide to marine ecosystems and environmental monitoring assessment Readers are introduced to coral reef ecosystems algal blooms and the role of environmental monitoring services in maintaining and restoring the quality of marine environments This is followed by examples of sustainable marine environment assessment Part 2 provides information about methods to detect microorganisms viruses and bacteria and evaluate marine environments This includes sample enrichment methods electrochemical analysis and single cell imaging techniques The highly sensitive and specific techniques presented in the book are applicable in a wide variety of situations Part 3 is dedicated to interactions between artificial metallic materials and microorganisms in marine environments Chapters in this section share results from several experiments conducted to separate microorganisms and biofilms from such environments This book is intended primarily for marine ecologists microbiologists environmental engineers and engineers associated with industrial projects This book is also useful as a text for undergraduate and graduate level courses in marine biology ecology and microbiology

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