

## Products And Properties Braskem

This handbook provides an exhaustive description of polyethylene. The 50+ chapters are written by some of the most experienced and prominent authors in the field, providing a truly unique view of polyethylene. The book starts with a historical discussion on how low density polyethylene was discovered and how it provided unique opportunities in the early days. New catalysts are presented and show how they created an expansion in available products including linear low density polyethylene, high density polyethylene, copolymers, and polyethylene produced from metallocene catalysts. With these different catalysts systems a wide range of structures are possible with an equally wide range of physical properties. Numerous types of additives are presented that include additives for the protection of the resin from the environment and processing, fillers, processing aids, anti-fogging agents, pigments, and flame retardants. Common processing methods including extrusion, blown film, cast film, injection molding, and thermoforming are presented along with some of the more specialized processing techniques such as rotational molding, fiber processing, pipe extrusion, reactive extrusion, wire and cable, and foaming processes. The business of polyethylene including markets, world capacity, and future prospects are detailed. This handbook provides the most current and complete technology assessments and business practices for polyethylene resins.

As energy demands continue to surge worldwide, the need for more efficient and environmentally neutral energy production also becomes increasingly apparent. *Renewable Resources and Renewable Energy: A Global Challenge* presents a well-rounded perspective on the development of bio-based feedstocks, biodegradable plastics, hydrogen energy, fuel

This book provides insight into the Life Cycle Management (LCM) concept and the progress in its implementation. LCM is a management concept applied in industrial and service sectors to improve products and services, while enhancing the overall sustainability performance of business and its value chains. In this regard, LCM is an opportunity to differentiate through sustainability performance on the market place, working with all departments of a company such as research and development, procurement and marketing, and to enhance the collaboration with stakeholders along a company's value chain. LCM is used beyond short-term business success and aims at long-term achievements by minimizing environmental and socio-economic burden, while maximizing economic and social value.

This publication examines the international drivers, the enabling technologies that are fast-tracking Industrial Biotechnology, industry trends, some of the products that are appearing on the market, industry structure and finance, and finally policy measures and trends.

In today's world, bioplastics are becoming increasingly prominent owing mainly to scarcity of oil, increase in the cost of petroleum-based commodities, and growing environmental concerns with the dumping of non-biodegradable plastics in landfills. This book summarizes the field of bioplastics by illustrating how they form a unique class of research area that integrates pure and applied sciences such as chemistry, engineering and materials science, to initiate solutions. Compelling science demystics this complex and often ambiguous branch of study for benefit of all those concerned with bioplastics.

Textiles have been historically and traditionally used to make clothes, but even in ancient times there were technical textiles for making sails, tents, etc. Today, technical textiles are used in various industries for a host of purposes and applications. Recently, there have been exciting developments on various fronts in the textile field to impart novel and innovative functionalities to textiles, e.g., easy-to-clean or dirt-repellent, flame retardancy, anti-bacterial, and fog-harvesting properties, to name a few. Also, textiles for electronics based on graphene, CNTs and other nanomaterials, conductive textiles, textiles for sensor function, textile-fixed catalysts, textiles for batteries and energy storage, textiles as substrates for tissue engineering, and textiles for O/W separation have appeared in the literature. All this has been possible through adopting novel ways for finishing textiles, e.g., by appropriate surface modification techniques, and utilizing biomimetic concepts borrowed from nature. This unique book entitled "Textile Finishing: Recent Developments and Future Trends" is divided into four parts: Part 1: Recent Developments/Current Challenges in Textile Finishing; Part 2: Surface Modification Techniques for Textiles; Part 3: Innovative Functionalities of Textiles; Part 4: Fiber-Reinforced Composites. The topics covered include: Antimicrobial textile finishes; flame retardant textile finishing; "self-cleaning" or easy-to-clean textiles; metallization of textiles; atmospheric pressure plasma, and uv-based photochemical surface modification of textiles; tunable wettability of textiles; 3D textile structures for fog harvesting; textile-fixed catalysts; medical textiles as substrates for tissue engineering; and fiber-reinforced "green" or "greener" biocomposites and the relevance of fiber/matrix adhesion.

