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**Bacterial NanoCellulose** - Miguel Gama  
2016-04-19 The first book dedicated to the potential applications and unique properties of bacterial cellulose (BC), this seminal work covers the basic science, technology, and economic impact of this bulk chemical as well as the companies and patents that are driving the field. It reviews the biosynthesis and properties of BC, including genetics and characterization; discusses the advancing technology as it relates to product development, bioreactors, and production; and analyzes the economic impact of BC on a diverse range of industry applications, including materials and biomaterials, biological and polymer sciences, and electromechanical engineering.

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**Bacterial Nanocellulose** - Miguel Gama  
2016-07-12 Bacterial Nanocellulose: From Biotechnology to Bio-Economy presents an overview on the current and future applications of bacterial nanocellulose, perspectives on the ecology and economics of its production, and a brief historic overview of BNC related companies. Discusses recent progresses on the molecular mechanism of BNC biosynthesis, its regulation, and production techniques Covers advances in the use of BNC in bio- and nano-polymer composite materials Presents a detailed economic analysis of BNC production Provides an overview on the regulatory framework on the food and biomedical fields Reviews current research in the biomedical and food industries, identifies gaps, and suggests future needs Raises awareness about this material and its potential uses in emergent fields, such as the development of aerogels and optoelectronic devices

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**Multifunctional Polymeric Nanocomposites Based on Cellulosic Reinforcements** - Debora Puglia  
2016-07-11 Multifunctional Polymeric Nanocomposites Based on Cellulosic Reinforcements introduces the innovative applications of polymeric materials based on nanocellulose, and covers extraction methods, functionalization approaches, and assembly methods to enable these applications. The book presents the state-of-the-art of this novel nano-filler and how it enables new applications in many different sectors, beyond existing products. With a focus on application of nano-cellulose based polymers with multifunctional activity, the book explains the methodology of nano-cellulose extraction and production and shows the potential performance benefits of these
particular nanostructured polymers, for applications across different sectors, including food active packaging, energy-photovoltaics, biomedical, and filtration. The book describes how the different methodologies, functionalization, and organization at the nano-scale level could contribute to the design of required properties at macro level. The book studies the interactions between the main nanofiller with other active systems and how this interaction enables multi-functionality in the produced materials. The book is an indispensable resource for the growing number of scientists and engineers interested in the preparation and novel applications of nano-cellulose, and for industrial scientists active in formulation and fabrication of polymer products based on renewable resources. Provides insight into nanostructure formation science, and processing of polymeric materials and their characterization. Offers a strong analysis of real industry needs for designing the materials. Provides a well-balanced structure, including a light introduction of basic knowledge on extraction methods, functionalization approaches, and assembling focused to applications. Describes how different methodologies, functionalization, and organization at the nano-scale level could contribute to the design of required properties at macro level.

**Nano-biosorbents for Decontamination of Water, Air, and Soil Pollution** - Adil Denizli 2022-02-04

Nano-biosorbents for Decontamination of Water, Air, and Soil Pollution explores the properties of nanobiosorbents and their applications in the removal of contaminants from the natural environment. The use of nanobiosorbents for environmental protection is a combinational approach that incorporates nanotechnology with naturally occurring biopolymers that form an amalgamation of nano-biopolymers used as sorbent materials in the removal of a variety of contaminants from wastewaters. This is an important reference source for materials scientists, bioscientists, and environmental scientists who are looking to understand how nanobiosorbents are being used for a range of environmental applications. Highlights the environmental applications of chitosan-based, cellulose-based and polymer-based nanoscale biosorbents. Explains the advantages of using different types of nanobiosorbents for soil, water and air purification applications. Assesses the challenges associated with manufacturing nanobiosorbents cheaply and on an industrial scale.

**Sustainable Fibres for Fashion Industry** - Subramanian Senthilkannan Muthu 2016-03-23

This book covers all sustainable fibres applicable in the fashion sector and discusses their importance in the context of sustainability. It is the first of its kind to address all the minute details pertaining to these fibres and to connect these fibres with the world of sustainable fashion. It stresses their importance in developing sustainable apparel, since fibres play a major role as the starting point in the life cycle of clothing.

**Nanocellulose Based Composites for Electronics** - Sabu Thomas 2020-10-06

Nanocellulose Based Composites for Electronics presents recent developments in the synthesis and applications of nanocellulose composites in electronics, highlighting applications in various technologies. Chapters cover new trends and challenges in a wide range of electronic applications and devices. Significant properties, safety, sustainability, and environmental impacts of the electronic devices are included, along with the challenges of using nanocellulose-based composites in electronics. This book is an important reference for materials scientists and engineers configuring and designing processes for the synthesis and device fabrication of nanocellulose composites in electronics. Explores how to utilize nanocellulose fibers and nanocrystalline cellulose substances to synthesize materials with designed functionalities. Outlines the major production processes for nanocellulose composites. Discusses the major challenges that need to be surmounted in order to effectively use nanocellulose composites for electronics.

