

# Handbook Of Environmental Degradation Of Materials

Handbook of Material Biodegradation, Biodeterioration, and Biostabilization, Second Edition gives extensive information on the microorganisms involved in the biodegradation of materials, along with the biocides which are permitted for use according to the most up-to-date worldwide legislation. Mechanisms of biodegradation and biodeterioration, results of biodeterioration, and methods of biostabilization are covered for a large number of products, making the title relevant for a range of industries and applications, including construction, coatings/paints, medical and pharmaceutical applications, and electronics. In addition, the health and safety aspects of biocide application are covered in detail, as well as the personal protection of practitioners who are required to use them. The contents and the most-up-to-date information make this book essential for almost all the fields of applied chemistry. Enables practitioners to identify the organisms responsible for biodeterioration in materials, select suitable preventative measures, and safely deploy methods of biostabilization Contains information on the biostabilization of various industrial products, including 24 groups of polymers Includes critical (and current) health and safety, environmental, and regulatory guidelines and best practices, and their relationships to legislation, regulation, toxicity, micro-organisms, biocides, and polymers Essential reading for scientists and practitioners as new regulations eliminate the use of previously used materials Contains up-to-date information on legislation and regulations governing the use of biocides in the European Union, the United States, and worldwide Much applied environmental economics is concerned with the valuation of changes in environmental quality. Obtaining reliable valuation estimates requires attention to theoretical and econometric issues that are often quite subtle. Volume 2 of the Handbook of Environmental Economics presents both the theory and the practice of environmental valuation. It synthesizes the vast literature that has accumulated since the publication of the Handbook of Natural Resource and Energy Economics two decades ago. It includes chapters on individual valuation methods written by researchers responsible for fundamental advances in those methods. It also includes cross-cutting chapters that deal with aspects of welfare theory, uncertainty, experimental methods, and public health that are pertinent to valuation. Throughout the volume, attention is paid to research and policy issues that arise not only in high-income countries, where most of the theory and econometrics that underlie applied valuation methods have been developed, but also in poorer parts of the world. The volume provides a state-of-the-art reference for scholars and practitioners alike.

Addressing the persistent environmental threat of organic chemicals with a fresh approach to degradation and transformation processes, Organic Chemicals in the Environment:

Mechanisms of Degradation and Transformation, Second Edition examines a wide range of compounds as well as abiotic and microbiological reactions mediated by microorganisms

This book is open access under a CC BY 4.0 license. This volume focuses on microscopic plastic debris, also referred to as microplastics, which have been detected in aquatic environments around the globe and have accordingly raised serious concerns. The book explores whether microplastics represent emerging contaminants in freshwater systems, an area that remains underrepresented to date. Given the complexity of the issue, the book covers the current state-of-research on microplastics in rivers and lakes, including analytical aspects, environmental concentrations and sources, modelling approaches, interactions with biota, and ecological implications. To provide a broader perspective, the book also discusses lessons learned from nanomaterials and the implications of plastic debris for regulation, politics, economy, and society. In a research field that is rapidly evolving, it offers a solid overview for environmental chemists, engineers, and toxicologists, as well as water managers

and policy-makers.

Pollution has been a developing problem for quite some time in the modern world, and it is no secret how these chemicals negatively affect the environment. With these contaminants penetrating the earth's water supply, affecting weather patterns, and threatening human health, it is critical to study the interaction between commercially produced chemicals and the overall ecosystem. Understanding the nature of these pollutants, the extent in which they are harmful to humans, and quantifying the total risks are a necessity in protecting the future of our world. The Handbook of Research on Emerging Developments and Environmental Impacts of Ecological Chemistry is an essential reference source that discusses the process of chemical contributions and their behavior within the environment. Featuring research on topics such as organic pollution, biochemical technology, and food quality assurance, this book is ideally designed for environmental professionals, researchers, scientists, graduate students, academicians, and policymakers seeking coverage on the main concerns, approaches, and solutions of ecological chemistry in the environment.

