

# MICROBIOLOGY FOR MINERALS, METALS, MATERIALS AND THE ENVIRONMENT



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# Microbiology For Minerals Metals Materials And The Environment

**ML Morrison**



## **Microbiology For Minerals Metals Materials And The Environment:**

**Microbiology for Minerals, Metals, Materials and the Environment** Abhilash, B. D. Pandey, K. A. Natarajan, 2015-02-25 Better Understand the Connection between Microbiology and the Inorganic World Microbiology for Minerals Metals Materials and the Environment links chemical metallurgical and other metal inherent systems with microbes and analyzes the interdependence between them Specifically intended to underscore the importance of microbes in environmental re

**Resource Recovery from Wastes** Lynne E Macaskie, Devin J Sapsford, Will M Mayes, 2019-10-15 The concept of a circular economy has been gaining increasing attention in recent years Many of the sources of chemicals we have become reliant on are dwindling and the accumulation of waste products poses a serious environmental problem By recovering resources from these waste materials we can reduce our dependence on virgin feedstocks that may not be sustainable as well as reducing the quantity of material going to landfill sites Incorporating different perspectives from a global authorship this book aims to introduce systems thinking to the field of waste and resource management The topics covered range from the use of biogeochemical processes in resource recovery to the application of engineered nanomaterials with information relevant to both academia and industry The broad range and cross disciplinary nature of the topics in this book make it a valuable resource for those working in circular economy research green chemistry and waste and resource management

*Microbiome-Based Decontamination of Environmental Pollutants* Ajay Kumar, Joginder Singh Panwar, Lucas Carvalho Basilio de Azevedo, 2024-04-04 Microbiome Based Decontamination of Environmental Pollutants explores the complex interactions of plant associated microbiomes providing insights into the pressing challenges of managing environmental resources such as soil water and waste Analysis has shown a formidable potential based in the network interactions between plant microbiota and environmental contaminants This book presents insights into the potential exploitation of these plant associated microbial functions This volume in the Plant and Soil Microbiome series summarizes microbiological aspects of environmental management from the basics to advanced theoretical as well as practical aspects of microbial based approaches The physical and chemical changes caused by pollution of an ecosystem can occur rapidly significantly impacting the functionality of ecosystem services in that environment Environmental contamination poses and increasingly global challenge through direct and indirect adverse impacts on the climate soil productivity and the health concerns of human beings Traditional remediation techniques are not consistently feasible in mitigating environmental contaminants challenges in terms of cost effectiveness limited land resources and toxic residual products The use of plant associated microbes as part of a network of tools opens a new door to explore an alternative eco friendly and economical technology to mitigate the challenges of environmental contamination Explores the emerging plant microbe interactive nexus for contaminants degradation Presents insights into the production and commercialization of plant microbiome based enzymes Includes engineered microbes and microbial products application in contaminant management Highlights the latest

omics and technologies used in plant soil microbiome in contaminant management      **Management of Electronic Waste**  
Anshu Priya, 2023-12-27 **MANAGEMENT OF ELECTRONIC WASTE** Holistic view of the current and future trends in electronic waste management focusing on recycling technologies and regulations **Management of Electronic Waste** delivers a complete overview of all aspects related to the toxicity characterization of electronic wastes along with other important topics including resource recovery recycling strategies biotechnological advancements and current perspectives on waste generation and management The book presents hazards associated with conventional recycling methods and highlights environmentally compatible economic approaches for resource recovery along with eco friendly strategies for management of electronic wastes The high metallic content heterogeneous and composite nature of e wastes make them a rich secondary reservoir of metals The book explores the valuable potential of e waste and highlights the eco friendly sustainable technologies and recycling strategies for the profitable and effective conversion of waste to wealth Written by a highly qualified and internationally renowned author **Management of Electronic Waste** covers sample topics such as Rise of e waste generation paired with rising economies and mounting demand for electrical and electronic devices with a country by country breakdown Status of e waste management and recycling efforts around the world along with key processes that drive e waste recycling Macroeconomic trends between global demand and supply for metal resources and the transition of linear to circular economy Bioleaching an economic and green approach for recovery of metals from e waste and other low grade metal repositories Different metallurgical approaches for extraction and recovery of resources from e waste and their pros and cons Filling a gap on the understudied biotechnological recycling techniques and methods for mitigating environmental pollution caused by electronic waste **Management of Electronic Waste** serves as an excellent guide on the subject for electronic waste producers consumers recycling industries policy and law makers academicians and researchers

