

Biochar Production Characterization And Applications Urbanization Industrialization And The Environment

Biochar prepared from agricultural biomass has received considerable attention because of the huge availability of ago-waste at zero cost, flexibility, high efficiency, renewability, faster contaminant removal rate, ability to treat concentrated effluent and reduction of sludge production after the treatment. This book on biochar is a comprehensive account of preparation of biochar from agricultural waste. It provides a roadmap in development of future strategy for pollution abatement and sustainable waste management. This book contains up-to-date information on biochar and its role in environment protection. The book covers useful information and applications of biochar to research scholars, academicians, agronomists, scientists and environmentalist working in the field of environment protection, bioremediation, waste management and climate change mitigation.

In the past few decades, it has been realized through research that fungal siderophores epitomize the uptake of iron as well as other essential elements like zinc, magnesium, copper, nickel and arsenic. Understanding the chemical structures of different fungal siderophores and the membrane receptors involved in uptake of

mineral ions has opened new areas for research. In this edited volume, recent research is presented on fungal siderophores in one comprehensive volume to provide researchers a strong base for future research. Siderophores are the low molecular weight, high affinity iron-chelating compounds produced by bacteria and fungi. They are responsible for transporting iron across the cell membrane. Fungi produce a range of hydroxamate siderophores involved in the uptake of essential elements in almost all microorganisms and plants. In recent years, siderophores have been used in molecular imaging applications to visualize and understand cellular functions, which thus provide an opportunity to identify new drug targets. Therefore, knowledge of fungal siderophores has become vital in current research. Siderophores have received much attention in recent years because of their potential roles and applications in various research areas. Their significance in these applications is because siderophores have the ability to bind a variety of metals in addition to iron, and they have a wide range of chemical structures and specific properties. For instance, siderophores function as biocontrols, biosensors, and bioremediation and chelation agents, in addition to their important role in weathering soil minerals and enhancing plant growth. This book focuses on siderophores with the following significant points. It discusses leading, state-of-the-art research in all possible areas on fungal siderophores. The contributors are well-

known and recognized authorities in the field of fungal siderophores. It discusses a projection of practical applications of fungal siderophores in various domains. This is the first book exclusively on fungal siderophores. In this comprehensive, edited volume, we show leading research on fungal siderophores and provide the most recent knowledge of researchers' work on siderophores. This book presents in-depth knowledge on siderophores to researchers working in areas of health sciences, microbiology, plant sciences, biotechnology, and bioinformatics.

Nanomaterials for Soil Remediation provides a comprehensive description on basic knowledge and current research progress in the field of soil treatment using nanomaterials. Soil pollution refers to the presence of toxic chemicals in soil. Compared with air and water remediations, soil remediation is technically more challenging due to its complex composition. The synergy between engineering and nanotechnology has resulted in rapid developments in soil remediation.

Nanomaterials could offer new routes to address challenging and pressing issues facing soil pollution. This book aims to explore how nanomaterials are used to cleanse polluted soils (organic compounds and heavy metal-contaminated soils) through various nanomaterials-based techniques (chemical/physical/biological techniques and their integrations). Highlights how nanotechnology is being used to more accurately measure soil pollution levels Discusses how the properties of

nanomaterials are being used to make more efficient soil remediation techniques and products Assesses the practical and regulatory challenges of using different nanomaterial-based products for soil repair

This book systematically covers the fundamentals and applications of modified biochar. The 19 chapters are divided into 3 sections that provide a holistic overview for researchers from all related fields. Section 1 and 2 present the pyrolysis process, including the advantages and limitations of the physical, chemical, and biological modification methods and characterization of modified biochar. Section 3 highlights the wide spectrum of applications of modified biochar in fuel cells and batteries, remediation of organic and inorganic contaminants from soil and water and soil fertilization. Given its scope, the book appeals to a broad readership in various fields of chemical engineering, materials science, and environmental science.

Fundamentals and Applications

Char and Carbon Materials Derived from Biomass

Challenges and Perspectives

Production of Materials from Sustainable Biomass Resources

A Practical Guide

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This book focuses on the pros and cons of amendment materials to restore the functioning of soil resources. It presents a holistic overview on affected land revitalization, clean up and revegetation using these amendments that could be implemented in the long term management of the soil-plant-atmosphere-animal continuum.

