Treatment Of Contaminated Soil Fundamentals Analysis Applications | 51f6b3eb6ee0acc8d78773bc1ece9a95


"This unique, single-source reference offers a thorough treatment of the remediation of soils contaminated by hazardous wastes and the scientific and engineering issues that must be addressed in creating practical solutions for their reclamation. Newly developed and innovative methods are mentioned and outlined so that the book can be used as a source of information for scientists and professionals specialised in the treatment of soils as well as for students in courses of environmental studies. The book offers a short, compressed overview of the important features of this subject and can be used as a reference book of the state of the art. The appendix offers the interested reader a detailed survey of materials, test methods and apparatus as well as a description of analytical directions and processes. Every practicing environmental engineer should already have a firm grasp on the basics of hazardous waste site remediation—the key to confronting a site problem, and devising an effective solution. Since their original introduction to remediation, technology has kept moving apace with ideas and procedures. Fundamentals of Hazardous Waste Site Remediation gives environmental professionals immediate access to the basics of the trade, along with information about recent advancements. This comprehensive overview examines the fundamental properties of soil/waste systems. This handbook presents detailed descriptions of methods for evaluating, monitoring and assessing bioremediation of soil contaminated with organic pollutants or heavy metals. Traditional soil investigation techniques, including chemical, physical and microbiological methods, are complemented by the most suitable modern methods, including biosensor technology, immunological, ecotoxicological and molecular assays. Step-by-step procedures, lists of required equipment and reagents and notes on evaluation and quality control allow immediate application.

FROM THE INTRODUCTION This three-volume set, Bioremediation: Principles and Practice, provides state of the art description of advances in pollution treatment and reduction using biological means; identify and address, at a fundamental level, broad scientific and technological areas that are unique to the subject or theme and that must be understood if advances are to be made; and provide a comprehensive overview of new developments at the regulatory, desk-top, bench-scale, pilot scale, and full-scale levels. The set covers all media-air, water, and soil/sediment-and blends the talents, knowledge, and know-how of academic, industrial, governmental, and international contributors. The set addresses the removal of both hazardous and nonhazardous contaminants from the liquid, solid, and gas phase using biological processes. This includes the biological treatment of wastes of municipal and industrial origin; bioremediation of leachates, soils, and sediments; and biofiltration for contaminated gases. This book provides an overview of the current development status of remediation technologies involving electrochemical processes, which are used to clean up soils that are contaminated with different types of contaminants (organics, inorganics, metalloids and radioactive). Written by internationally recognized experts, it comprises 21 chapters describing the characteristics and theoretical foundations of various electrochemical applications of soil remediation. The book’s opening section discusses the fundamental properties and characteristics of the soil, which are essential to understand the processes that can most effectively remove organic and inorganic compounds. This part also focuses on the primary processes that contribute to the application of electrochemically assisted remediation, the most important operating conditions. In turn, the book’s second part deals with practical applications of technologies related to the separation of pollutants from soil. Special emphasis is given to the characteristics of these technologies regarding transport of the contaminants and soil toxicity after treatment. The third part is dedicated to new technologies, including electrokinetic remediation and hybrid approaches, for the treatment of emerging contaminants by ex-situ and in-situ production of strong oxidant species used for soil remediation. It also discusses pre-pilot scale for soil treatment and the use of solar photovoltaic panels as an energy source for powering electrochemical systems, which can reduce both the investment and maintenance costs of electrochemically assisted processes.