Packaging plays an essential role in protecting and extending the shelf life of a wide range of foods, beverages and other fast-moving consumer goods. There have been many key developments in packaging materials and technologies in recent years, and Trends in packaging of food, beverages and other fast-moving consumer goods (FMCG) provides a concise review of these developments and international market trends. Beginning with a concise introduction to the present status and trends in innovations in packaging for food, beverages and other fast-moving consumer goods, the book goes on to consider modified atmosphere packaging and other active packaging systems, including smart and intelligent packaging, and the role these play in augmenting and securing the consumer brand experience. Developments

in plastic and bioplastic materials and recycling systems are then discussed, followed by innovations and trends in metal, paper and paperboard packaging. Further chapters review international environmental and sustainability regulatory and legislative frameworks, before the use of nanotechnology, smart and interactive packaging developments for enhanced communication at the packaging/user interface are explored. Finally, the book concludes by considering potential future trends in materials and technologies across the international packaging market. With its distinguished editor and international team of expert contributors, Trends in packaging of food, beverages and other fast-moving consumer goods (FMCG) is an important reference tool, providing a practical overview of emerging packaging technologies and market trends for research and design professionals in the food and packaging industry, and academics working in this area. Introduces the present status, current trends and new innovations in the field whilst considering future trends in materials and technologies Considers modified atmosphere packaging and other active packaging systems including smart and intelligent packaging Discusses developments in plastic and bioplastic materials and recycling systems

Sustainable Plastics Environmental Assessments of Biobased, Biodegradable, and Recycled Plastics John Wiley & Sons Plastics & Sustainability clearly lays out the thorny and contentious issues that we encounter at the nexus of plastics and sustainability. The book serves as a practical guide for making sustainability decisions about how plastics are made and used, including current developments in the newest bio-based plastics. Designers, marketers, academics, and engineers will all find something of value in this balanced and thoughtful second edition. Increased public scrutiny of plastics materials and the plastics industry has led, paradoxically, to both a deeper understanding and growing confusion about polymers, their origins, their uses, their risks, and ultimately their disposal. The author makes objective comparisons among major polymer grades and bioplastics including their life cycle assessments and practical performance in commercial applications.

As an area of high topical interest, Biopolymers – New materials for Sustainable Films and Coatings covers the development and utilization of polymers derived from bioresources, with a particular focus on film and coating applications. With growing concern for the environment and the rising price of crude oil, there is increasing demand for non-petroleum-based polymers from renewable resources. Leading research groups worldwide in industry and academe are working on such technology with the objective of applying the latest advances in the field. Written by well-respected experts, this text systematically covers the extraction and production of selected biopolymers as well as their properties and application as films or coatings in a variety of uses. The areas addressed include food packaging, edible coatings, paper coatings and agricultural films. Intended for researchers and students, this book will also be of interest to industry, especially in terms of the practical applications.

In recent years, the Circular Economy (CE) has gained worldwide attention as an effective alternative economic system to the current take-make-waste model of production and consumption. As more and more firms begin to recognize the potential of this novel approach, the CE quickly moves from theory to practice and the demand for a coherent and structured strategic approach –

one that companies can rely upon when commencing their circular journey – grows accordingly. Strategic Management and the Circular Economy aims to bridge the theory-practice gap by putting forward a detailed step-by-step process for analysis, formulation, and planning of CE strategies. Starting from a solid framework of easy-to-grasp constructs (key principles, business objectives and areas of intervention), the authors guide the reader through an understanding of how conventional tools for strategic management can be re-programmed under a CE perspective. To assist learning and encourage circular thinking, the reader is constantly prompted with examples of how forward-looking companies across industries and geographies are already applying circular strategies to future-proof their operations, boost innovation, penetrate new markets and secure customer loyalty. Composite Materials: Properties, Characterisation, and Applications provides an in-depth description of the synthesis, properties, and various characterisation techniques used for the study of composite materials. Covers applications and simulation tests of these advanced materials Presents real-world examples for demonstration Discusses surface, thermal, and electrical characterisation techniques Covers composites for use as sensors Aimed at industry professionals and researchers, this book offers readers thorough knowledge of the fundamentals as well as advanced level techniques involved in composite material characterisation, development, and applications.