"This book will summarize the latest trends and attitudes in Energy & Environmental Finance (EEF), balancing empirical research with theory, applications, and actual case studies and discussing the emergence, role, and current practices of EEF"--

This Handbook is the first comprehensive account of comparative environmental law. It examines in detail the methodological foundations of the discipline as well as the substance of environmental law across countries from four vantage points: country studies from all continents, responses to common problems (including air pollution, water management, nature conservation, genetically modified organisms, climate change and energy, chemicals, waste), foundational components of environmental law systems (including principles, property rights, administrative and judicial organisation, command-and-control regulation, market mechanisms, informational techniques and liability mechanisms), and common interactions of environmental protection with the broader public, private, and criminal law contexts. The volume brings together the foremost authorities in this field from around the world to provide a concise, self-contained, and technically rigorous account of environmental law as a single overall system. This book reviews water treatment technologies for the removal of pharmaceutically active compounds (PhACs). It provides the reader with an overview of state-of-the-art techniques and recent efforts to develop more sustainable approaches. After nearly two decades of research into the presence and impact of PhACs in the environment, they remain one of the hottest topics in the fields of environmental chemistry, toxicology and engineering. Accordingly, intensive research efforts are currently being devoted to water treatment technologies that can reduce the presence of these emerging contaminants in water bodies. This book examines various types of contaminated water from industry, hospitals and urban wastewater. It provides the reader with a range of potential solutions for water treatment and reuse, and addresses the advancement of analytical tools for evaluating the performance and efficiency of treatment technologies.

Handbook of Bioremediation: Physiological, Molecular and Biotechnological Interventions discusses the mechanisms of responding to inorganic and organic pollutants in the environment using different approaches of phytoremediation and bioremediation. Part One focuses specifically on inorganic pollutants and the use of techniques such as metallothionein-assisted remediation, phytoextraction and genetic manipulation. Part Two covers organic pollutants and consider topics such as plant enzymes, antioxidant defense systems and the remediation mechanisms of different plant species. This comprehensive volume is a must-read for researchers interested in plant science, agriculture, soil science and environmental science. The techniques covered in this book will ensure scientists have the knowledge to practice effective bioremediation techniques themselves. Provides a comprehensive review of the latest advances in bioremediation of organic and inorganic pollutants Discusses a range of different

phytoremediation techniques Evaluates the role of genomics and bioinformatics within bioremediation

Set at the intersection of political theory and environmental politics, yet with broad engagement across the environmental social sciences and humanities, *The Oxford Handbook of Environmental Political Theory*, defines, illustrates, and challenges the field of environmental political theory (EPT). Featuring contributions from distinguished political scientists working in this field, this volume addresses canonical theorists and contemporary environmental problems with a diversity of theoretical approaches. The initial volume focuses on EPT as a field of inquiry, engaging both traditions of political thought and the academy. In the second section, the handbook explores conceptualizations of nature and the environment, as well as the nature of political subjects, communities, and boundaries within our environments. A third section addresses the values that motivate environmental theorists—including justice, responsibility, rights, limits, and flourishing—and the potential conflicts that can emerge within, between, and against these ideals. The final section examines the primary structures that constrain or enable the achievement of environmental ends, as well as theorizations of environmental movements, citizenship, and the potential for on-going environmental action and change.

Written by an international team of authors from a range of educational, medical and research establishments, this book is an essential reference for advanced students and researchers in the areas of environmental sciences, ecology, agriculture, environmental health and medicine, in addition to industry and government personnel responsible for environmental regulations and directives. *A Handbook of Environmental Toxicology* focuses on two key aspects: human disorders and ecotoxicology as affected by major toxins originating from biological sources and pollutants, as well as radiation generated spontaneously or as a result of anthropogenic activity. A diverse array of these potentially harmful agents regularly appear in the atmosphere, soil, water and food, compromising both human health and biodiversity in natural and managed ecosystems.

This volume consists of 15 chapters and focuses on hazardous chemicals, how they are associated with plastics, and their environmental risks. It includes background information on plastics and additives chemistry, and their observed or potential effects on living organisms as well as the oceanographic aspects of marine debris dispersion. The respective chapters provide insights into the sorption/desorption of chemicals in and out of plastics, the mechanisms and kinetics, but also the scale of the concentrations of chemicals found in marine debris, particularly in microplastics. The occurrence of the various chemicals is analyzed, as well as the distribution profiles of the chemicals in microplastics throughout the world's oceans. The implications of the fact that plastics carry within them several chemicals are discussed in detail. In closing, new research topics that warrant further attention are identified. The book will appeal to all scientists who are already working or interested in starting to work on the topic of marine debris, as well as policymakers, NGOs and the broader informed public.