"Offers thorough coverage of the remediation of soils contaminated by hazardous wastes, including materials, analytical techniques, cleanup design and methodology, characterization of geo-media, monitoring of contaminants in the subsurface, and waste containment. Cites specific case studies in hydrocarbon remediation that offer a concise overview of

An introduction to the principles and practices of soil and groundwater remediation Soil and Groundwater Remediation offers a comprehensive and up-to-date review of the principles, practices, and concepts of sustainability of soil and groundwater remediation. The book starts with an overview of the importance of groundwater resource/quality, contaminant sources/types, and the scope of soil and groundwater remediation. It then provides the essential components of soil and groundwater remediation with easy-to-understand design equations/calculations and the practical applications. The book contains information on remediation basics such as subsurface chemical behaviors, soil and groundwater hydrology and characterization, regulations, cost analysis, and risk assessment. The author explores various conventional and innovative remediation technologies, including pump-and-treat, soil vapor extraction, bioremediation, thermal treatment, advanced techniques, soil washing/flushing, and permeable reactive barriers. The book also examines the modelling of groundwater flow and contaminant transport in saturated and unsaturated zones. This handbook presents the current challenges of remediation practices includes up-to-date information about the low-cost, risk-based, sustainable remediation practices, as well as...
institutional control and management Options a balanced mix of the principles, practices, and sustainable technologies to soil and groundwater remediation Contains learning objectives, discussions of key theories, and example problems Provides illustrative case studies and recent research when remediation techniques are introduced Written for undergraduate seniors and graduate students in natural resource, earth science, environmental science/engineering, and environmental management. Soil and Groundwater Remediation is an authoritative guide to the principles and components of soil and groundwater remediation that is filled with worked and practice problems.

In view of the grave consequences of soil degradation on ecosystem functions, food security, biodiversity and human health, this book covers the extent, causes, processes and impacts of global soil degradation, and processes for improvement of degraded soils. Soil conservation measures, including soil amendments, decompaction, mulching, cover cropping, crop rotation, green manuring, contour farming, strip cropping, alley cropping, surface roughening, windbreaks, terracing, sloping agricultural land technology (SALT), dune stabilization, etc., are discussed. Particular emphasis is given to soil pollution and the methods of physical, chemical and biological remediation of polluted soils. This book will lead the reader from the basics to a comprehensive understanding of soil degradation, conservation and remediation.

This introductory manual addresses environmental site restoration practices that both ensure compliance with federal statutes and prevent further contamination or expense. Emphasizing environmental chemistry, soil science, microbiology, plant science, and the underlying chemical processes, Fundamentals of Site Remediation incorporates relevant chemical principles into the cleanup and removal of hazardous chemicals from geological strata, and groundwater.

This book is the second volume of the proceedings of the 4th GeoShanghai International Conference that was held on May 27-30, 2018. The book, entitled “Fundamentals of Soil Behaviours”, presents the recent advances and technology in the understanding and modelling of fundamentals of soil’s behaviours. The subject of this book covers a wide range of topics related to soil behaviours in geotechnical engineering, geoenvironmental engineering and transportation engineering. The state-of-the-art theories, methodologies and findings in the related topics are included. This book may benefit researchers and scientists from the academic fields of soil and rock mechanics, geotechnical engineering, geoenvironmental engineering, transportation engineering, geology, mining and energy, as well as practical engineers from industry. Each of the papers included in this book received at least two positive peer reviews. The editors would like to express their sincere appreciation to all of the anonymous reviewers all over the world, for their diligent work.

Introduces the most up-to-date techniques for soil remediation, including chemical fixation/stabilization, soil vapor extraction, thermally enhanced vapor stripping, biodegradation, and air sparging written in a style accessible to nonspecialists. Discusses the ex situ technique of thermal desorption of soil contaminants-a low-cost alternative to incineration for the removal of organics.