Industrial Applications of Renewable Plastics: Environmental, Technological, and Economic Advances provides practical information to help engineers and materials scientists deploy renewable plastics in the plastics market. It explores the uses, possibilities, and problems of renewable plastics and composites to assist in material selection and rejection. The designer's main problems are examined, along with basic reminders that deal with structures and processing methods that can help those who are generally familiar with metals understand the unique properties of plastic materials. The book offers a candid overview of main issues, including conservation of fossil resources, geopolitical considerations, greenhouse effects, competition with food crops, deforestation, pollution, and disposal of renewable plastics. In addition, an overview of some tools related to sustainability (Life cycle assessments, CO<sub>2</sub> emissions, carbon footprint, and more) is provided. The book is an essential resource for engineers and materials scientists involved in material selection, design, manufacturing, molding, fabrication, and other links in the supply chain of plastics. The material contained is of great relevance to many major industries, including automotive and transport, packaging, aeronautics, shipbuilding, industrial and military equipment, electrical and electronics, energy, and more. Provides key, enabling information for engineers and materials scientists looking to increase the use of renewable plastic materials in their work Presents practical guidance to assist in materials selection, processing methods, and applications development, particularly for designers more familiar with other materials, such as metals Includes a candid discussion of the pros and cons of using renewable plastics, considering the technical, economic, legal, and environmental aspects

Polymers are an important part in everyday life; products made from polymers range from sophisticated articles, such as biomaterials, to aerospace materials. One of the reasons for the great popularity exhibited by polymers is their ease of processing. Polymer properties can be tailored to meet specific needs by varying the "atomic composition" of the repeat structure, by varying

molecular weight and by the incorporation (via covalent and non-covalent interactions) of an enormous range of compounds to impart specific activities. In food science, the use of polymeric materials is widely explored, from both an engineering and a nutraceutical point of view. Regarding the engineering application, researchers have discovered the most suitable materials for intelligent packaging which preserves the food quality and prolongs the shelf-life of the products. Furthermore, in agriculture, specific functionalized polymers are used to increase the efficiency of treatments and reduce the environmental pollution. In the nutraceutical field, because consumers are increasingly conscious of the relationship between diet and health, the consumption of high quality foods has been growing continuously. Different compounds (e.g. high quality proteins, lipids and polysaccharides) are well known to contribute to the enhancement of human health by different mechanisms, reducing the risk of cardiovascular disease, coronary disease, and hypertension. This first volume, of this two volume book, concerns the application of polymers in food packaging.

This new edition of Innovations in Food Packaging ensures that readers have the most current information on food packaging options, including active packaging, intelligent packaging, edible/biodegradable packaging, nanocomposites and other options for package design. Today's packaging not only contains and protects food, but where possible and appropriate, it can assist in inventory control, consumer education, increased market availability and shelf life, and even in ensuring the safety of the food product. As nanotechnology and other technologies have developed, new and important options for maximizing the role of packaging have emerged. This book specifically examines the whole range of modern packaging options. It covers edible packaging based on carbohydrates, proteins, and lipids, antioxidative and antimicrobial packaging, and chemistry issues of food and food packaging, such as plasticization and polymer morphology. Professionals involved in food safety and shelf life, as well as researchers and students of food science, will find great value in this complete and updated overview. New to this edition: Over 60% updated content — including nine completely new chapters — with the latest developments in technology, processes and materials Now includes bioplastics, biopolymers, nanoparticles, and eco-design of packaging

This document brings together a set of latest data points and publicly available information relevant for Manufacturing Industry. We are very excited to share this content and believe that readers will benefit from this periodic publication immensely.

