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Environmental Degradation of Industrial Composites Handbook of Environmental Degradation of Materials Reviews of Environmental Contamination and Toxicology, Volume 227 Handbook of Polymer Degradation Freshwater Microplastics Degradable Polymers Handbook of Environmental Degradation of Materials Handbook of Polymer Degradation, Second Edition, Eco-friendly and Smart Polymer Systems Thermoplastic Elastomers Fibrous Polymeric Composites Polymers and the Environment Long-Term Properties of Polyolefins Photodegradation of Polymers Plastics and the Environment Hazardous Chemicals Associated with Plastics in the Marine Environment Polymer Degradation and Stabilization Polymer Degradation and Stability Research Developments Marine Anthropogenic Litter Biodegradable Polymers in the Circular Plastics Economy Plastics and the Environment Plastics in the Environment Polymer Degradation and Performance Handbook of Nanomaterials and Nanocomposites for Energy and Environmental Applications Polymer Photodegradation Polymers Handbook of Environmental Degradation of Materials Enzymatic Plastic Degradation Polymers and the Environment Biodegradable polymers for industrial applications Handbook of UV Degradation and Stabilization Handbook of Microplastics in the Environment Environmental Degradation of Advanced and Traditional Engineering Materials Biodegradable Polymers New Polymer Nanocomposites for Environmental Remediation Microbial Degradation of Plastics Handbook of Biodegradable Polymers A Handbook of Applied Biopolymer Technology Biopolymers: Reuse, Recycling, and Disposal

Photodegradation of Polymers Sep 20 2021 In this book on physical characteristics and practical aspects of polymer photodegradation Rabek emphasizes the experimental work on the subject. The most important feature of the book is the physical interpretation of polymer degradation, e.g. mechanism of UV/light absorption, formation of excited states, energy transfer mechanism, kinetics, dependence on physical properties of macromolecules and polymer matrices, formation of mechanical defects, practices during environmental ageing. He includes also some aspects of polymer photodegradation in environmental and space condition.

Handbook of Microplastics in the Environment Jan 31 2020 This reference work presents an authoritative review of microplastics as vectors of environmental contaminants and provides a comprehensive coverage of their ecotoxicological and toxicological effects. Divided into four sections, this book outlines the current analytical techniques and applications for sampling, processing analysis, and data reporting of microplastics pollution in the environment, explores microplastics degradation and interaction with chemical pollutants, discusses the fate and behaviour of microplastics in the environment, and provides valuable insights about prevention, regulation and remediation of microplastics pollution. Written by interdisciplinary expert academics and practitioners, this reference work will appeal to a wide readership of students, researchers and professionals interested in this field, including marine scientists, environmental scientists, analytical chemists, organic chemists, biochemists, biologists, polymer scientists, and toxicologists.

Biodegradable Polymers in the Circular Plastics Economy Mar 15 2021 Biodegradable Polymers in the Circular Plastics Economy A comprehensive overview of the burgeoning field of biodegradable plastics As the lasting impact of humanity's reliance on plastics comes into focus, scholars have begun to seek out solutions to plastic litter. In Biodegradable Polymers in the Circular Plastics Economy, an accomplished team of researchers delivers a focused guide (1) to understand plastic degradation and its role in waste hierarchy besides recycling, and (2) to create and use biodegradable plastics where appropriate. Created preferably from renewable resources, these eco-friendly polymers provide an opportunity to create sustainable and lasting solutions to the growing plastic-driven pollution problem. The broad approach to this handbook allows the authors to cover all aspects of these emerging materials, ranging from the problems present in the current plastics cycle, to the differences in type, production, and chemistry available within these systems, to end-of-life via recycling or degradation, and to life-cycle assessments. It also delves into potential commercial and policy issues to be addressed to successfully deploy this technology. Readers will also find: A thorough introduction to biodegradable polymers, focusing not only on the scientific aspects, but also addressing the larger political, commercial, and consumer concerns Mechanisms of biodegradation and the environmental impact of persistent polymers An in-depth discussion of degradable/hydrolysable polyesters, polysaccharides, lignin-based polymers, and vitrimers Management of plastic waste and life cycle assessment of bio-based plastics Biodegradable Polymers in the Circular Plastics Economy is the perfect overview of this complicated but essential research field and will appeal to polymer chemists, environmental chemists, chemical engineers, and bioengineers in academia and industry. The book is intended as a step towards a circular plastics economy that relies heavily on degradable plastics to sustain it.