An unmatched reference on electrochemical technologies for soil, sediment, and groundwater pollution remediation Electrochemical technologies are emerging as important approaches for effective and efficient pollution remediation, both on their own and in concert with other remediation techniques. Electrochemical Remediation Technologies for Polluted Soils, Groundwaters and Sediments provides a systematic and clear explanation of fundamentals, field applications, as well as opportunities and challenges in developing and implementing electrochemical remediation technologies. Written by leading authorities in their various areas, the text summarizes the latest research and offers case studies that illustrate equipment, installation, and methods employed in real-world remediations. Divided into nine sections, the coverage includes: Introduction and fundamental principles Remediation of metal/metalloids and other inorganic contaminants Remediation of organic pollutants Remediation of mixed contaminants Electrokinetic barriers Integrated (coupled) technologies Mathematical modeling Economic and regulatory considerations Field applications and performance assessment Unique as a comprehensive reference on the subject, Electrochemical Remediation Technologies for Polluted Soils, Sediments and Groundwater will serve as a valuable resource to all environmental engineers, scientists, regulators, and policymakers.

Fundamentals of Environmental Site Assessment and Remediation examines all aspects of environmental site assessment and remediation and outlines the interdisciplinary skills needed to work in the field. It provides a comprehensive overview for students, environmental professionals, and real estate developers, and includes the latest environmental regulations, environmental site assessment and remediation practices, and industry standards. It examines pollution sources and the related impacts on drinking water supplies, the associated health risks, and how to protect water resources. The monitoring of surface water, groundwater, and soil is explained, as well as vapor intrusion. It will include several practical case studies throughout. Features Includes the latest and best practices for environmental site assessment and remediation procedures. Presents a multidisciplinary approach, including environmental forensics, nanotechnology, microbiology (DNA technology) and isotopes, etc. Examines various pollutants and their related impacts on drinking water supplies, the associated health risks, and how to protect water resources. Presents the best practices for the monitoring of surface water, groundwater, and soil. Covers the latest environmental regulations and industry standards.

A deeper insight into the complex processes involved in this field, covering the biological, chemical and engineering fundamentals needed to further develop effective methodologies. The book devotes detailed chapters to each of the four main areas of environmental biotechnology -- wastewater treatment, soil treatment, solid waste treatment, and waste gas treatment -- dealing with both the microbiological and process engineering aspects. The result is the combined knowledge contained in the extremely successful volumes 11a through 11c of the "Biotechnology" series in a handy and compact form.

Biochar: Fundamentals and Applications in Environmental Science and Remediation Technologies, Volume Six provides readers with the fundamentals of scientific and technological aspects of biochar application in stormwater treatment, its use in contaminant removal, greenhouse gas mitigation, as landfill cover material, and new environmental and agronomic applications. Chapters in this new release cover Biochar application for soil remediation in a redox-sensitive environment. Remediation of heavy metal contaminated soil: Role of biochar, Role of biochar as a cover material in Landfill waste disposal systems-Perspective from Unsaturated soil mechanics, Biochar in soil re-engineering, Green remediation of contaminated agricultural land using biochar, and more. Additional chapters cover the impact of biochars on redox processes in soils, Biochar for manipulation of manure properties, A relationship paradigm between biochar amendments and greenhouse gas emissions. Biochar amalgamation with clay: Enhanced performance for environmental remediation, Functionalization of biochar using microbial consortia, and the Potential role of biochar to mitigate the negative impacts of climate change on water quality. Provides up-to-date information on the use of biochar for contaminant remediation, as landfill cover material, and as a tool for energy transition Includes the aspect of biochar's use in mitigating impacts of climate change and how manure properties can be altered through biochar addition. Covers the role of microbial consortia on biochar functionalization


This volume examines the application of chelating agents for the treatment of soil contaminated with metals with a focus on soil washing, soil flushing, phytoremediaation, and electrokinetic remediation. The huge expansion of the chemical and petroleum industries in the twentieth century has resulted in the production of a vast array of chemical compounds and materials that have transformed our lives. The associated large-scale manufacturing, processing and handling activities have caused a serious deterioration in environmental quality and created threats to human health. These negative impacts have led to responses and regulations requiring remedial action in support of environmental sustainability, of biotechnological methods through bioremediation. Application has gained prominence as an option for soil remediation methods. Bioremediation is a multidisciplinary approach where biologists, chemists, soil scientists and engineers work as team to develop and implement remediation processes. Bioremediation has now been used successfully to remediate many petroleum-contaminated sites. However, there are as yet no commercial technologies commonly used to reanimate the most recalcitrant contaminants. Nevertheless, bioremediation is a rapidly advancing field and new bio-based remedial technologies are continuing to emerge.