This book is intended to give readers an appreciation of what the future holds, as cutting-edge technologies in synthetic biology and pathway engineering and advanced bioprocessing development pave the way for providing goods and services to benefit humankind that are based on the synergy of two biomasses - i.e. of what a renewable feedstock could yield and an infinite microbial biomass could provide in terms of enzymes and biocatalysts. This 13-chapter book, with an introductory treatise on the guiding principles of green chemistry and engineering metrics, brings together a broad range of research and innovation agendas and perspectives from industries, academia and government laboratories using renewable feedstocks that include macroalgae and lignins. In addition, social-economic aspects and the pillars of

competitiveness in regional cluster development are explored as we transition from fossil-fuel-based economies to a circular bioeconomy, with chemurgy and green chemistry being implicit to the innovation movement. The bulk of the book covers specific applications including the bioproduction of amino sugars, dicarboxylic acids, omega-3 fatty acids, starch and fermentable sugars from lignocellulosic materials, and phenolics as building blocks for polymer synthesis. Enzymatic systems for accessing chiral and special-purpose chemicals, as well as the development of specialized enzymes from macroalgae for biofuel and biochemical production are also addressed. Research gaps, hurdles to overcome in various biological processes, and present achievements in the production of biofuels and biochemicals from lignocellulosic materials are discussed. Going beyond the conventional expectation of discussing the production of drop-in chemicals, the book instead emphasizes how the potential of new chemicals and materials can be harnessed through innovative thinking and research. As such, it provides an invaluable reference source for researchers and graduate students interested in Chemurgy and Green Chemistry, as well as for practitioners in the field of industrial biotechnology and biobased industry. Peter C.K. Lau is a Distinguished Professor at Tianjin Institute of Industrial Biotechnology of the Chinese Academy of Sciences, and an Adjunct Professor at the Departments of Chemistry and Microbiology & Immunology, McGill University, Canada.

Providing guidelines for implementing sustainable practices for traditional petroleum based plastics, biobased plastics, and recycled plastics, *Sustainable Plastics and the Environment* explains what sustainable plastics are, why sustainable plastics are needed, which sustainable plastics to use, and how manufacturing companies can integrate them into their manufacturing operations. A vital resource for practitioners, scientists, researchers, and students, the text includes impacts of plastics including Life Cycle Assessments (LCA) and sustainability strategies related to biobased plastics and petroleum based plastics as well as end-of-life options for petroleum and biobased plastics.

Biopolymers and biodegradable plastics are finding new applications in various sectors, from packaging, to medical, automotive and many more. As synthetic plastics are increasingly replaced by their bioplastic equivalents, engineers are facing new challenges including processing, costs, environmental sustainability and – ultimately – developing successful products. *Biopolymers: Processing and Products*, the second book of a trilogy dedicated to biopolymers, gives a detailed insight into all aspects of processing, seamlessly linking the science of biopolymers to the latest trends in the development of new products. Processes covered in the book include blending, compounding, treatment, and shaping, as well as the formation of biocomposites. Biopolymer coatings and adhesives are also investigated. This book unique in its coverage contains information retrieved mainly from patents, which form the bulk of the book. The coverage of processing will help engineers and designers to improve output and efficiency of every stage of the product development

process, and will form an indispensable tool in selecting the right biopolymer and processing technique for any given application, covering medical, automotive, food packaging and more. It will assist also engineers, material scientists and researchers to improve existing biopolymer processes and deliver better products at lower cost. Multi-disciplinary approach and critical presentation of all available processing techniques and new products of biopolymers Contains information not to be found in any other book Self-contained chapters

The series Topics in Current Chemistry presents critical reviews of the present and future trends in modern chemical research. The scope of coverage is all areas of chemical science including the interfaces with related disciplines such as biology, medicine and materials science. The goal of each thematic volume is to give the non-specialist reader, whether in academia or industry, a comprehensive insight into an area where new research is emerging which is of interest to a larger scientific audience. Each review within the volume critically surveys one aspect of that topic and places it within the context of the volume as a whole. The most significant developments of the last 5 to 10 years are presented using selected examples to illustrate the principles discussed. The coverage is not intended to be an exhaustive summary of the field or include large quantities of data, but should rather be conceptual, concentrating on the methodological thinking that will allow the non-specialist reader to understand the information presented. Contributions also offer an outlook on potential future developments in the field.

