

INTEGRATED ENVIRONMENTAL TECHNOLOGY SERIES



2nd EDITION

Environmental Technologies to Treat Sulfur Pollution

Principles and Engineering

Editor: Piet N.L. Lens



Environmental Technologies To Treat Sulfur Pollution Principles And Engineering

Francisco J. Cervantes



Environmental Technologies To Treat Sulfur Pollution Principles And Engineering:

Environmental Technologies to Treat Sulfur Pollution Piet Lens, L. W. Hulshoff Pol, 2000-01-01 Environmental Technologies to Treat Sulfur Pollution Principles and Engineering provides a definitive and detailed discussion of state of the art environmental technologies to treat pollution by sulfurous compounds of wastewater off gases solid waste soils and sediments Special attention is given to novel bioremediation techniques that have been developed over the last 10 years Information density is unique owing to the many figures and graphs 150 tables over 80 and over 1500 cited literature references A detailed subject index helps the reader to find their way through the different technological applications making it the perfect reference work for professionals and consultants dealing with sulfur related environmental bio technologies Contents Part I The sulfur cycle Part II Technologies to Desulfurise Resources Part III Treatment of Waters Polluted by Sulfurous Compounds Part IV Treatment of Gases Polluted by Sulfurous Compounds Part V Treatment of Soils and Sediments Polluted by Sulfurous Compounds Part VI Other Applications of Sulfur Cycle Bioconversions in Environmental Engineering Part VII Problems Related to Sulfur Cycle Bioconversions

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Environmental Technologies to Treat Nitrogen Pollution Francisco J. Cervantes, 2009-06-30 Environmental Technologies to Treat Nitrogen Pollution provides a thorough understanding of the principles and applications of environmental technologies to treat nitrogen contamination The main focus is on water and wastewater treatment with additional coverage of leachates and off gasses The book brings together an up to date compilation of the main physical chemical and biological processes demanded for the removal of nitrogenous contaminants from water wastewater leachates and off gasses It includes a series of chapters providing a deep and broad knowledge of the principles and applications required for the treatment of nitrogen pollution Each chapter has been prepared by recognized specialists across the range of different aspects involved in the removal of nitrogenous contaminants from industrial discharges Environmental Technologies to Treat Nitrogen Pollution is the first book to provide a complete review of all the different processes used for the global management of nitrogen pollution It also contains updated information about strategies to achieve nitrogen recovery and reuse in different industrial sectors Several case studies document the application of different environmental technologies to manage nitrogen pollution This book will be of interest to lecturers and graduate students in the following subject areas Environmental Engineering Environmental Biotechnology wastewater treatment plant design water pollution control contaminants recovery and reuse The book will also be an attractive reference for environmental engineering consultants

Treatment of Micropollutants in Water and Wastewater Jurate Virkutyte, Rajender S. Varma, Veeriah Jegatheesan, 2010-08-14 Over the last few years there has been a growing concern over the increasing concentration of micropollutants originating from a great variety of sources including pharmaceutical chemical engineering and personal care

product industries in rivers lakes soil and groundwater As most of the micropollutants are polar and persistent compounds they are only partially or not at all removed from wastewater and thus can enter the environment posing a great risk to the biota It is hypothesized that wastewater is one of the most important point sources for micropollutants Treatment of Micropollutants in Water and Wastewater gives a comprehensive overview of modern analytical methods and will summarize novel single and hybrid methods to remove continuously emerging contaminants micropollutants from the aqueous phase New trends e g sensor technology nanotechnology and hybrid treatment technologies are described in detail The book is very timely because the new techniques are still in the development phase and have to be realized not only in the laboratory but also on a larger scale The content of the book is divided into chapters that present current descriptive and analytical methods that are available to detect and measure micropollutants together with detailed information on various chemical biological and physicochemical methods that have evolved over the last few decades Treatment of Micropollutants in Water and Wastewater will also enable readers to make well informed choices through providing an understanding of why and how micropollutants must be removed from water sources and what are the most appropriate and available techniques for providing a cost and technologically effective and sustainable solutions for reaching the goal of micropollutant free water and wastewater The book will be suitable for water and wastewater professionals as well for students and researchers in civil engineering environmental engineering and process engineering fields