*Industrial Biotechnology* Mark Anthony Benvenuto, 2024-10-07 The book provides an excellent introduction to industrial biotechnology addressing the applications of biomolecules and living systems in industrial manufacturing of various products Each part of the book is devoted to a certain biotech sector such as biofuels food chemicals pharmaceuticals and materials The book also covers the environmental aspects of industrial biotechnology and the principles of bio based economy

*Clean Coal Technologies* Rajesh Kumar Jyothi, Pankaj Kumar Parhi, 2021-05-10 This book presents the state of art of the several advanced approaches to beneficiation of coal The influence of recent technology attains the advantages of processing coal purification studies rheological behavior and the mineral beneficiation The experts collected in this volume have contributed significantly to the enrichment in the in depth knowledge not only in context of working knowledge but also future prospects of clean coal technology      *Rare Earth Elements* Athanasios K. Karamalidis, Roderick Eggert, 2024-10-08 **Rare Earth Elements Sustainable Recovery Processing and Purification** Rare earth elements are used in many modern technologies including electronics clean energy defense aerospace and automotive It is important that increasing demand is

met in ways that are more environmentally socially and economically sustainable than in the past Rare Earth Elements Sustainable Recovery Processing and Purification describes sources of rare earths and methods of production that have the potential to make recovery processing and purification more sustainable Volume highlights include Global overview of rare earth production reserves and resources Improvements in the recovery process to reduce costs and environmental impacts Potential new sources of rare earths that were not previously technically feasible Options for recovery of rare earths as byproducts of other activities Contributions from experts in academia industry government research and nonprofit organizations The American Geophysical Union promotes discovery in Earth and space science for the benefit of humanity Its publications disseminate scientific knowledge and provide resources for researchers students and professionals **Waste**

**Bioremediation** Sunita J. Varjani,Edgard Gnansounou,Baskar Gurunathan,Deepak Pant,Zainul Akmar Zakaria,2017-12-01 This book discusses the bioremediation of both solid and liquid waste including regional solutions for India as well as globally relevant applications The topics covered include pollutant reduction through composting solutions for petroleum refinery waste use of microorganisms in the bioremediation of industrial waste and toxicity reduction microbial fuel cells and microbial depolymerisation The book also explores the biosorption of metals and the bioremediation of leachates especially with regard to soil and groundwater remediation It is a valuable resource for researchers professionals and policy makers alike Geomechanics and Geodynamics of Rock Masses Vladimir Litvinenko,2018-05-15

Geomechanics and Geodynamics of Rock Masses contains contributions presented at EUROCK 2018 the 2018 International Symposium of the International Society for Rock Mechanics ISRM 2018 Saint Petersburg Russia 22 26 May 2018 Dedicated to recent advances and achievements in the fields of geomechanics and geotechnology the main topics of the book include Physical and mechanical properties of fractured rock laboratory testing and rock properties field measurements and site investigations Geophysics in rock mechanics Rock mass strength and failure Nonlinear problems in rock mechanics Effect of joint water on the behavior of rock foundation Numerical modeling and back analysis Mineral resources development methods and rock mechanics problems Rock mechanics and underground construction in mining hydropower industry and civil engineering Rock mechanics in petroleum engineering Geodynamics and monitoring of rock mass behavior Risks and hazards Geomechanics of technogenic deposits Geomechanics and Geodynamics of Rock Masses will be of interest to researchers and professionals involved in the various branches of rock mechanics and rock engineering EUROCK 2018 organized by the Saint Petersburg Mining University is a continuation of the successful series of ISRM symposia in Europe which began in 1992 in Chester UK