Biomass-Derived Materials for Environmental Applications presents state-of-the-art coverage of bio-based materials that can be applied to address the growing global concern of pollutant discharge in the environment. The book examines the production, characterization and application of bio-based materials for remediation. Organized clearly by type of material, the book includes details on lignocellulosic materials, natural clays, carbonaceous materials, composites and advanced materials from natural origins. Readers will find an interdisciplinary and practical examination of these materials and their use in environmental remediation that will be valuable to environmental scientists, materials scientists, environmental chemists, and environmental engineers alike. Highlights a wide range of synthetic methodologies, as well as physicochemical and engineered features of bio-based materials for environmental purposes Provides in-depth examination of bio-based materials and their characteristics and advantages in environmental remediation Covers a range of specific materials, including background information, key results, critical discussions, conclusions and future

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perspectives

Char and Carbon Materials Derived from Biomass: Production, Characterization and Applications provides an overview of biomass char production methods (pyrolysis, hydrothermal carbonization, etc.), along with the characterization techniques typically used (Scanning Electronic Microscopy, X-Ray Fluorescence, Nitrogen adsorption, etc.) In addition, the book includes a discussion of the various properties of biomass chars and their suitable recovery processes, concluding with a demonstration of applications. As biomass can be converted to energy, biofuels and bioproducts via thermochemical conversion processes, such as combustion, pyrolysis and gasification, this book is ideal for professionals in energy production and storage fields, as well as professionals in waste treatment, gas treatment, and more. Provides a discussion of sources of biomass feedstocks, such as agricultural, woody plants and food processing residue Discusses the various production processes of biomass chars, including pyrolysis and hydrothermal carbonization Explores various applications of biomass chars within different industries, including energy and agronomy Recent Perspectives in Pyrolysis Research presents and discusses different routes of pyrolytic conversions. It contains exhaustive and comprehensive reports and studies of the use of pyrolysis for energy and materials production and waste management.

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Biochar for Environmental Management
Recent Perspectives in Pyrolysis Research
Biochar as Soil Amendment
Emerging Pollutants
A Guide to Analytical Methods
Engineered Biochar

This book reports current progress in the development, design and utilization of carbonaceous materials in such diverse areas as electronics, medical implants, drug delivery, clean energy, biofuel and pollution control. Keywords: Carbonaceous Materials, Carbons, Graphite, Biochar, Fullerenes, Graphene, Carbon Foam, Carbon Nanotubes, Graphene Oxide, Graphitic Carbon Nitride, Carbon Aerogels, Carbon Matrix Composites, Organic-inorganic Hybrid Materials, Building Materials, Carbon-based Composites, Carbon Matrix Polymer Composites, Conducting Polymers, Clean Energy, Energy Storage, Electrode Materials, Batteries, Supercapacitors, Fuel Cells, Catalysts, Bio-fuel Production, Organic Pollutants, Catalysts, Greenhouse Gas Sequestration, Climate Control, Bio-medical Applications, Biomass Applications, Smart Hybrids, Photocatalysts, Hydrogen Production, Contaminants Degradation,

Pollution Control.

The revised edition of the comprehensive book that explores the principles and applications of aquaculture engineering Since the publication of the first edition of Aquaculture Engineering there have been many advances in the industry. The revised and thoroughly updated third edition of Aquaculture Engineering covers the principles and applications of all major facets of aquaculture engineering and the newest developments in the field. Written by a noted expert on the topic, the new edition highlights information on new areas of interest including RAS technology and offshore fish farming. Comprehensive in scope, the book examines a range of topics including: water transportation and treatment; feed and feeding systems; fish transportation and grading; cleaning and waste handling; instrumentation and monitoring; removal of particles; aeration and oxygenation; recirculation and water reuse systems; ponds; and the design and construction of aquaculture facilities. This important book: Presents an updated review of the basic principles and applications in aquaculture engineering Includes information on new areas of focus; RAS technology and offshore fish farming Contains a revised edition of the classic

resource on aquaculture engineering Continues to offer an authoritative guide written by a leading expert in the field Written for aquaculture scientists and managers, engineers, equipment manufacturers and suppliers, and biological scientists, the third edition of Aquaculture Engineering is the authoritative guide to the topic that has been updated to include the most recent developments in the industry.