Anaerobic Biotechnology: Environmental Protection And Resource Recovery Herbert Han Ping Fang, Tong Zhang, 2015-08-24 Environmental protection and resource recovery are two crucial issues facing our society in the 21st century Anaerobic biotechnology has become widely accepted by the wastewater industry as the better alternative to the more conventional but costly aerobic process and tens of thousands of full scale facilities using this technology have been installed worldwide in the past two decades Anaerobic Biotechnology is the sequel to the well received Environmental Anaerobic Technology Applications and New Developments 2010 and compiles developments over the past five years This volume contains contributions from 48 renowned experts from across the world including Gatzke Lettinga laureate of the 2007 Tyler Prize and the 2009 Lee Kuan Yew Water Prize and Perry McCarty whose pioneering work laid the foundations for today s anaerobic biotechnology This book is ideal for engineers and scientists working in the field as well as decision makers on energy and environmental policies

Bioelectrochemical Systems Korneel Rabaey, Lars Angenent, Uwe Schroder, Jurg Keller, 2009-12-01 In the context of wastewater treatment Bioelectrochemical Systems BESs have gained considerable interest in the past few years and several BES processes are on the brink of application to this area This book written by a large number of world experts in the different sub topics describes the different aspects and processes relevant to their development Bioelectrochemical Systems BESs use micro organisms to catalyze an oxidation and or reduction reaction at an anodic and cathodic electrode respectively Briefly at an anode oxidation of organic and inorganic electron donors can occur Prime examples of such electron donors are waste organics and sulfides

At the cathode an electron acceptor such as oxygen or nitrate can be reduced The anode and the cathode are connected through an electrical circuit If electrical power is harvested from this circuit the system is called a Microbial Fuel Cell if electrical power is invested the system is called a Microbial Electrolysis Cell The overall framework of bio energy and bio fuels is discussed A number of chapters discuss the basics microbiology microbial ecology electrochemistry technology and materials development The book continues by highlighting the plurality of processes based on BES technology already in existence going from wastewater based reactors to sediment based bio batteries The integration of BESs into existing water or process lines is discussed Finally an outlook is provided of how BES will fit within the emerging biorefinery area

Recent Advances in Marine Biotechnology, Vol. 8 Milton Fingerman,2003-01-01 This book discusses petroleum spill bioremediation the use of spectroscopy to identify microbial metabolic pathways the detoxification of mercury by using recombinant mercury resistant bacteria and the use of manganese oxidizing bacteria for bioremediation Sustainable Practices in Geoenvironmental Engineering, Second Edition Raymond N. Yong,Catherine N. Mulligan,Masaharu Fukue,2014-09-25 In the seven years since the publication of the first edition of Sustainable Practices in Geoenvironmental Engineering the combination of population growth and increased exploitation of renewable and non renewable natural resources has added increased stresses on the quality and health of the geoenvironment This is especially true when viewed in the context of the growing demand for food and shelter energy and mineral resources and their resultant effects on the natural capital of the geoenvironment Completely revised and updated this second edition of a bestseller introduces and discusses the concept of stressors and their impacts on the geoenvironment See What s New in the Second Edition Clear definition of the geoenvironment New tools and remediation technologies new management methods for geohazards and enhanced coverage of social and economic sustainability Innovative approaches and techniques for reaching geoenvironmental sustainability More detail on treatment technologies both in situ and ex situ Discussion on the mitigation of geodisasters Additional sections to discuss sustainability assessment protocols Updated information on models for prediction of contaminant behavior The authors explore the technologies that take into account targets exposure routes if applicable future land use acceptable risks legislation and resultant emissions discharges in establishing the criteria and tools for evaluating technologies and protocols for environmental management of the impacted land They then discuss how to choose the correct ones to use in different situations to protect the quality and health of natural resource and capital of the geoenvironment and ensure that these geoenvironmental natural resources and capital remain available for future generations and to develop innovative and sustainable techniques to make land more stable and safer **Psychrophiles: From Biodiversity to Biotechnology** Rosa Margesin,Franz Schinner,Jean-Claude Marx,Charles Gerday,2007-12-08 Most scientists in the middle of the twentieth century would probably not have believed that life was possible at extreme values of environmental factors such as pH values close to 0 e g sulfurous environments or to 14 e g soda lakes salinities of 6 M NaCl e

g Dead Sea hydrostatic pressures approaching 0.1 MPa deep sea and temperatures exceeding 100 C thermal vents or hot springs or as low as 20 C e.g. polar regions Of the current studies on extremophiles approximately 30 000 articles by the year 2007 almost two thirds have been performed on organisms adapted to outstanding temperatures but much more attention has been paid to thermophiles than to psychrophiles However over the past 10 years scientific publications on cold adapted microorganisms have increased by a factor of ten If one considers the extent of cold habitats psychrophiles i.e. cold loving organisms should largely lead in this comparison with thermophiles because a great proportion of the Earth's biosphere never reaches temperatures above 5 C Nearly three quarters of the Earth is covered by oceans whose deep water masses irrespective of latitude are constantly between 2 and 4 C The large continent of Antarctica also provides a permanently cold terrestrial environment as well as an aquatic niche in the surrounding ice that melts during the summer Other examples of cold habitats are permafrost soils high alpine soils cold deserts cold caves marine sediments snow glacier and sea ice