**Nanocelluloses** - Elena Vismara 2020-05-12

Nanocelluloses: Synthesis, Modification and Applications is a book that provides some recent enhancements of various types of nanocellulose, mainly bacterial nanocellulose, cellulose nanocrystals and nanofibrils, and their nanocomposites. Bioactive bacterial nanocellulose finds applications in biomedical applications, https://doi.org/10.3390/nano9101352. Grafting and cross-linking bacterial nanocellulose modification emerges as a good choice for...
improving the potential of bacterial nanocellulose in such biomedical applications as topical wound dressings and tissue-engineering scaffolds, https://doi.org/10.3390/nano9121668. On the other hand, bacterial nanocellulose can be used as paper additive for fluorescent paper, https://doi.org/10.3390/nano9010058. Nanocellulose membranes are used for up-to-date carbon capture applications, https://doi.org/10.3390/nano9060877. Nanocellulose has been applied as a novel component of membranes designed to address a large spectrum of filtration problems, https://doi.org/10.3390/nano9060867. Poly(vinyl alcohol) (PVA) and cellulose nanocrystals (CNC) in random composite mats prepared using the electrospinning method are widely characterized in a large range of physical chemical aspects, https://doi.org/10.3390/nano9050805. Similarly, physical chemical aspects are emphasized for carboxylated cellulose nanofibrils produced by ammonium persulfate oxidation combined with ultrasonic and mechanical treatment, https://doi.org/10.3390/nano8090640. It is extraordinary how nanocellulose can find application in such different fields. Along the same lines, the contributions in this book come from numerous different countries, confirming the great interest of the scientific community for nanocellulose.

Nanocellulose: Synthesis, Structure, Properties And Applications-Guang Yang 2021-04-09 Nanocellulose, a unique and promising natural material extracted from native cellulose, has received immense interest for its broad spectrum of applications owing to its remarkable physical properties, special surface chemistry, and excellent biological properties (biocompatibility, biodegradability and low toxicity). In attempts to meet the requirements of humanity’s well-being, biomaterials scientists taking advantage of the structure and properties of nanocellulose aim to develop new and formerly non-existing materials with novel and multifunctional properties. This book highlights the importance of nanocellulose and reviews its synthesis, types, structure and properties. Further, it discusses various biofabrication approaches and applications of nanocellulose-based biomaterials in various fields such as the environment, biomedicine, optoelectronics, pharmaceutics, paper, renewable energy and the food industry. Devised to have a broad appeal, this book will be useful to beginners, who will appreciate its comprehensive approach, as well as active researchers, who will find the focus on recent advancements highly valuable.

Bacterial Cellulose-Sher Bahadar Khan 2021-10-01 Bacterial cellulose (BC) is a natural polymer produced by different microbial cells. Its unique structural, physico-chemical, mechanical, thermal, and biological properties offer much potential for use in diverse applications in the biomedical, electronics, energy, and environmental fields, among others. This text provides an overview of the synthesis, characterization, modification, and application of BC. • Discusses sources, characterization, and biosynthesis of BC • Covers composites and aerogels based on BCs • Describes development of BCs from waste and challenges in large-scale production of BCs • Explores a variety of applications such as environmental, industrial, and biomedical. This book will be of great interest to researchers and industry professionals in materials science, chemical engineering, chemistry, and other related fields seeking to learn about the synthesis and application of this important material.