Advances in Agronomy continues to be recognized as a leading reference and first-rate source for the latest research in agronomy. Each volume contains an eclectic group of reviews by leading scientists throughout the world. As always, the subjects covered are rich, varied, and exemplary of the abundant subject matter addressed by this long-running serial. Includes numerous, timely, state-of-the-art reviews on the latest advancements in agronomy Features distinguished, well recognized authors from around the world Builds upon this venerable and iconic review series Covers the extensive variety and breadth of subject matter in the crop and soil sciences

Clean Energy and Resources Recovery: Biomass Waste Based Biorefineries, Volume One presents the technological options for

energy and resources recovery from all types of organic wastes. The book addresses municipal and industrial sludges, municipal solid waste, agro-residue, animal wastes, industrial waste, forestry residue, and algal biomass, and provides a global overview of biomass waste production, waste handling issues and related GHG emissions and climate change, legislative waste management guidelines, biomass composition, and conventional methods for biomass waste treatment. For each biomass waste, chapters cover energy and bio-based products recovery, pre-treatment methods, process microbiology, community dynamics, co-digestion, reactor design and configuration, and techno-economic evaluation. Case studies on upscaling technology and pilot and industry scale implementation are included, alongside step-by-step calculations that integrate practical field data and regulatory requirements into the environmental design process. Finally, future trends and developments in advanced biotechnological concepts for biomass waste processing and management are also discussed. Provides innovative strategies to increase the efficiency of anaerobic digestion, including during pre- and post-treatment Includes industry case studies that demonstrate successful implementation

processes and strategies Addresses municipal and industrial sludges, municipal solid waste, agro-residue, animal wastes, industrial waste, forestry residue, and algal biomass, and provides a global overview of biomass waste production Impact on Soil Properties and Sustainable Resource Management Biochar from Biomass and Waste Carbonaceous Composite Materials Essential Soil Microbial Ecology Lignocellulosic Biorefining Technologies Biorefinery of Oil Producing Plants for Value-Added Products Biorefinery of Oil Producing Plants for Value-Added Products An instructive and up-to-date pretreatment and industrial applications of oil producing plants Biorefinery of Oil Producing Plants for Value-Added Products is a two-volume set that delivers a comprehensive exploration of oil producing plants, from their availability to their pretreatment, bioenergy generation, chemical generation, bioproduct generation, and economic impact. The distinguished team of editors has included a wide variety

of highly instructive resources written by leading contributors to the field. This set explores the current and future potential of bioenergy production to address the energy and climate crisis, as well as the technologies used to produce materials like biogas, biodiesel, bioethanol, biobutanol, biochar, fuel pellets, and biohydrogen. It also discusses the production of biobased chemicals, including bio-oil, biosurfactants, cationic surfactants, glycerol, biovanillin, bioplastic, and plant-oil based polyurethanes. Concluding with an insightful analysis of the economic effects of oil producing plants, the set also offers readers: A thorough introduction to the availability of oil producing plants, including palm oil, castor oil, jatropha, nyamplung, and coconut A comprehensive exploration of the pretreatment of oil producing plants, including the physical, chemical and biological pretreatment of lignocellulosic biomass Practical discussion of the generation of bioenergy, including biogas generation in the palm oil mill and biodiesel production techniques using

jatropha In-depth examinations of the generation of biobased chemicals, including those produced from the tobacco plant Perfect for researchers and industry practitioners involved with the biorefinery of oil producing plants, Biorefinery of Oil Producing Plants for Value-Added Products also belongs in the libraries of undergraduate and graduate students studying agriculture, chemistry, engineering, and microbiology.

Biochar is a carbon-rich material produced from the pyrolysis of organic materials from agricultural and forestry biomass at a relatively low temperature in the absence of oxygen. As such, it has potential for solving many agricultural and environmental problems. This book is divided into five sections: "Introduction," "Production and Legislation of Biochar," "Applications of Biochar for Soil Fertility Improvement," "Role of Biochar for Soil Remediation and Ameliorating Salinity Effects" and "Applications of Biochar for Water Treatment." Chapters address topics such as the pros and cons of biochar, its

production, and its role in remediating and treating contaminated soils and water.