Polymer Degradation and Stabilization Jun 17 2021 The development of polymers as an important class of material was inhibited at the first by the premature failure of these versatile compounds in many applications. The deterioration of important properties of both natural and synthetic polymers is the result of irreversible changes in composition and structure of polymers molecules. As a result of these reactions, mechanical, electrical and/or aesthetic properties are degraded beyond acceptable limits. It is now generally recognized that stabilization against degradation is necessary if the useful life of polymers is to be extended sufficiently to meet design requirements for long-term applications. Polymers degrade by a wide variety of mechanisms, several of which affect all polymers through to varying degree. This monograph will concentrate on those degradation mechanisms which result from reactions of polymers with oxygen in its various forms and which are accelerated by heat and/or radiation. Those stabilization mechanisms are discussed which are based on an understanding of degradation reaction mechanisms that are reasonably well established. The stabilization of polymers is still undergoing a transition from an art to a science as mechanisms of degradation become more fully developed. A scientific approach to stabilization can only be approached when there is an understanding of the reactions that lead to degradation. Stabilization against biodegradation and burning will not be discussed since there is not a clear understanding of how polymers degrade under these conditions.

A Handbook of Applied Biopolymer Technology Jul 27 2019 Scientists are conducting active research in different fields of engineering, science and technology by adopting the Green Chemistry Principles and methodologies to devise new processes, with a view to help protect and ultimately save the environment from further anthropogenic interruptions and damage. With this in mind, the book provides an up-to-date, coherently written and objectively presented set of chapters from eminent international researchers who are actively involved in academic and technological research in the synthesis, (bio)degradation, testing and applications of biodegradable polymers and biopolymers. This pool of the latest ideas, recent research and technological progress, together with a high level of thinking with a comprehensive perspective, makes the emerging field of biodegradable polymer science and engineering (or bio-based polymers) linked to environmental sustainability, the essence of this key publication. The handbook consists of chapters written and contributed by international experts from academia who are world leaders in research and technology in sustainability and biopolymer and biodegradable polymer synthesis, characterisation, testing and use. The book highlights the following areas: green polymers; biopolymers and bionanocomposites; biodegradable and injectable polymers; biodegradable polyesters; synthesis and physical properties; discovery and characterization of biopolymers; degradable bioelastomers, lactic acid based biodegradable polymers; enzymatic degradation of biodegradable polymers; biodegradation of polymers in the composting environment; recent development in biodegradable polymers; research and applications and biodegradable foams. The book is aimed at technical, research-orientated and marketing people in industry, universities and institutions. It will also be of value to the worldwide public interested in sustainability issues and biopolymer development as well as others interested in the practical means that are being used to reduce the environmental impacts of chemical processes and products, to further eco-efficiency, and to advance the utilization of renewable resources for a bio-based production and supplier chain. Readers will gain a comprehensive and consolidated overview of the immense potential and ongoing research in bio-based and biodegradable polymer science, engineering and technology to make the world greener.

Plastics in the Environment Jan 13 2021 Plastics in the Environment is a collection of reviewed and relevant research chapters, offering a comprehensive overview of recent developments in the field of plastic pollution and how it is affecting the environment. The book comprises single chapters authored by various researchers and edited by an expert active in the research area. All chapters are complete in themselves but united under a common research study topic. This publication aims at providing a thorough overview of the latest research efforts by international authors on the trending topic of plastics in the environment and opens new possible research paths for further novel developments.