The International Conference on Food Engineering is held every four years and draws global participation. ICEF 10 will be held in April 2008 in Chile with the theme of food engineering at interfaces. This will not be a typical proceedings with uneven contributions. Papers will be solicited from each plenary speaker plus two or three invited speakers from each topic and the goal is to publish a book that conveys the interdisciplinary spirit of the meeting as well as covers the topics in depth, creating a strong reference work. The idea is to explore how food engineers have to be prepared in years ahead not only to perform in their normal activities but also to engage in new challenges and opportunities that will make the profession more attractive, responsive, and able to create a larger impact. These challenges and opportunities are within the profession and at interfaces with other areas. A major role of engineers is to incorporate new knowledge into the profession and respond to practical needs. The goal is to explore how food engineers are integrating developments in the basic sciences of physics and chemistry, nutrition, informatics, material sciences, genomics (and other -omics), quality and safety, consumer behavior and gastronomy. Interfaces with the environment, the business sector, regulations and export markets are also important to consider.

This book introduces the most recent innovations in natural polymer applications in the food, construction, electronics, biomedical, pharmaceutical, and engineering industries. The authors provide perspectives from their respective range of

industries covering classification, extraction, modification, and application of natural polymers from various sources in nature. They discuss the techniques used in analysis of natural polymers in various systems incorporating natural polymers as well as their intrinsic properties.

As the planet's natural resources continue to be depleted, society's environmental awareness has grown. Businesses especially are being coerced into incorporating more sustainable approaches to carrying out their activities.

Organizations that develop sustainable business strategies that deliver enhanced value by radically reducing material inputs and engaging consumers on circular economy will be well-positioned for success. Mapping, Managing, and Crafting Sustainable Business Strategies for the Circular Economy is an essential reference source that discusses implementing sustainable business strategies as well as economic policies for the modern business era. Featuring research on topics such as global business, urban innovation, and cost management, this book is ideally designed for managers, operators, manufacturers, academics, practitioners, policymakers, researchers, business professionals, and students seeking coverage on utilizing natural resources in the most sustainable way.

This document brings together a set of latest data points and publicly available information relevant for Manufacturing Industry. We are very excited to share this content and believe that readers will benefit from this periodic publication immensely.

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

Since the 1950s, subsidiaries of the most prestigious foreign multinationals have played a key role in Brazilian economic development, thus creating a very competitive domestic market. On top of this, government interventions in the last few decades have been inconsistent and contradictory, resulting in a series of economic crises. Only the most resilient Brazilian firms have been able to survive and prosper in this challenging environment. This book, first published in 2011, analyzes a variety of leading Brazilian multinationals and examines their

competencies and competitive strategies in a variety of different settings. It develops an innovative analytical framework based on international business, international operations management, and international human resources management. This framework is then applied not only to Brazilian multinationals, but also firms from Latin America, Russia, India and China. This provides novel insights into the rise of Brazilian multinationals and the increasingly important role played by emerging economy multinationals in the global economy. While the prevalence of plastics and elastomers in medical devices is now quite well known, there is less information available covering the use of medical devices and the applications of polymers beyond medical devices, such as in hydrogels, biopolymers and silicones beyond enhancement applications, and few books in which these are combined into a single reference. This book is a comprehensive reference source, bringing together a number of key medical polymer topics in one place for a broad audience of engineers and scientists, especially those currently developing new medical devices or seeking more information about current and future applications. In addition to a broad range of applications, the book also covers clinical outcomes and complications arising from the use of the polymers in the body, giving engineers a vital insight into the real world implications of the devices they're creating. Regulatory issues are also covered in detail. The book also presents the latest developments on the use of polymers in medicine and development of nano-scale devices. Gathers discussions of a large number of applications of polymers in medicine in one place Provides an insight into both the legal and clinical implications of device design Relevant to industry, academic and medical professionals Presents the latest developments in the field, including medical devices on a nano-scale