Nothing stays the same for ever. The environmental degradation and corrosion of materials is inevitable and affects most aspects of life. In industrial settings, this inescapable fact has very significant financial, safety and environmental implications. *The Handbook of Environmental Degradation of Materials* explains how to measure, analyse, and control environmental degradation for a wide range of industrial materials including metals, polymers, ceramics, concrete, wood and textiles exposed to environmental factors such as weather, seawater, and fire. Divided into sections which deal with analysis, types of degradation, protection and surface engineering respectively, the reader is introduced to the wide variety of environmental effects and what can be done to control them. The expert contributors to this book provide a wealth of insider knowledge and engineering knowhow, complementing their explanations and advice with Case Studies from areas such as pipelines, tankers, packaging and chemical

processing equipment ensures that the reader understands the practical measures that can be put in place to save money, lives and the environment. The Handbook's broad scope introduces the reader to the effects of environmental degradation on a wide range of materials, including metals, plastics, concrete, wood and textiles. For each type of material, the book describes the kind of degradation that affects it and how best to protect it. Case Studies show how organizations from small consulting firms to corporate giants design and manufacture products that are more resistant to environmental effects.

Since becoming formally established with an international academic society in the late 1980s, ecological economics has advanced understanding of the interactions between social and biophysical reality. It initially combined questioning of the basis of mainstream economics with a concern for environmental degradation and limits to growth, but has now advanced well beyond critique into theoretical, analytical and policy alternatives. Social ecological economics and transformation to an alternative future now form core ideas in an interdisciplinary approach combining insights from a range of disciplines including heterodox economics, political ecology, sociology, political science, social psychology, applied philosophy, environmental ethics and a range of natural sciences. This handbook, edited by a leading figure in the field, demonstrates the dynamism of ecological economics in a wide-ranging collection of state-of-the-art essays. Containing contributions from an array of international researchers who are pushing the boundaries of the field, the Routledge Handbook of Ecological Economics showcases the diversity of the field and points the way forward. A critical analytical perspective is combined with realism about how economic systems operate and their essential connection to the natural world and society. This provides a rich understanding of how biophysical reality relates to and integrates with social reality. Chapters provide succinct overviews of the literature covering a range of subject areas including: heterodox thought on the environment; society, power and politics, markets and consumption; value and ethics; science and society; methods for evaluation and policy analysis; policy challenges; and the future post-growth society. The rich contents dispel the myth of there being no alternatives to current economic thought and the political economy it supports. The Routledge Handbook of Ecological Economics provides a guide to the literature on ecological economics in an informative and easily accessible form. It is essential reading for those interested in exploring and understanding the interactions between the social, ecological and economic and is an important resource for those interested in fields such as: human ecology, political ecology, environmental politics, human geography, environmental management, environmental evaluation, future and transition studies, environmental policy, development studies and heterodox economics.

Despite the global endorsement of the Sustainable Development Goals, environmental justice struggles are growing all over the world. These struggles are not isolated injustices, but symptoms of interlocking forms of oppression that privilege the few while inflicting misery on the many and threatening ecological collapse. This handbook offers critical perspectives on the multi-dimensional, intersectional nature of environmental injustice and the cross-cutting forms of oppression that unite and divide these struggles, including gender, race, poverty, and indigeneity. The work sheds new light on the often-neglected social dimension of sustainability and its relationship to human rights and environmental justice. Using a variety of legal frameworks and case studies from around the world, this volume illustrates the importance of overcoming the fragmentation of these legal frameworks and social movements in order to develop holistic solutions that promote justice and protect the planet's ecosystems at a time of intensifying economic and ecological crisis.

This 5-volume set allows you to assess the health and environmental effects of chemicals by determining the routes of exposure of the chemical to sensitive organisms. *Environmental Fate and Exposure of Organic Chemicals* provides relevant facts on how individual chemicals

behave in the environment and how humans and environmental organisms are exposed to the chemicals during their production, rise, transport, and disposal. Each chemical is prepared by one of the best-known organizations in environmental fate and exposure and is peer-reviewed by a panel of expert scientists. The information on each chemical includes all experimental values and references for physical properties, all chemical fate studies, and all available monitoring data and interpretative summaries.