Nanocellulose Materials-Ramesh Oraon 2022-01-17 Nanocellulose Materials: Fabrication and Industrial Applications focuses on the practices, distribution and applications of cellulose at the nanoscale. The book delivers recent advancements, highlights new perspectives and generic approaches on the rational use of nanocellulose, and includes sustainability advantages over conventional sources towards green and sustainable industrial developments. The topics and sub-topics are framed to cover all key features of cellulose, from extraction to technological evolution. Nanocellulose has great potential due to its versatility and numerous applications, including the potential role of nanocellulose scaffold derivatives towards active involvement in the energy sector, chemical sensing, catalysis, food industry and anti-bacterial coatings towards land, agricultural and aquatic systems. Explores the whole spectrum of industrial scale fabrications and the utilization of nanocellulose as a sustainable material or as part of a sustainability agenda. Discusses the environmental, legal, health and safety issues of
Green Chemistry for Sustainable Textiles - Nabil Ibrahim 2021-07-23
Green Chemistry for Sustainable Textiles: Modern Design and Approaches provides a comprehensive survey of the latest methods in green chemistry for the reduction of the textile industry's environmental impact. In recent years industrial R&D has been exploring more sustainable chemicals as well as eco-friendly technologies in the textile wet processing chain, leading to a range of new techniques for sustainable textile manufacture. This book discusses and explores basic principles of green chemistry and their implementation along with other aspects of cleaner production strategies, as well as new and emerging textile technologies, providing a comprehensive reference for readers at all levels. Potential benefits to industry from the techniques covered in this book include: Savings in water, energy and chemical consumption, waste minimization as well as disposal cost reduction, and production of high added value sustainable textile products to satisfy consumer demands for comfort, safety, aesthetic, and multi-functional performance properties. Innovative emerging methods are covered as well as popular current technologies, creating a comprehensive reference that facilitates comparisons between methods.

Nanostructured Solar Cells - Narottam Das 2017-02-22
Nanostructured solar cells are very important in renewable energy sector as well as in environmental aspects, because it is environment friendly. The nano-grating structures (such as triangular or conical shaped) have a gradual change in refractive index which acts as a multilayer antireflective coating that is leading to reduced light reflection losses over broadband ranges of wavelength and angle of incidence. There are different types of losses in solar cells that always reduce the conversion efficiency, but the light reflection loss is the most important factor that decreases the conversion efficiency of solar cells significantly. The antireflective coating is an optical coating which is applied to the surface of lenses or any optical devices to reduce the light reflection losses. This coating assists for the light trapping capturing capacity or improves the efficiency of optical devices, such as lenses or solar cells. Hence, the multilayer antireflective coatings can reduce the light reflection losses and increases the conversion efficiency of nanostructured solar materials.
Interface / Interphase in Polymer Nanocomposites - Anil N. Netravali 2016-11-29
Significant research has been done in polymeric nanocomposites and progress has been made in understanding nanofiller-polymer interface and interphase and their relation to nanocomposite properties. However, the information is scattered in many different publication media. This is the first book that consolidates the current knowledge on understanding, characterization and tailoring interfacial interactions between nanofillers and polymers by bringing together leading researchers and experts in this field to present their cutting edge research. Eleven chapters authored by senior subject specialists cover topics including: Thermodynamic mechanisms governing nanofiller dispersion, engineering of interphase with nanofillers Role of interphase in governing the mechanical, electrical, thermal and other functional properties of nanocomposites, characterization and modelling of the interphase Effects of crystallization on the interface, chemical and physical techniques for surface modification of nanocellulose reinforcements Electro-micromechanical and nanoindentation techniques for interface evaluation, molecular dynamics (MD) simulations to quantify filler-matrix adhesion and nanocomposite mechanical properties.

Principles and Applications of Fermentation Technology - Arindam Kuila 2018-07-30
The book covers all aspects of fermentation technology such as principles, reaction kinetics, scaling up of processes, and applications. The 20 chapters written by subject matter experts are divided into two parts: Principles and Applications. In the first part subjects covered include: Modelling and kinetics of fermentation technology Sterilization techniques used in fermentation processes Design and types of bioreactors used in fermentation technology Recent advances and future prospect of fermentation technology The second part subjects covered include: Lactic acid and ethanol production using fermentation technology Various industrial value-added product biosynthesis using fermentation technology Microbial cyp450 production and its industrial application Polyunsaturated fatty acid production through solid state fermentation Application of oleaginous yeast for lignocellulosic biomass based single cell oil production Utilization of micro-algal biomass for bioethanol production Poly-lactide production from lactic acid through fermentation technology Bacterial cellulose and its potential impact on industrial applications.

Sustainable Polymer Composites and Nanocomposites - Inamuddin 2019-02-01
This book presents emerging economical and environmentally friendly polymer composites that are free of the side effects observed in traditional composites. It focuses on eco-friendly composite materials using granulated cork, a by-product of the cork industry; cellulose pulp from the recycling of paper residues; hemp fibers; and a range of other environmentally friendly materials procured from various sources. The book presents the manufacturing methods, properties and characterization techniques of these eco-friendly composites. The respective chapters address classical and recent aspects of eco-friendly polymer composites and their chemistry, along with practical applications in the biomedical, pharmaceutical, automotive and other sectors. Topics addressed include the fundamentals, processing, properties, practicality, drawbacks and advantages of eco-friendly polymer composites. Featuring contributions by experts in the field with a variety of backgrounds and specialties, the book will appeal to researchers and students in the fields of materials science and environmental science. Moreover, it fills the gap between research work in the laboratory and practical applications in related industries.