Discover biomolecular engineering technologies for the production of biofuels, pharmaceuticals, organic and amino acids, vitamins, biopolymers, surfactants, detergents, and enzymes In *Biomolecular Engineering Solutions for Renewable Specialty Chemicals*, distinguished researchers and editors Drs. R. Navanietha Krishnaraj and Rajesh K. Sani deliver a collection of insightful resources on advanced technologies in the synthesis and purification of value-added compounds. Readers will discover new technologies that assist in the commercialization of the production of value-added products. The editors also include resources that offer strategies for overcoming current limitations in biochemical synthesis, including purification. The articles within cover topics like the rewiring of anaerobic microbial processes for methane and hythane production, the extremophilic bioprocessing of wastes to biofuels, reverse methanogenesis of methane to biopolymers and value-added products, and more. The book presents advanced concepts and biomolecular engineering technologies for the production of high-value, low-volume products, like therapeutic molecules, and describes methods for improving microbes and enzymes using protein engineering, metabolic engineering, and systems biology approaches for converting wastes. Readers will also discover: A thorough introduction to engineered microorganisms for the production of biocommodities and microbial production of vanillin from ferulic acid Explorations of antibiotic trends in microbial therapy, including current approaches and future prospects, as well as fermentation strategies in the food and beverage industry Practical discussions of bioactive oligosaccharides, including their production, characterization, and applications In-depth treatments of biopolymers, including a retrospective analysis in the facets of biomedical engineering Perfect for researchers and practicing professionals in the areas of environmental and industrial biotechnology, biomedicine, and the biological sciences, *Biomolecular Engineering Solutions for Renewable Specialty Chemicals* is also an invaluable resource for students taking courses involving biorefineries, biovalorization, industrial biotechnology, and environmental biotechnology.

*Automotive Plastics and Composites: Materials and Processing* is an essential guide to the use of plastic and polymer composites in automotive applications, whether in the exterior, interior, under-the-hood, or powertrain, with a focus on materials, properties, and processing.

The book begins by introducing plastics and polymers for the automotive industry, discussing polymer materials and structures, mechanical, chemical, and physical properties, rheology, and flow analysis. In the second part of the book, each chapter is dedicated to a category of material, and considers the manufacture, processing, properties, shrinkage, and possible applications, in each case. Two chapters on polymer processing provide detailed information on both closed-mold and open-mold processing. The final chapters explain other key aspects, such as recycling and sustainability, design principles, tooling, and future trends. This book is an ideal reference for plastics engineers, product designers, technicians, scientists, and R&D professionals who are looking to develop materials, components, or products for automotive applications. The book also intends to guide researchers, scientists, and advanced students in plastics engineering, polymer processing, and materials science and engineering. Analyzes mechanical, chemical, physical, and thermal properties, enabling the reader to select the appropriate material for specific applications Explains polymer processing, with thorough coverage of operations across both closed-mold and open-mold processing Provides systematic coverage of materials, including commodity and engineering thermoplastics, bio-based plastics, thermosets, composites, elastomeric polymers, and 3D-printed plastics

This book investigates the main vegetable biomass types, their chemical characteristics and their potential to replace oil as raw material for the chemical industry, according to the principles of green chemistry. Authors from different scientific and technical backgrounds, from industry and academia, give an overview of the state of the art and ongoing developments. Aspects including bioeconomy, biorefineries, renewable chemistry and sustainability are also considered, given their relevance in this context. Furthermore, the book reviews green chemistry principles and their relation to biomass, while also exploring the main processes for converting biomass into bioproducts. The need to develop renewable feedstock for the chemical industry to replace oil has been identified as a major strategic challenge for the 21st century. In this context, the use of different types of vegetable biomass – starch, lignocellulosic, oleaginous, saccharide and algae – can be seen as a viable alternative to the use of non-renewable, more expensive raw materials. Furthermore, it offers a model for adding economic value to the agro industrial chains such as soybean, sugarcane, corn and forests, among others. This will in turn contribute to the sustainability of a wide range of chemicals, mainly organics and their transformation processes, which are widely used by modern society.