Oil Spill Environmental Forensics provides a complete view of the various forensic techniques used to identify the source of an oil spill into the environment. The forensic procedures described within represent various methods from scientists throughout the world. The authors explore which analytical and interpretative techniques are best suited for a particular oil spill project. This handy reference also explores the use of these techniques in actual environmental oil spills. Famous incidents discussed include the Exxon Valdez incident in 1989 and the Guanabara Bay, Brazil 2000. The authors chronicle both the successes and failures of the techniques used for each of these events. Dr. Zhendi Wang is a senior research scientist and Head of Oil Spill Research of Environment Canada, working in the oil and toxic chemical spill research field. He has authored over 270 academic publications and won a number of national and international scientific honors and awards. Dr. Wang is a member of American Chemical Society (ACS), the Canadian Society for Chemistry (CSC), and the International Society of Environmental Forensics (ISEF). International experts show readers the forensic techniques used in oil spill investigations Provides the theoretical basis and practical applications for investigative techniques Contains numerous case studies demonstrating proven technique

Due to the increasing trend of international interest in education for climate change and the environment, there has been an increase of research in the area. There is a current question on what the best methods and tools are for integrating climate change education and sustainability into school programs. These educational methods can create the development of effective responses, attitudes, and behaviors to adapt to climate change. Empirical and conceptual models must be explored to help those interested in learning and teaching environmental education and climate change and adding it to modern school curriculum. The Handbook of Research on Environmental Education Strategies for Addressing Climate Change and Sustainability produces innovative approaches, methods, and ideas in education for climate change, environment strategies, and sustainability along with the development of curriculum and strategies for sustainable development goals. The chapters encompass multiple disciplines such as geology, geography, remote sensing, geographic information systems, environmental science, and environmental engineering. This book is ideal for in-service and preservice teachers, administrators, teacher educators, practitioners, stakeholders, researchers, academicians, and students interested in educational strategies and curriculum for climate change and sustainability.

This book emphasizes the scientific origin of deformation and damage of FRP composites under various environmental effects and analyses present understanding on degradation mechanisms, role of interfaces and addition of nanofillers Discusses micro-characterization of composites and interfaces, also includes micro-mechanisms and microscopic evidences to establish the structure-property correlation Elucidates advantages and limitations of FRP composites in supercritical applications

One of the main, ongoing challenges for any engineering enterprise is that systems are built of materials subject to environmental degradation. Whether working with an airframe, integrated circuit, bridge, prosthetic device, or implantable drug-delivery system, understanding the chemical stability of materials remains a key element in determining their useful life. Environmental Degradation of Advanced and Traditional Engineering Materials is a monumental work for the field, providing comprehensive coverage of the environmental

impacts on the full breadth of materials used for engineering infrastructure, buildings, machines, and components. The book discusses fundamental degradation processes and presents examples of degradation under various environmental conditions. Each chapter presents the basic properties of the class of material, followed by detailed characteristics of degradation, guidelines on how to protect against corrosion, and a description of testing procedures. A complete, self-contained industrial reference guide, this valuable resource is designed for students and professionals interested in the development of deterioration-resistant technological systems constructed with metallurgical, polymeric, ceramic, and natural materials.

Measuring Environmental Degradation is a unique book that provides a comprehensive yet concise overview of the key issues of environmental significance addressed as part of the Eurostat 'Environmental Pressure Indicators Project'. The book is part of the 'Towards Environmental Pressure Indicators for the EU' (TEPI) series that has resulted from the project. The second edition of this outstanding handbook covers an area that has become increasingly important within global chemical legislation. Environmental degradation rates are vital for assessing environmental exposure from chemicals in various media. This book saves time and effort by providing and evaluating this essential information. Easy to use and well indexed by chemical name as well as by CAS number, the text presents rate constant and half-life ranges for various processes and then combines them into ranges for different media, which can be directly entered into a wide range of models. Figures of chemical structures and physical properties facilitate the interpretation of degradation rates.