Marine Anthropogenic Litter Apr 15 2021 This book describes how man-made litter, primarily plastic, has spread into the remotest parts of the oceans and covers all aspects of this pollution problem from the impacts on wildlife and human health to socio-economic and political issues. Marine litter is a prime threat to marine wildlife, habitats and food webs worldwide. The book illustrates how advanced technologies from deep-sea research, microbiology and mathematic modelling as well as classic beach litter counts by volunteers contributed to the broad awareness of marine litter as a problem of global significance. The authors summarise more than five decades of marine litter research, which receives growing attention after the recent discovery of great oceanic garbage patches and the ubiquity of microscopic plastic particles in marine organisms and habitats. In 16 chapters, authors from all over the world have created a universal view on the diverse field of marine litter pollution, the biological impacts, dedicated research activities, and the various national and international legislative efforts to combat this environmental problem. They recommend future research directions necessary for a comprehensive understanding of this environmental issue and the development of efficient management strategies. This book addresses scientists, and it provides a solid knowledge base for policy makers, NGOs, and the broader public.

New Polymer Nanocomposites for Environmental Remediation Oct 29 2019 New Polymer Nanocomposites for Environmental Remediation summarizes recent progress in the development of materials' properties, fabrication methods and their applications for treatment of contaminants, pollutant sensing and detection. This book presents current

research into how polymer nanocomposites can be used in environmental remediation, detailing major environmental issues, and key materials properties and existing polymers or nanomaterials that can solve these issues. The book covers the fundamental molecular structure of polymers used in environmental applications, the toxicology, economy and life-cycle analysis of polymer nanocomposites, and an analysis of potential future applications of these materials. Recent research and development in polymer nanocomposites has inspired the progress and use of novel and cost-effective environmental applications. Presents critical, actionable guidelines to the structure and property design of nanocomposites in environmental remediation Focuses on taking technology out of the lab and into the real world Summarizes the latest developments in polymer nanocomposites and their applications in catalytic degradation, adsorptive removal and detection of contaminants in the environment Enables researchers to stay ahead of the curve, with a full discussion of regulatory issues and potential new applications and materials in this area

Environmental Degradation of Advanced and Traditional Engineering Materials Jan 01 2020 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.

Polymer Degradation and Performance Dec 12 2020 "Developed from ... papers ... presented at the symposium on Polymer Performance Degradation and Materials Selection at the American Chemical Society (ACS) spring meeting held in March 2007 in Chicago, Illinois"--P. xi.

Fibrous Polymeric Composites Dec 24 2021 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

Handbook of Biodegradable Polymers Aug 27 2019 This handbook covers characteristics, processability and application areas of biodegradable polymers, with key polymer family groups discussed. It explores the role of biodegradable polymers in different waste management practices including anaerobic digestion, and considers topics such as the different types of biorefineries for renewable monomers used in producing the building blocks for biodegradable polymers.

Handbook of Polymer Degradation, Second Edition, Mar 27 2022 "Covers recent advances in polymer degradation and stabilization. Focuses on the basics of photo- and biodegradability. 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, and source reduction."

Biodegradable polymers for industrial applications Apr 03 2020 The vast majority of plastic products are made from petroleum-based synthetic polymers that do not degrade in a landfill or in a compost-like environment. Therefore, the disposal of these products poses a serious environmental problem. An environmentally-conscious alternative is to design/synthesize polymers that are biodegradable. *Biodegradable polymers for industrial applications* introduces the subject in part one by outlining the classification and development of biodegradable polymers with individual chapters on polyhydroxyalkanoates, polyesteramides and thermoplastic starch biodegradable polymers and others. The second part explores the materials available for the production of biodegradable polymers. Polymers derived from sugars, natural fibres, renewable forest resources, poly(lactic acid) and protein-nanoparticle composites will be looked at in detail in this section. Part three looks at the properties and mechanisms of degradation, prefacing the subject with a chapter on current standards. The final part explores opportunities for industrial applications, with chapters on packing, agriculture and biodegradable polycaprolactone foams in supercritical carbon dioxide. *Biodegradable polymers for industrial applications* explores the fundamental concepts concerning the development of biodegradable polymers, degradable polymers from sustainable sources, degradation and properties and industrial applications. It is an authoritative book that will be invaluable for academics, researchers and policy makers in the industry.