**Geomechanics and Geodynamics of Rock Masses - Volume 2** Vladimir Litvinenko,2018-05-20 This book is Volume 2 of the EUROCK 2018 proceedings Geomechanics and Geodynamics of Rock Masses contains contributions presented at EUROCK 2018 the 2018 International Symposium of the International Society for Rock Mechanics ISRM 2018 Saint Petersburg Russia 22 26 May 2018 Dedicated to recent advances and achievements in the fields of geomechanics and

geotechnology the main topics of the book include Physical and mechanical properties of fractured rock laboratory testing and rock properties field measurements and site investigations Geophysics in rock mechanics Rock mass strength and failure Nonlinear problems in rock mechanics Effect of joint water on the behavior of rock foundation Numerical modeling and back analysis Mineral resources development methods and rock mechanics problems Rock mechanics and underground construction in mining hydropower industry and civil engineering Rock mechanics in petroleum engineering Geodynamics and monitoring of rock mass behavior Risks and hazards Geomechanics of technogenic deposits Geomechanics and Geodynamics of Rock Masses will be of interest to researchers and professionals involved in the various branches of rock mechanics and rock engineering EUROCK 2018 organized by the Saint Petersburg Mining University is a continuation of the successful series of ISRM symposia in Europe which began in 1992 in Chester UK

**Microbial Technology for Sustainable E-waste Management** Prasenjit Debbarma, Saurabh Kumar, Deep Chandra Suyal, Ravindra Soni, 2023-03-01

This book besides discussing challenges and opportunities will reveal the microbe metal interactions and strategies for e waste remediation in different ecosystems It will unveil the recent biotechnological advancement and microbiological approach to sustainable biorecycling of e waste such as bioleaching for heavy metal extraction valorization of precious metal biodegradation of e plastic the role of the diverse microbial community in e waste remediation genetically engineered microbes for e waste management the importance of microbial exopolysaccharides in metal biosorption next generation technologies omics based technologies etc It also holds the promise to discuss the conservation utilization and cataloging indigenous microbes in e waste polluted niches and promising hybrid technology for sustainable e waste management Revolution in the area of information technology and communication is constantly evolving due to scientific research and development Concurrently the production of new electrical and electronic equipment also thus uplifting in this era of revolution These technological advancements certainly have problematic consequences which is the rise of huge amounts of electronic obsolesces or electronic waste e waste Improper management of both hazardous and nonhazardous substances of e waste led to a major concern in our digital society and environment Therefore a sustainable approach including microbial candidates to tackle e waste is the need of the hour Nevertheless the continuous demand for new generation gadgets and electronics set this high tech evolution to a new frontier in the last few years With this continuing trend of technological development e waste is expanding exponentially worldwide In the year of 2019 the worldwide generation of e waste was approximately 53.6 Mt of which only about 17.4% of e waste was collected and recycled and the other 82.6% was not even documented E waste contains various heterogeneous waste complexes such as metals 60% blends of many polymers 30% and halogenated compounds radioactive elements and other pollutants 10% respectively The sustainable efficient and economic management of e waste is thus a challenging task today and in the coming decades Conventional techniques such as the use of chemicals incineration and informal ways of e waste dismantling trigger serious health risks and contamination to the

human population and environment respectively due to the liberation of toxic and hazardous substances from the waste. In this context, bio candidates especially microorganisms could be sharp edged biological recycling tools to manage e waste sustainably. As microbes are omnipresent and diverse in their physiology and functional aspects they offer a wide range of bioremediation.

**Handbook of Metal-Microbe Interactions and Bioremediation** Surajit Das, Hirak Ranjan

Dash, 2017-04-07 Around the World metal pollution is a major problem. Conventional practices of toxic metal removal can be ineffective and/or expensive, delaying and exacerbating the crisis. Those communities dealing with contamination must be aware of the fundamentals, advances of microbe mediated metal removal practices because these methods can be easily used and require less remedial intervention. This book describes innovations and efficient applications for metal bioremediation for environments polluted by metal contaminants.