The remediation of environmental pollutants has become a relevant topic within the field of waste management. Advances in biological approaches are a potential tool for contamination and pollution control. The Handbook of Research on Microbial Tools for Environmental Waste Management is a critical scholarly resource that explores the advanced biological approaches that are used as remediation for pollution cleanup processes. Featuring coverage on a broad range of topics such as biodegradation, microbial dehalogenation, and pollution controlling treatments, this book is geared towards environmental scientists, biologists, policy makers, graduate students, and scholars seeking current research on environmental engineering and green technologies.

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"Covers recent advances in polymer degradation and stabilization. Focuses on the basics of photo- and bio-degradability. Delineates special and general environmental parameters such as solar irradiation, temperature, and agrochemical exposure. Surveys plastic waste disposal strategies such as recycling, incineration, chemical recovery by pyrolysis,

This work provides those involved in water purification research and administration with a comprehensive resource of methods for analyzing water to assure its safety from contaminants, both natural and human caused. The book first provides an overview of major water-related issues in developing and developed countries, followed by a review of issues of sampling for water analysis, regulatory considerations and forensics in water quality and purity investigations. The subsequent chapters cover microbial as well as chemical contaminations from inorganic compounds, radionuclides, volatile and semi-volatile compounds, disinfectants, herbicides, and pharmaceuticals, including endocrine disruptors, as well as potential terrorist-related contamination. The last chapter describes the Grainger prize-winning filter that can remove arsenic from water sources and sufficiently protect the health of a large number of people. -

Covers the scope of water contamination problems on a worldwide scale -

Provides a rich source of methods for analyzing water to assure its safety from natural and deliberate contaminants -

Describes the filter that won the \$1 million Grainger prize and thereby highlighting an important approach to remediation

In order to assess the environmental exposure from chemicals in various media, you must know the rate at which a chemical will degrade. Handbook of Environmental Degradation Rates saves you the time and money collecting and evaluating this important information. The Handbook provides rate constant and half-life ranges for various processes and combines them into ranges for different media (air, groundwater, surface water, soils), which can be directly entered into various models. Some of the processes the Handbook includes are aerobic and anaerobic biodegradation, direct photolysis, hydrolysis, and reaction with various oxidants or free radicals (e.g., hydroxyl radical and ozone in the atmosphere). Experimental data are used and cited when available, and validated estimation methods are used when no experimental data are available. Researched and organized by leading experts, Handbook of Environmental Degradation Rates is easy-to-use and is well indexed by chemical name and CAS Number.

Featuring a stellar international cast list of leading and cutting-edge scholars, The

Routledge Handbook of the Political Economy of the Environment presents the state of the art of the discipline that considers ecological issues and crises from a political economy perspective. This collective volume sheds new light on the effect of economic and power inequality on environmental dynamics and, conversely, on the economic and social impact of environmental dynamics. The chapters gathered in this handbook make four original contributions to the field of political economy of the environment. First, they revisit essential concepts and methods of environmental economics in the light of their political economy. Second, they introduce readers to recent theoretical and empirical advances in key issues of political economy of the environment with a special focus on the relationship between inequality and environmental degradation, a nexus that has dramatically come into focus with the COVID crisis. Third, the authors of this handbook open the field to its critical global and regional dimensions: global issues, such as the environmental justice movement and inequality and climate change as well as regional issues such as agriculture systems, air pollution, natural resources appropriation and urban sustainability. Fourth and finally, the work shows how novel analysis can translate into new forms of public policy that require institutional reform and new policy tools. Ecosystems preservation, international climate negotiations and climate mitigation policies all have a strong distributional dimension that chapters point to. Pressing environmental policy such as carbon pricing and low-carbon and energy transitions entail numerous social issues that also need to be accounted for with new analytical and technological tools. This handbook will be an invaluable reference, research and teaching tool for anyone interested in political economy approaches to environmental issues and ecological crises.