Circular Bioeconomy: Technologies for Waste Remediation covers information about the strategies and approaches facilitating the integration of technologies for wastewater and solid waste remediation. The book highlights the models developed to valorize wastes to produce biobased products. Various chapters presented in the book put a focus on sustainability approaches as a central theme in order to facilitate industries and policymakers to adopt circular economy goals. Since the principal idea of a circular bioeconomy is to transition from a linear economy, it involves advanced technological and designing breakthroughs to reduce waste with a closed looped system. Covers the integration of technologies and processes for waste remediation Narrates recent developments and perspectives on value added products from wastes Summarizes recent developments in lifecycle assessment and techno economic analysis using wastes for sustainable development Offers

academicians, engineers, researchers and stakeholders help in adapting suitable technologies for solid waste and wastewater management

Agricultural and Environmental Applications of Biochar: Advances and Barriers: Over the past decade, biochar has been intensively studied by agricultural and environmental scientists and applied as a soil quality enhancer and environmental ameliorator in various trials worldwide. This book, with 21 chapters by 57 accomplished international researchers, reports on the recent advances of biochar research and the global status of biochar application. Scientific findings, uncertainties, and barriers to practice of biochar amendment for sustaining soil fertility, improving crop production, promoting animal performance, remediating water and land, and mitigating greenhouse gas emissions are synthesized. The book presents a whole picture of biochar in its production, characterization, application, and development.

Agricultural and Environmental Applications of Biochar:

Advances and Barrier highlights the mechanisms and processes of biochar amendment for achieving stunning agricultural and environmental benefits. Composition and characteristics of biochar, its interactions with contaminants and soil constituents, and its transformation in the environment are illustrated to enlighten the achievements of biochar amendment in improving soil physical, chemical, and biological quality and animal health, reducing soil greenhouse gas emissions, and decontaminating stormwater and mine sites. Additional emphasis is given to the pyrogenic carbon in Terra Preta soils and Japanese Andosols, the pyrolysis technology for converting agricultural byproducts to biochar, and the existing economic and technical barriers to wide application of biochar in Australia, China, New Zealand, North America, and Europe. Readers will appreciate the comprehensive review on the up-to-date biochar research and application and gain critical guidance in best biochar generation and utilization.

Special Issue on Biochar: Production, Characterization and Applications - Beyond Soil Applications

Biomass Waste Based Biorefineries, Volume 1

Biomass Chars: Elaboration, Characterization and Applications □

Biomass-Derived Materials for Environmental Applications

August 20-25, 2017, Hotel Calissano, Alba, Italy

Properties and Applications

A text to the advances and development of novel technologies in the production of high-value products from economically viable raw materials Lignocellulosic Biorefining Technologies is an essential guide to the most recent advances and developments of novel technologies in the production of various high-value products from economically viable raw materials. Written by a team of experts on the topic, the book covers important topics specifically on production of economical and sustainable products such as various biofuels, organic acids, enzymes, biopigments, biosurfactants, etc. The book highlights the important aspects of lignocellulosic biorefining including structure, function, and chemical composition of the plant cell wall and reviews

the details about the various components present in the lignocellulosic biomass and their characterizations. The authors explore the various approaches available for processing lignocellulosic biomass into second generation sugars and focus on the possibilities of utilization of lignocellulosic feedstocks for the production of biofuels and biochemicals. Each chapter includes a range of clear, informative tables and figures, and contains relevant references of published articles. This important text: Provides cutting-edge information on the recent developments in lignocellulose biorefinery Reviews production of various economically important and sustainable products, such as biofuels, organic acids, biopigments, and biosurfactants Highlights several broad-ranging areas of recent advances in the utilization of a variety of lignocellulosic feedstocks Provides a valuable, authoritative reference for anyone interested in the topic Written for post-graduate students and researchers in disciplines such as biotechnology, bioengineering, forestry, agriculture, and chemical industry, Lignocellulosic Biorefining Technologies is an authoritative and updated guide to the knowledge about various biorefining technologies.