*Biochemical Engineering and Biotechnology* Ghasem Najafpour, 2025-03-27

*Biochemical Engineering and Biotechnology* Third Edition continues to outline the principles of biochemical processes and explain their use in the manufacturing of everyday products. The author uses a direct approach that proved to be very useful for graduate students and fellow research scientists in following the concepts of biochemical engineering and practical applications related to the field of biotechnology. This book is unique in having many solved problems, case studies, examples and demonstrations of detailed experiments with simple design equations and required calculations. All chapters are fully revised and updated and include the latest research results in the field of biochemical engineering and biotechnology. The new edition emphasizes practical aspects, microorganisms and upgrades of new types of membrane bioreactors and it contains more case studies and solved problems along with seven new chapters on recent topics in biosensors, bioanode, nanoscience, hydrogel, conceptual investigations on biological processes for industrial wastewater treatment and algal growth. *Biochemical Engineering and Biotechnology* Third Edition remains an indispensable reference for researchers in bioprocess engineering, chemical and physical biological treatment of industrial wastewater, enzyme technology, fermentation processes, nanoparticle synthesis for antibiotic loading, medicine and drug delivery. Fully revised and updated new edition including the latest research results in biochemical engineering and biotechnology. Expanded with seven new chapters covering biosensors, bioanode, microalgae growth, nanoscience, industrial wastewater treatment and exopolysaccharide. Indispensable reference for researchers in chemical, physical and biological treatment of industrial wastewater, membrane bioreactors, biosensors and bioanodes, application in microbial fuel cells. Strong emphasis on practical aspects and case studies including extensive applications of biotechnology in biochemical engineering.

*Radionuclide Uptake In Food And Consequences For Humans*

Dharmendra Kumar Gupta, Clemens Walther, 2025-01-17 This book provides a comprehensive review on how radionuclides occur in the environment, how radionuclides are distributed in soil, how the migration of radionuclides in plants occurs and their consequences on human health. It explains how the speciation of radionuclide interferes in the uptake and accumulation processes in fruits and includes case studies as well as reviews of modern and state of the art technology related to

radioactive material uptake in plants This volume is a useful reference to researchers in the field of radionuclide contamination in foods and will also be helpful for graduate and undergraduate students specializing in radioactive waste disposal and its toxicity effects in food products and their consequences on humans Microbiologically Influenced

Corrosion in the Upstream Oil and Gas Industry Torben Lund Skovhus, Dennis Enning, Jason S. Lee, 2017-03-03

Microorganisms are ubiquitously present in petroleum reservoirs and the facilities that produce them Pipelines vessels and other equipment used in upstream oil and gas operations provide a vast and predominantly anoxic environment for microorganisms to thrive The biggest technical challenge resulting from microbial activity in these engineered environments is the impact on materials integrity Oilfield microorganisms can affect materials integrity profoundly through a multitude of elusive bio chemical mechanisms collectively referred to as microbiologically influenced corrosion MIC MIC is estimated to account for 20 to 30% of all corrosion related costs in the oil and gas industry This book is intended as a comprehensive reference for integrity engineers production chemists oilfield microbiologists and scientists working in the field of petroleum microbiology or corrosion Exhaustively researched by leaders from both industry and academia this book discusses the latest technological and scientific advances as well as relevant case studies to convey to readers an understanding of MIC and its effective management **Microbes and Microbial Biotechnology for Green Remediation** Junaid Ahmad

Malik, 2022-06-14 Microbes and Microbial Biotechnology for Green Remediation provides a comprehensive account of sustainable microbial treatment technologies The research presented highlights the significantly important microbial species involved in remediation the mechanisms of remediation by various microbes and suggestions for future improvement of bioremediation technology The introduction of contaminants due to rapid urbanization and anthropogenic activities into the environment causes unsteadiness and distress to the physicochemical systems including living organisms Hence there is an immediate global demand for the diminution of such contaminants and xenobiotics which can otherwise adversely affect the living organisms Over time microbial remediation processes have been accelerated to produce better eco friendlier and more biodegradable products for complete dissemination of these xenobiotic compounds The advancements in microbiology and biotechnology lead to the launch of microbial biotechnology as a separate area of research and contributed dramatically to the development of the areas such as agriculture environment biopharmaceutics and fermented foods Microbes stand as an imperative efficient green and economical alternative to conventional treatment technologies The proposed book provides cost effective and sustainable alternatives This book serves as a reference for graduate and postgraduate students in environmental biotechnology and microbiology as well as researchers and scientists working in the laboratories and industries involved in research related to microbiology environmental biotechnology and allied research Discusses important microbial activities such as biofertilizer biocontrol biosorption biochar biofilm biodegradation bioremediation bioclogging and quorum sensing Covers all the advanced microbial bioremediation techniques which are finding their way from the