Violence and insecurity are among the most important issues facing communities in the 21st century. Both family violence and community violence are rapidly rising in the urbanizing nations of the 'South', and richer nations are also facing increased conce

During the last few decades, China has accomplished unprecedented economic growth and has emerged as the second largest economy in the world. This 'economic miracle' has led hundreds of millions of people out of poverty, but has also come at a high cost. Environmental degradation and the impact of environmental pollution on health are nowadays issues of the greatest concern for the Chinese public and the government. The Routledge Handbook of Environmental Policy in China focuses on the environmental challenges of China's rapidly growing economy and provides a comprehensive overview of the policies developed to address the environmental crisis. Leading international scholars and practitioners examine China's environmental governance efforts from an interdisciplinary perspective. Divided into five parts, the handbook covers the following key issues: Part I: Development of Environmental Policy in China - Actors and Institutions Part II: Key issues and Strategies for Solution Part III: Policy Instruments and Enforcement Part IV: Related Policy Fields – Conflicts and Synergies Part V: China's Environmental Policy in the International Context This comprehensive handbook will be an invaluable resource to students and scholars of environmental policy and politics, development studies, Chinese studies, geography and international relations. The Routledge Handbook of Environmental Journalism provides a thorough understanding of environmental journalism around the world. An increasing number of media platforms – from newspapers and television to Internet social media networks – are the major providers of

indispensable information about the natural world and environmental risk. Despite the dramatic changes in the news industry that have tended to reduce the number of full-time newspaper reporters, environmental journalists remain key to bringing stories to light across the globe. With contributions from around the world broken down into five key regions – the United States of America, Europe and Russia, Asia and Australia, Africa and the Middle East, and South America – this book provides support for today's environment reporters, the providers of essential news in the 21st century. As a scholarly and journalistic work written by academics and the environmental reporters themselves, this volume is an essential text for students and scholars of environmental communication, journalism, and global environmental issues more generally, as well as professionals working in this vital area.

The use of financial concepts and tools to shape development is hardly new, but their recent adoption by advocates of sustainable environmental management has created opportunities for innovation in business and regulatory groups. The Handbook of Environmental and Sustainable Finance summarizes the latest trends and attitudes in environmental finance, balancing empirical research with theory and applications. It captures the evolution of environmental finance from a niche scholarly field to a mainstream subdiscipline, and it provides glimpses of future directions for research. Covering implications from the Kyoto and Paris Protocols, it presents an intellectually cohesive examination of problems, opportunities, and metrics worldwide. Introduces the latest developments in environmental economics, sustainable accounting work, and environmental/sustainable finance Explores the effects of environmental regulation on the economy and businesses Emphasizes research about the trade-environmental regulation nexus, relevant for economics and business students Energy consumption and production have major influences on the economy, environment, and society, but in return they are also influenced by how the economy is structured, how the social institutions work, and how the society deals with environmental degradation. The need for integrated assessment of the relationship between energy, economy, environment, and society is clear, and this handbook offers an in-depth review of all four pillars of the energy-economy-environment-society nexus. Bringing together contributions from all over the world, this handbook includes sections devoted to each of the four pillars. Moreover, as the financialization of commodity markets has made risk analysis more complicated and intriguing, the sections also cover energy commodity markets and their links to other financial and non-financial markets. In addition, econometric modeling and the forecasting of energy needs, as well as energy prices and volatilities, are also explored. Each part emphasizes the multidisciplinary nature of the energy economics field and from this perspective, chapters offer a review of models and methods used in the literature. The Routledge Handbook of Energy Economics will be of great interest to all those studying and researching in the area of energy economics. It offers guideline suggestions for policy makers as well as for future research. This textbook provides a solid introduction to the theoretical and empirical aspects of environmental economics, and their links to environmental policy. It advocates drawing on the economist's toolbox as a powerful means of finding solutions to environmental problems by addressing the conflict between the societal costs of pollution on the one hand, and the financial costs of emissions reduction on the other. The book presents the main economic theory approaches to handling environmental problems and assessing the monetary value of environmental quality; the most relevant environmental policy instruments and challenges involved in their effective real-world application; and both national and global environmental problems addressed by environmental negotiations and agreements. Given its scope, the book offers a valuable basis of information for students, and for policymakers pursuing effective environmental policies.

The Handbook of Environmental Economics focuses on the economics of environmental externalities and environmental public goods. Volume I examines environmental degradation

and policy responses from a microeconomic, institutional standpoint. Its perspective is dynamic, including a consideration of the dynamics of natural systems, and global, with attention paid to issues in both rich and poor nations. In addition to chapters on well-established topics such as the theory and practice of pollution regulation, it includes chapters on new areas of environmental economics research related to common property management regimes; population and poverty; mechanism design; political economy of regulation; experimental evaluations of policy instruments; and technological change.

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