Biomass can be converted to energy, biofuels, and bioproducts via thermochemical conversion processes, such as combustion, pyrolysis, and gasification. Combustion technology is most widely applied on an industrial scale. However, biomass gasification and pyrolysis processes are still in the research and development stage. The major products from these processes are syngas, bio-oil, and char (called also biochar for agronomic application). Among these products, biomass chars have received increasing attention for different applications, such as gasification, co-combustion, catalysts or adsorbents precursors, soil amendment, carbon fuel cells, and supercapacitors. This Special Issue provides an overview of biomass char production methods (pyrolysis, hydrothermal carbonization, etc.), characterization techniques (e.g., scanning electronic microscopy, X-ray fluorescence, nitrogen adsorption, Raman spectroscopy, nuclear magnetic resonance spectroscopy, X-ray photoelectron spectroscopy, and temperature programmed desorption and mass spectrometry), their properties, and their suitable recovery processes.

Biochar Application: Essential Soil Microbial Ecology outlines the

cutting-edge research on the interactions of complex microbial populations and their functional, structural, and compositional dynamics, as well as the microbial ecology of biochar application to soil, the use of different phyto-chemical analyses, possibilities for future research, and recommendations for climate change policy. Biochar, or charcoal produced from plant matter and applied to soil, has become increasingly recognized as having the potential to address multiple contemporary concerns, such as agricultural productivity and contaminated ecosystem amelioration, primarily by removing carbon dioxide from the atmosphere and improving soil functions. Biochar Application is the first reference to offer a complete assessment of the various impacts of biochar on soil and ecosystems, and includes chapters analyzing all aspects of biochar technology and application to soil, from ecogenomic analyses and application ratios to nutrient cycling and next generation sequencing. Written by a team of international authors with interdisciplinary knowledge of biochar, this reference will provide a platform where collaborating teams can find a common resource to establish outcomes and identify future research needs throughout the world.

Includes multiple tables and figures per chapter to aid in analysis and understanding Includes a comprehensive table of the methods used within the contents, ecosystems, contaminants, future research, and application opportunities explored in the book Includes knowledge gaps and directions of future research to stimulate further discussion in the field and in climate change policy Outlines the latest research on the interactions of complex microbial populations and their functional, structural, and compositional dynamics Offers an assessment of the impacts of biochar on soil and ecosystems This book provides up-to-date information on biochar use in management of soil health, agriculture productivity, green-house gases, restoration ecology and environment. Biochar application to nutrient deficient and disturbed soils is a viable option which may promotes advances in food safety and food security to human nutrition and overall fundamental research in the agricultural sciences. The book describes in detail how the recalcitrant biochar is able to persist for long periods of time and work as a shelter for soil microbial colonisation and their biomass/numbers. This book also includes contents related to important role of biochar applications in

the restoration of contaminated agricultural soils. The book will be of particular interest to students, teachers and researchers in the disciplines.

Clean Energy and Resources Recovery

Biochar: Production, Characterization and Applications

Circular Bioeconomy: Technologies for Waste Remediation

Biochar and Its Application in Bioremediation

Aquaculture Engineering

Handbook of Coffee Processing By-Products

Encompassing high priority research areas such as bioenergy production, global warming mitigation, and sustainable agriculture, biochar has received increased worldwide interest in the past decade. Biochar: Production, Characterization, and Applications covers the fundamentals of biochar including its concept, production technology, and characteriza

This book explores the production and applications of biochar. This material is used to remove contaminants from industrial effluent and to reutilize waste sludge in the production of biofuel/bioenergy. The treatment of wastewater and reuse of waste sludge in value added products manufacturing and environmental clean-up is explored. The proposed book provides a roadmap for future strategies for pollution abatement and sustainable development.

Environmental Health discusses environmental effects on human health. It examines heavy metal pollution, biological effects of arsenic (on reproductive health, especially), effects of soil organic carbon,

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chemical pollution of drinking water, climate change and vector-borne diseases, marine fuels, particulate matter, and the United Nations Sustainable Development Goals (SDGs).