Hazardous Chemicals Associated with Plastics in the Marine Environment Jul 19 2021 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.

Reviews of Environmental Contamination and Toxicology, Volume 227 Sep 01 2022 ?Reviews of Environmental Contamination and Toxicology attempts to provide concise, critical reviews of timely advances, philosophy and significant areas of accomplished or needed endeavor in the total field of xenobiotics, in any segment of the environment, as well as toxicological implications.?

Handbook of Environmental Degradation of Materials Oct 02 2022 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 effects 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

Microbial Degradation of Plastics Sep 28 2019

Polymers Sep 08 2020 * Timely information on the environmental impact of polymer recycling. * Ample sample questions and answers in chapters. * Provides material on the economics and legislation of recycling, and on LCA. * Examines the advantages and disadvantages of polymer recycling.

Freshwater Microplastics Jun 29 2022 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.

Biopolymers: Reuse, Recycling, and Disposal Jun 25 2019 *Biopolymers Reuse, Recycling and Disposal* is the first book covering all aspects of biopolymer waste management and post-usage scenarios, embracing existing technologies, applications, and the behavior of biopolymers in various waste streams. The book investigates the benefits and weaknesses, social, economic and environmental impacts, and regulatory aspects of each technology. It covers different types of recycling and degradation, as well as life cycle analysis, all supported by case studies, literature references, and detailed information about global patents. Patents in particular—comprising 80% of published technical literature in this emerging field, widely scattered, and often available in Japanese only—are a key source of information. Dr. Niaounakis draws on disciplines such as polymer science, management, biology and microbiology, organic chemistry, environmental chemistry, and patent law to produce a reference guide for engineers, scientists and other professionals involved in the development and production of biopolymers, waste management, and recycling. This information is also valuable for regulators, patent attorneys and academics working in this field. Explores techniques and technologies involved in managing biopolymers in the waste stream, including recycling and upcycling Provides waste management and recycling professionals the knowledge they need to plan for the exponential growth in biopolymer waste Helps engineers and product designers fully consider the end-of-life aspects of their environmentally sustainable 'green' products and solutions

Enzymatic Plastic Degradation Jun 05 2020 *Enzymatic Plastic Degradation, Volume 648* in the *Methods in Enzymology* series, continues the legacy of this premier serial with chapters authored by leaders in the field. Chapters in this latest release include Evaluating plastic pollution and environmental degradation, Assessment methods for microplastic pollution in the oceans and fresh water, Exploring microbial consortia from various environments for plastic degradation, Characterization of filamentous fungi for attack on synthetic polymers via biological Fenton chemistry, Synthesis of radioactive-labeled nanoplastics for assaying the environmental (microbial) PS degradation, Exploring metagenome for plastic degrading enzymes, Cutinases from thermophilic bacteria (actinomycetes): from identification to functional and structural characterization, and much more. Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the *Methods in Enzymology* series Covers the latest research and technologies in enzymatic plastic degradation

Polymer Photodegradation Oct 10 2020 During the last two decades, the production of polymers and plastics has been increasing rapidly. In spite of developing new polymers and polymeric materials, only 40-60 are used commercially on a large scale. It has been estimated that half of the annual production of polymers is employed

outdoors. The photochemical instability of most polymers limits their outdoor application as they are photodegraded quickly over periods from months to a few years. To the despair of technologists and consumers alike, photodegradation and environmental ageing of polymers occur much faster than can be expected from knowledge collected in laboratories. In order to improve polymer photostability there has been a very big effort during the last 30 years to understand the mechanisms involved in photodegradation and environmental ageing. This book represents the author's attempt, based on his 25 years' experience in research on photodegradation and photo stabilization, to collect and generalize a number of available data on the photodegradation of polymers. The space limitation and the tremendous number of publications in the past two decades have made a detailed presentation of all important results and data difficult. The author apologizes to those whose work has not been quoted or widely presented in this book. Because many published results are very often contradictory, it has been difficult to present a fully critical review of collected knowledge, without antagonizing authors. For that reason, all available theories, mechanisms and different suggestions have been presented together, and only practice can evaluate which of them are valid.