laboratory to the field for revival of the degraded agro ecosystems Examines the role of bacteria fungi microalgae *Bacillus* sp *Prosopis juliflora* *Deinococcus radiodurans* *Pseudomonas methanotrophs* siderophores and PGPRs as the biocontrol and green remediation agents for soil sustainability

**Biohydrometallurgical Recycling of Metals from Industrial Wastes**

Hong Hocheng, Mital Chakankar, Umesh Jadhav, Swati Gurme, 2025-03-13 Although many available metal recycling methods are simple and fast they are also expensive and cause environmental pollution Biohydrometallurgical processing of metals offers an alternative to overcome these issues as the use of biological means not only helps to conserve dwindling ore resources but also fulfills the unambiguous need to extract metals in nonpolluting low energy and low cost way This book covers biohydrometallurgy and its application in the recovery of metals from secondary sources like wastes Fully updated for a new edition it provides readers with a comprehensive overview of different wastes for metal recovery and biological treatment methods that are both environmentally friendly and economically viable Offers a detailed explanation about generation of different metals containing industrial waste Explains traditional and new biological methods of recycling Reflects research advances across different industrial waste sources including electric vehicle batteries and LCDs from computers and other devices Focuses on each waste type and explores in detail the biohydrometallurgical recovery of metals from that waste Discusses fundamental microbial studies in bioleaching and updates about the use of emerging technologies and integrated techniques with different methods in combination for metal recovery Features a new chapter on techniques for metal extraction from bioleachate This book serves as an essential resource for researchers and professional engineers working in chemical and environmental engineering and biotechnology

**Critical and Rare Earth Elements** Abhilash, Ata

Akcil, 2019-11-11 This book is aimed to compile the distribution of rare earth elements in various resources with their processing from secondary resources It includes details of various processes developed for extraction of rare earth elements from varied raw materials ranging from e wastes tailings process wastes and residues It emphasizes importance of processing of the secondary resources to assist environmental remediation of such untreated wastes and get finished products It covers all aspects of rare metals and rare earth metals in one volume covering extraction separation and recycling of secondary resources for extraction of these metals along with relevant case studies

U.S. Geological Survey

Open-file Report, 1994 *Geomicrobiology: Natural and Anthropogenic Settings* Lucian C. Staicu, Larry L.

Barton, 2024-05-27 This volume brings together leading international experts to offer a unique and timely perspective on geomicrobiology through their latest research and findings Chapters address interactions of marine and freshwater microorganisms contributing to geochemical cycles including biochemical mechanisms for mineralization and transformation of solid minerals and dissolved metals In addition the resilience and physiological elasticity of specific bacteria in extreme environments is discussed such as mechanisms of metal homeostasis and electrochemistry involving extracellular electron flow Further coverage includes resource recovery metals minerals using microbial driven processes and technologies with

the aim to contribute to a better understanding of microbial potential within the framework of circular economy This book is designed for professionals and students including environmental engineers microbiologists and individuals studying the interaction of bacteria with metals and minerals in the environment It is also a resource for students in academic programs or short courses focused on bacterial diversity in the environment systems of bacterial energetics resource recovery and bacterial activities in extreme or nutrient stressed environments

Uncover the mysteries within Crafted by is enigmatic creation, Embark on a Mystery with **Microbiology For Minerals Metals Materials And The Environment** . This downloadable ebook, shrouded in suspense, is available in a PDF format (Download in PDF: \*). Dive into a world of uncertainty and anticipation. Download now to unravel the secrets hidden within the pages.

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