Biological Metal Recovery from Wastewaters Sabrina Hedrich, Oliver Wiche, 2025-01-28 This book reviews the latest research on innovative and sustainable biotechnologies for metal recovery from various process streams emphasising the fundamentals and applications of biosystems Divided into 7 chapters it clarifies many topics including biological iron and aluminum recovery from wastewaters precious metal recovery Pt Pd Au Ag algal based metal recovery selenium and tellurium recovery phytoextraction options and arsenic removal by sulfate reducing bacteria Expert contributors explore microbial metabolisms such as iron oxidation sulfate sulfur reduction and selenite reduction through the lens of environmental sustainability In this book readers will discover various case studies and commercial applications of these biotechnologies Particular attention is given to combinations of biological systems with electrochemistry to enhance metal recycling from complex and diluted streams This book is a valuable resource for researchers in the field of environmental biotechnology and scholars of environmental science chemical engineering and microbiology Waste management and resource recovery professionals will benefit greatly from the insights provided This book is a must read for anyone interested in sustainable solutions for critical metal supply within a circular economy framework

Nuclear Material Performance

Rehab Abdel Rahman, Hosam El-Din M. Saleh, 2016-06-29 Assessing and improving nuclear material performance is a crucial subject for the sustainability of the nuclear energy and radioactive isotope supplies This book aims to present research efforts used to identify nuclear materials performances in different areas The contributions of esteemed international experts have covered important research aspects in fission and fusion technologies and naturally occurring radioactive materials management The authors introduced current and anticipated trends toward better performances and mitigating challenges for commercial application of innovative technologies biological remediation of mine effluents nuclear fuel performance in power and research fission reactors gamma ray spectrometer calibration and recent advances in understanding the performance of tungsten composite in fusion reactor environment

Abiotic Stresses M. Ashraf, Philip Harris, 2005-04-07

Gain a better understanding of the genetic and physiological bases of stress response and stress tolerance as part of crop improvement programs Abiotic Stresses Plant Resistance Through Breeding and Molecular Approaches explores innovative methods for breeding new varieties of major crops with resistance to environmental stresses that l **Technologies for the Treatment and Recovery of Nutrients from Industrial Wastewater** Val del Río, Ángeles, Campos Gómez, José Luis, Mosquera Corral, Anuska, 2016-10-21 The production of wastewater from various human and industrial activities has a harsh impact on the environment Without adequate treatment the disposal of this wastewater poses a threat to the quality of water globally Technologies for the Treatment and Recovery of Nutrients from Industrial Wastewater investigates emergent research and best practices within the field of wastewater management Highlighting novel technological tools in wastewater treatment effective nutrient removal technologies and innovative solutions to quality water preservation practices this book is a critical reference source for professionals scientists academics and students Bio-Geotechnologies for Mine Site Rehabilitation M.N.V. Prasad, Paulo Jorge de Campos Favas, Subodh Kumar Maiti, 2018-01-02 Bio Geotechnologies for Mine Site Rehabilitation deals with the biological physical chemical and engineering approaches necessary for the reclamation of mine waste As mining has negative effects on natural resources and deteriorates the quality of the surrounding environment this book provides coverage across different types of mining industries which are currently creating industrial deserts overloaded with technogenic waste The book offers cost effective strategies and approaches for contaminated sites along with remediation and rehabilitation methods for contaminated soils and waste dumps It is an essential resource for students and academics but is also ideal for applied professionals in environmental geology mineral geologists biotechnologists and policymakers Deals with global and holistic approaches of abandoned mine land rehabilitation Includes mine waste rehabilitation case studies from around the world Covers integrated technologies such as bioremediation of metalliferous soil Provide strategies for sustainable ecosystems on mine spoil dumps Offers novel methods for the remediation of acid mine drainage **Biodegradation of Azo Dyes** Hatice Atacag Erkurt, 2010-04-21 Azo dyes play an important role as coloring agents in the textile food and pharmaceutical industry Due to the toxicity mutagenicity and carcinogenicity of azo dyes and their breakdown products their removal from industrial wastewaters has been an urgent challenge Promising and cost effective methods are based on their biodegradation which is treated in this volume The topics presented by experts in the field include the classification of azo dyes toxicity caused by azo dyes aerobic and anaerobic azo dye biodegradation mechanisms the role of bacteria fungi algae and their enzymes in biodegradation the impact of redox mediators on azo dye reduction the integration of biological with physical and chemical processes the biotransformation of aromatic amines reactor modelling for azo dye conversion the biodegradation of azo dyes by immobilized bacteria and fungi and factors affecting the complete mineralization of azo dyes **Disasters and Minewater** Harvey Wood, 2012-01-15 Part of Groundwater Set Buy all six books and save over 30% on buying separately Disasters and Minewater Good Practice and