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.

This state-of-the-art reference contains chapters on all aspects of the characterization of minerals, metals, and materials. The title presents papers from one of the largest yearly gatherings of materials scientists in the world and thoroughly discusses the characterization of minerals, metals, and materials The scope includes current industrial applications and research and developments in the following areas: • Characterization of Ferrous Metals • Characterization of Non-Ferrous Materials • Characterization of Minerals and Ceramics • Characterization Technologies • Characterization of Environmental and Construction Materials • Characterization of Energy, Electronic and Optical Materials • Characterization of Carbon and Soft Materials • Characterization of Light Metals An excellent reference for global extractive and process metallurgy industries, materials scientists and engineers, metallurgists, and mechanical engineers.

Presents the most up-to-date information on the state of Materials Fabrication, Properties, Characterization, and Modeling. It's a great mix of practical applied technology and hard science, which is of invaluable benefit to the global industry.

Thermoplastics and Thermoplastic Composites, Third Edition bridges the technology and business aspects of thermoplastics, providing a guide designed to help engineers working in real-world industrial settings. The author explores the criteria for material selection, provides a detailed guide to each family of thermoplastics, and explains the various processing options for each material type. More than 30 families of thermoplastics are described with information on their advantages and drawbacks, special grades, prices, transformation processes, applications, thermal behavior, technological properties (tenacity, friction, dimensional stability), durability (ageing, creep, fatigue), chemical and fire behavior, electrical properties, and joining possibilities. In this third edition, standards and costs have been updated for all materials, and more information on topics such as bioplastics, 3D printing and recycling have been added. In addition, an entirely new chapter on the concept of 'Industry 4.0' has been added, with guidance and suggestions on the incorporation of virtualization, connectivity, and automation into the plastics engineering process to reduce materials and processing failure. Includes detailed case studies that illustrate best practices across a wide range of applications and industry sectors Presents a new chapter on the 'Industry 4.0' concept Suggests software solutions to assist with design, decision-making and management, along with other forms of automation

This book gathers the proceedings of the International Symposium on Plastics Technology, which was held on March 10, 2020 in Aachen, Germany, and was organised by the Institute for Plastics Processing (IKV) in Industry and Craft at RWTH Aachen University. Peer-reviewed by an international scientific committee, the conference proceedings comprise the papers presented by the international speakers. Topics covered include - circular economy- extrusion- lightweight technologies- simulation and digitisation - injection moulding- hybrid materials and additive manufacturing. In these fields, key themes for plastics technologies have been identified that will shape the face of research and industry for the next decade. In their contributions, the authors present the latest scientific findings, and discuss topical issues in plastics technologies. The symposium offered an inspiring forum for the exchange on research and innovation, for discussing urgent questions and providing impulses for the future of plastics technology.

Sustainable Bioenergy and Bioproducts considers the recent technological innovations and emerging concepts in biobased energy production and coproducts utilization. Each chapter in this book has been carefully selected and contributed by experts in the field to provide a good understanding of the various challenges and opportunities associated with sustainable production of biofuel.

Sustainable Bioenergy and Bioproducts covers a broad and detailed range of topics including: production capacity of hydrocarbons in the plant kingdom, algae, and microbes; biomass pretreatment for biofuel production; microbial fuel cells; sustainable use of biofuel co-products; bioeconomy and transportation infrastructure impacts and assessment of environmental risks and the life cycle of biofuels. Researchers, practitioners, undergraduate and graduate students engaged in the study of biorenewables, and members of the well-informed public will find Sustainable Bioenergy and Bioproducts to be a useful and

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comprehensive research tool, describing the state of the art and recent developments in this field.

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