The role of biochar in improving soil fertility is increasingly being recognized and is leading to recommendations of biochar amendment of degraded soils. In addition, biochars offer a sustainable tool for managing organic wastes and to produce added-value products. The benefits of biochar use in agriculture and forestry can span enhanced plant productivity, an increase in soil C stocks, and a reduction of nutrient losses from soil and non-CO₂ greenhouse gas emissions. Nevertheless, biochar composition and properties and, therefore, its performance as a soil amendment are highly dependent on the feedstock and pyrolysis conditions. In addition, due to its characteristics, such as high porosity, water retention, and adsorption capacity, there are other applications for biochar that still need to be properly tested. Thus, the 16 original articles contained in this book, which were selected and evaluated for this Special Issue, provide a comprehensive overview of the biological, chemico-physical, biochemical, and environmental aspects of the application of biochar as soil amendment. Specifically, they address the applicability of biochar for nursery growth, its effects on the productivity of various food crops under contrasting conditions, biochar capacity for pesticide retention, assessment of greenhouse gas emissions, and soil carbon dynamics. I would like to thank the contributors, reviewers, and the support of the Agronomy editorial staff, whose professionalism and dedication have made this issue possible.

BioChar

From Concepts to Insights

Advances and Barriers

From Mineral-Microbe Interactions to Anti-Pathogenicity

Sustainable Carbon Materials from Hydrothermal Processes

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Production, Characterization and Applications

This book presents a collection of studies on state-of-art techniques developed specifically for lignocellulose component derivation, and for the production of functional materials, composite polymers, carbonaceous biocatalysts, and pellets from lignocellulosic biomass, with an emphasis on using sustainable chemistry and engineering to develop innovative materials and fuels for practical application. Technological strategies for the physical processing or biological conversion of biomass for material production are also presented. All chapters were contributed by respected experts in the field from around the globe, providing a broad range of perspectives on cutting-edge applications. The book offers an ideal reference guide for academic researchers and industrial engineers in the fields of natural renewable materials, biorefinery of lignocellulose, biofuels and environmental engineering. It can also be used as a comprehensive reference source for university students in chemical engineering, material science and environmental engineering.

This book will discuss the effective and sustainable technological approaches for remediation of contaminates via eco-friendly usage of microbes. The primary focus will be on the role of microbes, particularly bacteria and fungi, for the degradation and removal of various xenobiotic substances in the environment. The book will also

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emphasize molecular approaches and biosynthetic pathways of microbes, and present gene and protein expression studies for bio-deterioration techniques. New innovative and sophisticated green technologies for waste minimization and waste control will be presented, as well as the potential of microbes for various techniques of bioremediation, including bio-sorption, bio-augmentation, bio-stimulation, to clean contaminated environments.

Biochar from Biomass and Waste: Fundamentals and Applications provides the fundamentals of biochar, such as its basic concepts, production technology and characterization methods, also including comprehensive examples for readers. This book includes information on state-of-art biochar application technologies in the fields of agriculture, energy and environmental sciences with step-by-step case studies. Biochar has received worldwide interests in the past decade because it encompasses high priority research areas, including bioenergy production, global warming mitigation and sustainable agriculture. Offers comprehensive coverage of biochar production, characterization and modification methods Provides global case studies covering a wide range of application fields, including environmental, agricultural, syngas and bio-oil Covers the sustainability and future of biochar

This book offers various soil and water treatment technologies due to increasing global soil and water pollution. In many countries, the

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management of contaminated land has matured, and it is developing in many others. Topics covered include chemical and ecological risk assessment of contaminated sites; phytomanagement of contaminants; arsenic removal; selection and technology diffusion; technologies and socio-environmental management; post-remediation long-term management; soil and groundwater laws and regulations; and trace element regulation limits in soil. Future prospects of soil and groundwater remediation are critically discussed in this book. Hence, readers will learn to understand the future prospects of soil and groundwater contaminants and remediation measures. Key Features: Discusses conventional and novel aspects of soil and groundwater remediation technologies Includes new monitoring/sensing technologies for soil and groundwater pollution Features a case study of remediation of contaminated sites in the old, industrial, Ruhr area in Germany Highlights soil washing, soil flushing, and stabilization/solidification Presents information on emerging contaminants that exhibit new challenges This book is designed for undergraduate and graduate courses and can be used as a handbook for researchers, policy makers, and local governmental institutes. Soil and Groundwater Remediation Technologies: A Practical Guide is written by a team of leading global experts in the field. Biomass, Biofuels, Biochemicals