Polymers and the Environment May 05 2020 This book reviews the and industrial applications of properties polymers and discusses their environmental benefits compared with traditional materials. It also addresses the issues of polymer durability, recycling processes to aid waste minimization, and biodegradable polymers. This book introduces the non-specialist to the benefits and limitations of polymeric materials from an environmental viewpoint.

Polymers Aug 08 2020 * Timely information on the environmental impact of polymer recycling. * Ample sample questions and answers in chapters. * Provides material on the economics and legislation of recycling, and on LCA. * Examines the advantages and disadvantages of polymer recycling.

Biodegradable Polymers Nov 30 2019 This book is about development of biodegradable polymers alternatives, which are required to save our reserves of fossil fuels and to save our mother earth from further environmental degradation. This book deals with the family of biodegradable polymers which have to be prepared with a novel idea of studying polymers with a "Cradle to Grave" approach. It touches upon basic materials, which can be potential materials to prepare biodegradable polymers with their basic structures, properties, behaviour and limitations known till date. This book will help students in understanding various characterization techniques which can be used for the study of identification of functional group, structural properties, thermal behaviour, crystallographic nature, mechanical properties and morphological properties through FTIR-ATR for physico chemical properties, DSC & TGA for thermal studies, XRD for crystallographic studies & SEM for morphological studies. It also provides an overview of various testing methods to analyse biodegradability including standard guideline for evaluation of biodegradation and compostability of polymer material through ASTM/ISO/EN standard methods. Note: T&F does not sell or distribute the Hardback in India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka.

Eco-friendly and Smart Polymer Systems Feb 23 2022 This proceedings book presents the main findings of the 13th International Seminar on Polymer Science and Technology (ISPST 2018), which was held at Amirkabir University of Technology, Tehran, on November 10–22, 2018. This forum was the culmination of more than three decades of academic and industrial activities of Iranian scholars and professionals, and the participation of many notable international scientists, in covering various important polymer-related subjects of concern to Iran and the world at large, including polymer synthesis, processing and properties, as well as issues concerning polymer degradation, stability, and environmental aspects. For the past half a century, the growing concern for advancing human health, quality of life, and – especially in the last few decades – avoiding and combating environmental pollution have shaped and driven scientific activities geared toward the creation of smart materials that are compatible with the human body, and have prompted scientists and technologists to pursue research using natural and sustainable sources. This book highlights efforts to responsibly address the problems caused by, and which can potentially be solved by, polymers and plastics.

Long-Term Properties of Polyolefins Oct 22 2021

Handbook of Nanomaterials and Nanocomposites for Energy and Environmental Applications Nov 10 2020 This exhaustive Handbook covers the synthesis and applications of nanomaterials that can be used in energy and environmental science applications. Given the pressing need for more efficient energy sources at lower costs, this book will help to provide a more cohesive understanding of nanocomposites and nanomaterials. Each chapter in this handbook is written by an expert in his or her field, and topics ranging from energy efficiency to material performance are presented. Catalysis, ceramic science, metallurgy, coatings, and green, sustainable materials are included. This Handbook provides a comprehensive guide to the field of applied nanomaterials. It will drive interest and research in the use of nanocomposites and nanomaterials for energy and environmental applications.

Handbook of UV Degradation and Stabilization Mar 03 2020 This book, the second edition of the first monograph fully devoted to UV degradation and stabilization ever published in English, has 12 chapters discussing different aspects of UV related phenomena occurring when polymeric materials are exposed to UV radiation. In the introduction the existing literature has been reviewed to find out how plants, animals and humans protect themselves against UV radiation. This review permits evaluation of mechanisms of protection against UV used by living things and potential application of these mechanisms in protection of natural and synthetic polymeric materials. This is followed by chapters with a more detailed look at more specific aspects of UV degradation and stabilization. A practical and up-to-date reference guide for engineers and scientists designing with plastics, and formulating plastics materials Explains the effects of UV light on plastics, and how to mitigate its effects through the use of UV stabilizers Surveys the range of UV stabilizers on the market, and provides advice on their selection and use

Handbook of Environmental Degradation of Materials Apr 27 2022 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 effects 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

Handbook of Polymer Degradation Jul 31 2022 "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, and source reduction."