Prevention draws together all of the major minewater catastrophes that have occurred over the last half century It examines incidents to find useful and positive information of great value that could prevent future disasters Practical experience provides many lessons in respect of the causes of minewater incidents where lack of adherence to good practice is principally to blame Disasters and Minewater Good Practice and Prevention is of particular interest to students of mining civil engineering and environmental engineering It is an invaluable resource for mining engineers geotechnical engineers environmental engineers and disaster relief professionals and consultants Disasters and Minewater is a valuable complement to Minewater Treatment Technology Application and Policy by M Brown B Barley and H Wood ISBN 9781843390046 Author Harvey Wood Clean Rivers Trust UK

Sustainable Practices in Geoenvironmental Engineering Catherine N. Mulligan, Masaharu Fukue, Raymond N. Yong, 2025-02-21 This third edition focuses on the application of geoenvironmental engineering procedures and practices to mitigate and reduce the adverse impacts on the geoenvironment from anthropogenic sources including emerging contaminants such as micro and nanoplastics pharmaceuticals and fire retarding chemicals Thoroughly updated with three new chapters and extensive use of case studies to showcase examples of sustainable practices this new edition discusses many activities that are still generating geoenvironmental impacts that are adverse to the quality and health of the geoenvironment It includes new tools and procedures that have been developed to evaluate and minimize adverse impacts This new edition Discusses the impacts of climate change and potential mitigation Addresses emerging contaminants of concern Introduces an entirely new chapter on sustainable nitrogen and carbon cycles Includes new case studies like the Fukushima case study on sediments and microbial induced precipitation processes Provides new practices and tools for sustainability to evaluate and to minimize adverse impacts Discusses the aspects of social sustainability and cultural aspects of the geoenvironment This book is intended for professionals researchers academics senior undergraduate students and graduate students in geotechnical engineering geoenvironmental engineering site remediation sustainable development and earth sciences

Pond Treatment Technology Andrew Shilton, 2006-03-01 Pond treatment technology is used in tens of thousands of applications serving many millions of people across the globe why Simply because it is efficient and effective While pond treatment technology offers relative simplicity in its application it incorporates a host of complex and diverse mechanisms that work to treat and cleanse polluted waters before their return to our environment This book offers a comprehensive review of the pond technology field including the newest ideas and latest findings Topics covered include The physical chemical and biological characteristics of the pond environment A detailed review of pond treatment mechanisms and performance Comprehensive guidance on pond design operation and upgrade options A range of chapters summarising new and emerging pond technologies The integration of ponds with wetlands and aquaculture systems and their use as storage reservoirs Special applications of pond technology in cold climates for agricultural wastes and for treatment of stormwater The objective of this book is to get this wealth of knowledge out there to

the users to ensure the continuous improvement and ongoing success of this crucial technology *Microbiologically Influenced Corrosion* Brenda J. Little, Jason S. Lee, 2007-03-30 A multi disciplinary multi industry overview of microbiologically influenced corrosion with strategies for diagnosis and control or prevention Microbiologically Influenced Corrosion helps engineers and scientists understand and combat the costly failures that occur due to microbiologically influenced corrosion MIC This book combines recent findings from diverse disciplines into one comprehensive reference Complete with case histories from a variety of environments it covers Biofilm formation Causative organisms relating bacteria and fungi to corrosion mechanisms for groups of metals Diagnosing and monitoring MIC Electrochemical techniques with an overview of methods for detection of MIC The impact of alloying elements including antimicrobial metals and design features on MIC MIC of non metallics Strategies for control or prevention of MIC including engineering chemical and biological approaches This is a valuable all inclusive reference for corrosion scientists engineers and researchers as well as designers managers and operators

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