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Polysaccharides

Science and Technology

Soil Amendments for Sustainability

Applications of Biochar for Environmental Safety

Some Strategies for the Quality Preservation of Our Environment

Handbook of Coffee Processing By-Products: Sustainable Applications presents alternative and sustainable solutions for coffee processing by-products and specifies their industrial potential, both as a source for the recovery of bioactive compounds and their reutilization in the pharmaceutical, biotechnological, food, biotechnology, and cosmetic industries, also covering environmental and agronomic applications. This book addresses key topics specific to sustainable management in the coffee industry, placing an emphasis on integrated solutions for the valorization and upgrade of coffee processing by-products, biorefinery, and different techniques for the separation, extraction, recovery and formulation of polyphenols. Specifies potential for the use of coffee by-products as a source for the recovery of bioactive compounds and their reutilization in the pharmaceutical, biotechnological, food, biotechnology and cosmetic industries. Places emphasis on integrated solutions for the valorization and upgrade of coffee processing by-products, biorefinery, and different techniques for the separation, extraction, recovery and formulation of polyphenols.

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This reference text covers the latest developments in biochar materials research which is becoming increasingly popular due to the potential of biochar to replace carbon materials derived from non-renewable sources. Emerging and innovative applications of biochar materials are discussed, and all aspects of the field are covered from production to applications, including details on the techniques used. There is a particular focus on biochar as a material for composites and sensors. This is the first book to cover emerging applications of biochar as an innovative, versatile, carbon-based renewable material, beyond its traditional uses in agriculture. It is a valuable reference for all researchers in the fields of biochar and carbon materials, including industry practitioners.

This book provides comprehensive coverage of the theoretical developments and technological breakthroughs that have deepened our understanding of environmental pollution and human health, while also promoting a comprehensive strategy to address these problems. The respective chapters highlight groundbreaking concepts fueling the development of environmental chemistry and toxicology; revolutionary analytical and computational approaches providing novel insights into environmental health; and nature-inspired, innovative engineering solutions for tackling complex hazardous exposures. The book also features a forward-looking perspective on emerging environmental issues that call for new research and regulatory paradigms, laying

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groundwork for future advances in the broad field of environmental chemistry and toxicology. Written by respected authorities in the field, *A New Paradigm for Environmental Chemistry and Toxicology - From Concepts to Insights* will offer an invaluable reference guide for concerned researchers and professional practitioners for years to come.

Biochar Production, Characterization, and Applications CRC Press
Soil Bioremediation

Soil and Groundwater Remediation Technologies

Fundamentals, Preparation, Characterization and Applications

Applications for Bioremediation of Contaminated Systems

Emerging Applications

Nanomaterials for Soil Remediation

The production of low cost and environmentally friendly highperforming carbon materials is crucial for a sustainable future. *Sustainable Carbon Materials from Hydrothermal Processes* describes a sustainable and alternative technique to produce carbon from biomass in water at low temperatures, a process known as Hydrothermal Carbonization (HTC). *Sustainable Carbon Materials from Hydrothermal Processes* presents an overview of this new and rapidly developing field, discussing various synthetic approaches, characterization of the final

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products, and modern fields of application for of sustainable carbon materials. Topics covered include: • Green carbon materials • Porous hydrothermal carbons • HTC for the production of valuable carbon hybrid materials • Functionalization of hydrothermal carbon materials • Characterization of HTC materials • Applications of HTC in modern nanotechnology: Energy storage, electrocatalysis in fuel cells, photocatalysis, gas storage, water purification, sensors, bioapplications • Environmental applications of HTC technology: Biochar production, carbon sequestration, and waste conversion • Scale-up in HTC Sustainable Carbon Materials from Hydrothermal Processes will serve as a comprehensive guide for students and newcomers in the field, as well as providing a valuable source of information for researchers and investors looking for alternative technologies to convert biomass into useful products.