This book presents recent developments in the field of environmental biotechnology. Three major forces are currently driving this discipline: the exploration of microbial diversity by genetic and genomic tools, the ongoing progress in the modelling of various transient
phenomena, and environmental biotechnology. This book provides a state-of-art-overview of developments in the field of environmental biotechnology concerning exploration, implementation, modelling, economic development and safety. It comprises selected, peer-reviewed papers that were presented at the European Symposium on Environmental Biotechnology (ESEB) 2004, held in Ostende, Belgium, April 2004.

Environmental and social impact assessment (ESIA) is an important and often obligatory part of proposing or launching any development project. Delivering a successful ESIA needs not only an understanding of the theory but also a detailed knowledge of the methods for carrying out the processes required. Riki Therivel and Graham Wood bring together the latest advice on best practice from experienced practitioners to ensure an ESIA is carried out effectively and efficiently. This new edition: • explains how an ESIA works and how it should be carried out • demonstrates the links between socio-economic, cultural, environmental and ecological systems and assessments • incorporates the World Bank's IFC performance standards, and best practice examples from developing as well as developed countries • includes new chapters on emerging ESIA topics such as climate change, ecosystem services, cultural impacts, resource efficiency, land acquisition and involuntary resettlement. Invaluable to undergraduate and MSc students of ESIA on planning, ecology, geography and environment courses, this internationally oriented fourth edition of Methods of Environmental and Social Impact Assessment is also of great use to planners, ESIA practitioners and professionals seeking to update their skills.

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This book covers a broad range of wastes, from bio-waste to hazardous waste, but primarily the largest (by mass and volume) group of wastes that are not hazardous, but also are not inert, and are problematic for three major reasons: (1) they are difficult to manage because of their volume: usually they are used in civil engineering as a common fill etc., where they are exposed to environmental conditions almost the same way as at disposal sites; (2) they are not geochemically stable and in the different periods of environmental exposure undergo transformations that might add hazardous properties to the material that are not displayed when it is freshly generated; (3) many designers and researchers in different countries involved in waste management are often not aware of time-delayed adverse environmental impact of some large-volume waste, and also do not consider some positive properties that may extend the area of their environmentally beneficial application.

This highly informative and carefully presented book discusses the synthesis, processing, characterization and applications of different types of materials. It provides an overview of recent advances in the areas of materials research and engineering and highlights a wide range of significant recent results in energetic materials, bio-based materials, ceramics, nanomaterials, among others, and their use for emerging applications. The contents of this book are relevant to researchers in academia and industry professionals working on the development of advanced materials and their applications.

Introductory technical guidance for civil and environmental engineers interested in remediation treatment of contaminated soil. Here is what is discussed:

1. INTRODUCTION
2. DESCRIPTION OF MPE TECHNOLOGIES AND APPLICATION STRATEGIES
3. GENERAL CONCEPTS
4. FUNDAMENTALS OF MULTIPHASE FLOW IN POROUS MEDIA.