Degradable Polymers May 29 2022 Few scientific developments in recent years have captured the popular imagination like the subject of 'biodegradable' plastics. The reasons for this are complex and lie deep in the human subconscious. Discarded plastics are an intrusion on the sea shore and in the countryside. The fact that nature's litter abounds in the sea and on land is acceptable because it is biodegradable - even though it may take many years to be bioassimilated into the ecosystem. Plastics litter is not seen to be biodegradable and is aesthetically unacceptable because it does not blend into the natural environment. To the environmentally aware but often scientifically naive, biodegradation is seen to be the ecologically acceptable solution to the problem of plastic packaging waste and litter and some packaging manufacturers have exploited the 'green' consumer with exaggerated claims to 'environmentally friendly' biodegradable packaging materials. The principles underlying environmental degradation are not understood even by some manufacturers of 'biodegradable' materials and the claims made for them have been categorized as 'deceptive' by USA legislative authorities. This has set back the acceptance of plastics with controlled biodegradability as part of the overall waste and litter control strategy. At the opposite end of the commercial spectrum, the polymer manufacturer ing industries, through their trade associations, have been at pains to discount the role of degradable materials in waste and litter management. This negative campaign has concentrated on the supposed incompatibility of degradable plastics with aspects of waste management strategy, notably materials recycling.

Polymers and the Environment Nov 22 2021 This book reviews the and industrial applications of properties polymers and discusses their environmental benefits compared with traditional materials. It also addresses the issues of polymer durability, recycling processes to aid waste minimization, and biodegradable polymers. This book introduces the non-specialist to the benefits and limitations of polymeric materials from an environmental viewpoint.

Handbook of Environmental Degradation of Materials Jul 07 2020 Industry pays an enormous price for material degradation. The Handbook of Environmental Degradation of Materials outlines these costs, but more importantly, explains how to measure, analyze, and prevent environmental degradation for a wide range of industrial materials. Experts from around the world share how a diverse set of industries cope with the degradation of metals, polymers, reinforced concrete, clothing, and wood under adverse environmental conditions such as weather, seawater, and fire. Case studies show how organizations from small consulting firms to corporate giants design and manufacture products that are more resistant to environmental effects. By implementing these standards companies of all sizes should realize savings beneficial to their operations.

Polymer Degradation and Stability Research Developments May 17 2021 Polymer degradation is a change in the properties -- tensile strength, colour, shape, etc -- of a polymer or polymer based product under the influence of one or more environmental factors such as heat, light or chemicals. These changes may be undesirable, such as changes during use, or desirable, as in biodegradation or deliberately lowering the molecular weight of a polymer. Such changes occur primarily because of the effect of these factors on the chemical composition of the polymer. In a finished product such a change is to be prevented or delayed. However the degradation process can be useful from the view points of understanding the structure of a polymer or recycling/reusing the polymer waste to prevent or reduce environmental pollution. Polymer molecules are very large on the molecular scale which derive their unique and useful properties from their size. This book presents leading-edge research in the field.

Environmental Degradation of Industrial Composites Nov 03 2022 Thanks to their low density and tailored properties, polymer matrix composites are attractive candidates for a large number of industrial applications ranging from aerospace to transportation and energy. However, the behaviour of polymer-based materials is strongly affected by a number of environmental factors. Environmental Degradation in Industrial Composites provides vital information on the effects of environmental factors such as temperature, liquid and gas exposure, electrical fields and radiations, and how micro- and micromechanical calculations during design and manufacture must take these effects into account. The book concludes with reviews on standard and specific testing methods for the various environmental factors and their combinations, helping mechanical/materials engineers and specifiers to predict possible changes due to environmental conditions. Each chapter is supplemented by industrial case studies to help in the understanding of

degradation of composites in real life situations. This book will help you to... * Understand how environmental factors lead to degradation effects in polymer matrix composite structures * Build these factors into calculations when predicting the part performance and lifetime of structures * Compare real-life situations from case studies with your predicted results * Predict probable composite behaviour with greater accuracy This book will help you to... * Understand how environmental factors lead to degradation effects in polymer matrix composite structures * Build these factors into calculations when predicting the part performance and lifetime of structures * Compare real-life situations from case studies with your predicted results * Predict probable composite behaviour with greater accuracy