This edited book, *Emerging Pollutants - Some Strategies for the Quality Preservation of Our Environment*, contains a series of chapters providing some strategies for the preservation of our environmental quality focusing on the different categories of environmental pollutants and their negative consequences on living organisms.

Biochar: Fundamentals and Applications in Environmental Science and Remediation Technologies, Volume Six provides readers with the fundamentals

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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 system- 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 green house 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

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In diesem Werk werden Polysaccharide unter sämtlichen Aspekten betrachtet, von den Grundkonzepten bis zur kommerziellen Vermarktung. Thema der einzelnen Kapitel sind die verschiedenen Arten von Quellen, die Klassifikation, Eigenschaften, Charakterisierung, Verarbeitung, Rheologie und Herstellung von Materialien auf Grundlage von Polysacchariden sowie von Polysaccharid-Gemischen und -Gelen. Anwendung finden Polysaccharide u. a. in der Kosmetik, der Lebensmittelwissenschaft, der Medikamentenverabreichung, der Biomedizin, der Biokraftstoffproduktion, der Schifffahrt, im Verpackungswesen, in der Chromatographie und der Umweltsanierung. Darüber hinaus vermittelt das Werk einen Überblick über die Herstellung von anorganischen und Kohlenstoff-Nanomaterialien aus Polysacchariden. Mit der Betrachtung industrieller Anwendungen schließt das Buch die Lücke zwischen der Forschungsarbeit im Labor und wirtschaftlich nutzbaren Anwendungen in entsprechenden Unternehmen.

Environmental Health

An Approach Towards Sustainable Technology

Agricultural and Environmental Applications of Biochar

Biochar: Fundamentals and Applications in Environmental Science and
Remediation Technologies

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Biochar Application

A New Paradigm for Environmental Chemistry and Toxicology

Biochar is the carbon-rich product when biomass (such as wood, manure or crop residues) is heated in a closed container with little or no available air. It can be used to improve agriculture and the environment in several ways, and its stability in soil and superior nutrient-retention properties make it an ideal soil amendment to increase crop yields. In addition to this, biochar sequestration, in combination with sustainable biomass production, can be carbon-negative and therefore used to actively remove carbon dioxide from the atmosphere, with major implications for mitigation of climate change. Biochar production can also be combined with bioenergy production through the use of the gases that are given off in the pyrolysis process. This book is the first to synthesize the expanding research literature on this topic. The book's interdisciplinary approach, which covers engineering, environmental sciences, agricultural sciences, economics and policy, is a vital tool at this stage of biochar technology development. This comprehensive overview of current knowledge

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will be of interest to advanced students, researchers and professionals in a wide range of disciplines.

Interest in biochar among soil and environment researchers has increased dramatically over the past decade. Biochar initially attracted attention for its potential to improve soil fertility and to uncouple the carbon cycle, by storing carbon from the atmosphere in a form that can remain stable for hundreds to thousands of years. Later it was found that biochar had applications in environmental and water science, mining, microbial ecology and other fields. Beneficial effects of biochar and its environmental applications cannot be fully realised unless the chemical, physical, structural and surface properties of biochar are known. Currently many of the analytical procedures used for biochar analysis are not well defined, which makes it difficult to choose the right biochar for an intended use and to compare the existing data for biochars. Also, in some instances the use of inappropriate procedures has led to erroneous or inaccurate values for biochars in the scientific literature. Biochar: A Guide to Analytical Methods fills this gap and provides procedures and

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guidelines for routine and advanced characterisation of biochars. Written by experts, each chapter provides background to a technique or procedure, a stepwise guide to analyses, and includes data for biochars made from a range of feedstocks common to all presented methods. Discussion about the unique features, advantages and disadvantages of a particular technique is an explicit focus of this handbook for biochar analyses. Biochar is primarily intended for researchers, postgraduate students and practitioners who require knowledge of biochar properties. It will also serve as an important resource for researchers, industry and regulatory agencies dealing with biochar.

Biochar

Biochar Applications in Agriculture and Environment Management
Production, Characterization, and Applications

Fungal Siderophores

Advances in Agronomy

Sustainable Applications