Based on papers delivered at the First International Congress on Toxic Combustion By-products: Formation and Control, held in Los Angeles, Calif., August 1989. An overview of emissions, health risks, and existing regulations is followed by coverage of such topics as continuous emissions monitoring and control, processing of solids and liquids, fundamental chemistry, metals emissions, gas transport, and advanced combustion and control systems. Despite the length of time between the conference and publication, no index was prepared. Annotation copyright by Book News, Inc., Portland, OR

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Soils are neither good nor bad, but some have inherent or acquired characteristics that may or may not suit our intended use. Unsuitable characteristics are considered to be soil problems, soil constraints or soil limitations. Only twelve percent of global land is right for agricultural production without much limitation. Some soils have severe limitations for crop production. These soils are so called ‘problem soils’. Many of them do not have enough fertility to be productive; some are arid and saline; some are very sandy and dry; and some are wet and waterlogged for most of the growing season. The global demand for food, wood, fuel, fiber, medicine and other plant products for the 7.2 billion current world population has created such an immense pressure on global soil resources that even the most fertile soils are losing their productive capacity. We are being compelled to bring more and more unsuitable or marginally suitable soils under cultivation. Unless innovative and integrated soil, crop and environmental management practices are adopted for their improvement and sustainable use, further degradation is inevitable. This book, Management of Soil Problems, identifies the problems and discusses management options in a smooth and reader-friendly style. It will be useful for students and professionals of soil science, agriculture, forestry, geography and environmental sciences.

Plant microbe interaction is a complex relationship that can have various beneficial impacts on both the communities. An urgent need of today’s world is to get high crop yields in an ecofriendly manner. Utilization of beneficial and multifaceted plant growth promoting (PGP) microorganisms can solve the problem of getting enhanced yields without disturbing the ecosystem thus leading to sustainability. For this to achieve understanding of the intricate details of how the beneficial microbes form associations with the host plant and sustain that for millions of years must be known. A holistic approach is required wherein the diversity of microbes associated with plant and the network of mechanisms by which they benefit the host must be studied and utilized. ‘Plant Microbe Symbiosis – Fundamentals and Advances’ provides a comprehensive understanding of positive interactions that occur between plant and microorganisms and their utilization in the fields. The book covers the broad diversity of plant associated microbes, the dialog between plant-microbes-microbes and mechanisms of action of PGP microbes. Utilization of PGPR as nutrient providers, in combating phytopathogens and ameliorating the stressed and polluted soils is also explained. Importantly, the book also throws light on the unanswered questions and future direction of research in the field. It illustrates how the basic knowledge can be amalgamated with advanced technology to design the future bioformulations.

Increase in global population, drastic changes in the environment, soil degradation and decrease in quality and quantity of agricultural productivity warranted us to adapt sustainable farming practices. This book focuses on soil health management and creating biased rhizosphere that can effectively augment the needs of sustainable agriculture.

"Advances in Environmental Geotechnics" presents the latest developments in this interdisciplinary field. The topics covered include basic and advanced theories for modeling of geoenvironmental phenomena, testing and monitoring for geoenvironmental engineering, municipal solid wastes and landfill engineering, sludge and dredged soils, geotechnical reuse of industrial wastes, contaminated land and remediation technology, applications of geosynthetics in geoenvironmental engineering, geoenvironmental risk assessment, management and sustainability, ecological techniques and case histories. This proceedings includes papers authored by core members of ISSMGE TC5 (International Society of Soil Mechanics and Geotechnical Engineering—Environmental Geotechnics) and geoenvironmental researchers from more than 20 countries and regions. It is a valuable resource for geoenvironmental and geotechnical engineers as well as civil engineers. Yunmin Chen, Xiaowu Tang, and Liangtong Zhan are Professors at the Department of Civil
Engineering of Zhejiang University, China.

Fundamentals of Air Pollution is an important and widely used textbook in the environmental science and engineering community. This thoroughly revised fifth edition of Fundamentals of Air Pollution has been updated throughout and remains the most complete text available, offering a stronger systems perspective and more coverage of international issues relating to air pollution. Sections on pollution control have been reorganized and updated to demonstrate the move from regulation and control approaches to green and sustainable engineering approaches. The fifth edition maintains a strong interdisciplinary approach to the study of air pollution, covering such topics as chemistry, physics, meteorology, engineering, toxicology, policy, and regulation. New material includes near-road air pollution, new risk assessment approaches, indoor air quality, the impact of biofuels and fuel additives, mercury emissions, forecasting techniques, and the most recent results from the National Air Toxics Assessment. Stronger systems approach, emphasizing the impact of air pollution on ecosystems and human health. Risks, measures, models, and control of air pollution are discussed at scale – starting at the individual/niche level and expanding to planetary/global scale. Increased emphasis on international issues, including coverage of European initiatives and discussions of the impact of emerging economies like India and China. Updated references, standards, and methods throughout the book make this the most current air pollution text/reference on the market. All new end-of-chapter problems enhance its usefulness as a course text.