Thermoplastic Elastomers Jan 25 2022 Thermoplastic elastomers (TPEs), commonly known as thermoplastic rubbers, are a category of copolymers having thermoplastic and elastomeric characteristics. A TPE is a rubbery material with properties very close to those of conventional vulcanized rubber at normal conditions. It can be processed in a molten state even at elevated temperatures. TPEs show advantages typical of both rubbery materials and plastic materials. TPEs are a class of polymers bridging between the service properties of elastomers and the processing properties of thermoplastics. Nowadays, the best use of thermoplastics is in the field of biomedical applications, starting from artificial skin to many of the artificial human body parts. Apart from these, thermoplastic elastomers are being used for drug encapsulation purposes, and since they are biocompatible in many cases, their scope of applications has been broadened in the biotechnological field as well. The present book highlights many biological and biomedical applications of TPEs from which the broader area readers will benefit.

Plastics and the Environment Feb 11 2021 An original, comprehensive survey on the complex relationship between plastics and the environment Plastics offer a variety of environmental benefits. However, their production, applications, and disposal present many environmental concerns. *Plastics and the Environment* provides state-of-the-art technical and research information on the complex relationship between the plastic and polymer industry and the environment, focusing on the sustainability, environmental impact, and cost-benefit tradeoffs associated with different technologies. Bringing together the field's leading researchers, Anthony Andrady's innovative collection not only covers how plastics affect the environment, but also how environmental factors affect plastics. The relative benefits of recycling, resource recovery, and energy recovery are also discussed in detail. The first of the book's four sections represents a basic introduction to the key subject matter of plastics and the environment; the second explores several pertinent applications of plastics with environmental implications—packaging, paints and coatings, textiles, and agricultural film use. The third section discusses the behavior of plastics in some of the environments in which they are typically used, such as the outdoors, in biotic environments, or in fires. The final section consists of chapters on recycling and thermal treatment of plastics waste. Chapters include: * Commodity Polymers * Plastics in Transportation * Biodegradation of Common Polymers * Thermal Treatment of Polymer Waste * Incineration of Plastics The contributors also focus on the effectiveness of recent technologies in mitigating environmental impacts, particularly those for managing plastics in the solid waste stream. Plastic and design engineers, polymer chemists, material scientists, and ecologists will find *Plastics and the Environment* to be a vital resource to this critical industry.

Plastics and the Environment Aug 20 2021 Plastics offer a variety of environmental benefits. However, their production, applications, and disposal present many environmental concerns. *Plastics and the Environment* provides state-of-the-art technical and research information on the complex relationship between the plastic and polymer industry and the environment, focusing on the sustainability, environmental impact, and cost—benefit tradeoffs associated with different technologies. Bringing together the field's leading researchers, Anthony Andrady's innovative collection not only covers how plastics affect the environment, but also how environmental factors affect plastics. The relative benefits of recycling, resource recovery, and energy recovery are also discussed in detail. The first of the book's four sections represents a basic introduction to the key subject matter of plastics and the environment; the second explores several pertinent applications of plastics with environmental implications—packaging, paints and coatings, textiles, and agricultural film use. The third section discusses the behavior of plastics in some of the environments in which they are typically used, such as the outdoors, in biotic environments, or in fires. The final section consists of chapters on recycling and thermal treatment of plastics waste. Chapters include: Commodity Polymers Plastics in Transportation Biodegradation of Common Polymers Thermal Treatment of Polymer Waste Incineration of Plastics The contributors also focus on the effectiveness of recent technologies in mitigating environmental impacts, particularly those for managing plastics in the solid waste stream. Plastic and design engineers, polymer chemists, material scientists, and ecologists will find *Plastics and the Environment* to be a vital resource to this critical industry.

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