The field of environmental engineering is rapidly emerging into a mainstream engineering discipline. For a long time, environmental engineering has suffered from the lack of a well-defined identity. At times, the problems faced by environmental engineers require knowledge in many engineering fields, including chemical, civil, sanitary, and mechanical engineering. Increased demand for undergraduate training in environmental engineering has led to growth in the number of undergraduate programs offered. Fundamentals of Environmental Engineering provides an introductory approach that focuses on the basics of this growing field. This informative reference provides an introduction to environmental pollutants, basic engineering principles, dimensional analysis, physical chemistry, mass, and energy and component balances. It also explains the applications of these ideas to the understanding of key problems in air, water, and soil pollution.

This handbook helps you with the most pervasive activity in environmental science – taking and analyzing environmental samples from water; air or soil. --

This volume provides in-depth coverage of such topics as multi-reservoir system operation theory and practice, management of aquifer systems connected to streams using semi-analytical models, one-dimensional model of water quality and aquatic ecosystem-ecotoxicology in river systems, environmental and health impacts of hydraulic fracturing and shale gas, bioaugmentation for water resources protection, wastewater renovation by flotation for water pollution control, determination of receiving water's reaeration coefficient in the presence of salinity for water quality management, sensitivity analysis for stream water quality management, river ice process, and computer-aided mathematical modeling of water properties. This critical volume will serve as a valuable reference work for advanced undergraduate and graduate students, designers of water resources systems, and scientists and researchers. The goals of the Handbook of Environmental Engineering series are: (1) to cover entire environmental fields, including air and noise pollution control, solid waste processing and resource recovery, physicochemical treatment processes, biological treatment processes, biotechnology, biosolids management, flotation technology, membrane technology, desalination technology, water resources, natural control processes, radioactive waste disposal, hazardous waste management, and thermal pollution control; and (2) to employ a multimedia approach to environmental conservation and protection since air, water, soil and energy are all interrelated.

Soil is an irreplaceable resource that sustains life on the planet, challenged by food and energy demands of an increasing population. Therefore, soil contamination constitutes a critical issue to be addressed if we are to secure the life quality of present and future generations. Integrated efforts from researchers and policy makers are required to develop sound risk assessment procedures, remediation strategies and sustainable soil management policies. Environmental Risk Assessment of Soil Contamination provides a wide depiction of current research in soil contamination and risk assessment, encompassing reviews and case studies on soil pollution by heavy metals and organic pollutants. The book introduces several innovative approaches for soil remediation and risk assessment, including advances in phyto remediation and implementation of metabolomics in soil sciences.

Sustainable sources of energy and a supply of good quality water are two major challenges facing modern societies across the globe. Biomass from cultivated plants may be used to generate energy, but at the cost of contaminated surface waters from pesticide and fertilizer use. This two-volume set examines the potential use of biomass as both a source of sustainable energy and a resource to tackle contaminated soils and wastewaters. Consideration is given to non-food crops, bacteria and fungi as sources of biomass and the book enables the reader to identify the best local bioresources according to the desired application. With contributions from across the globe, this is an essential guide to meeting the demand for energy and pollution remediation by exploiting local and renewable resources. The example scenarios given will inspirational to policy makers and local officers, while chemical engineers and environmental scientists in both academia and industry will benefit from the comprehensive review of current thinking and application.

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