Micro- and Nano-containers for Smart Applications - Jyotishkumar Parameswaranpillai

Nanotechnology - Bhaskar Mazumder 2019-03-18
Today we find the applications of nanotechnology in all spheres of life. Nanotechnology: Therapeutic, Nutraceutical and Cosmetic Advances discusses recent advances in the field, particularly with therapeutics, nutraceuticals and cosmetic sciences. Therapeutics is an area which has perhaps benefitted the most, although nanoscience and technology have quietly entered the realms of food science and are playing pivotal roles in the efficient utilization of nutraceuticals. Finally, even before therapeutics came cosmetics and
companies started marketing unique products embedding the beneficial and advanced properties enabled by the use of nanostructures. This book highlights trends and applications of this wonderful new technology.

**Acetic Acid Bacteria**-Ilkin Yucel Sengun 2017-06-28 This book, written by leading international authorities in the field, covers all the basic and applied aspects of acetic acid bacteria. It describes the importance of acetic acid bacteria in food industry by giving information on the microbiological properties of fermented foods as well as production procedures. Special attention is given to vinegar and cocoa, which are the most familiar and extensively used industrial applications of acetic acid bacteria. This book is an essential reference to all scientists, technologists, engineers, students and all those working in the field of food science and technology.

**SYNTHETIC MICROBIAL RESEARCH - CHALLENGES AND PROSPECTS**-Dr. R. Bhakyaraj 2022-01-28 Synthetic microbial research-challenges and prospects are more inclined towards interdisciplinary studies. Recent developments in the Microbial technologies have led to a better understanding of living systems and this has removed the demarcations between various disciplines of biological sciences. A new trend in bioscience incorporates Bitechology and biological research involving Agrobacterium mediated gene transfer in medicinal plants for enhanced production of secondary metabolites, Biohydrogen and bioplastic from photosynthetic bacteria – A State of art review, Microbial Cellulase- An Overview, Microbial Nanotechnology: Challenges and Prospects for Green Biocatalytic Synthesis of Nanoscale Materials for Sensory and Biomedical Applications, Probiotics and Its application, Impact of Copper on water treatment plant, Chitin and Chitinases: An overview of production and applications, Therapeutic approaches for the manageent of Polycystic Ovarian Syndrome, The 3Rs of managing solid waste: reduce, reuse and recycle, Green Synthesis of Algal Nanoparticles and its Biotechnological Potentials, Biopigments, Microbial profiling of vermicompost.

**Handbook Of Green Materials: Processing Technologies, Properties And Applications** (In 4 Volumes)-Oksman Kristiina 2014-04-11 Green materials and green nanotechnology have gained widespread interest over the last 15 years; first in academia, then in related industries in the last few years. The Handbook of Green Materials serves as reference literature for undergraduates and graduates studying materials science and engineering, composite materials, chemical engineering, bioengineering and materials physics; and for researchers, professional engineers and consultants from polymer or forest industries who encounter biobased nanomaterials, biocomposites, self- and direct-assembled nanostructures and green composite materials in their lines of work. This four-volume set contains material ranging from basic, background information on the fields discussed, to reports on the latest research and industrial activities, and finally the works by contributing authors who are prominent experts of the subjects they address in this set. The four volumes comprise of: The first volume explains the structure of cellulose; different sources of raw material; the isolation/separation processes of nanomaterials from different material sources; and properties and characteristics of cellulose nanofibers and nanocrystals (starch nanomaterials). Information on the different characterization methods and the most important properties of biobased nanomaterials are also covered. The industrial point of view regarding both the processability and access of these nanomaterials, as well as large scale manufacturing and their industrial application is discussed — particularly in relation to the case of the paper industry. The second volume expounds on different biocomposites based on cellulose nanofibers or nanocrystals and their preparation/manufacturing processes. It also provides information on different characterization methods and the most important properties of biocomposites, as well as techniques of modeling the mechanical properties of nanocomposites. This volume presents the industrial point of view regarding large scale manufacturing and their applications from the perspective of their medical uses in printed electronics and in adhesives. The third volume deals with the ability of biocomposites to self-assemble in either liquids or forming organized solid materials. The chemistry of cellulose nanomaterials and chemical modifications as well as different assembling techniques and used characterization methods, and the most important properties which can be achieved by self-assembly, are described. The
chapters, for example, discuss subjects such as ultra-light biobased aerogels based on cellulose and chitin, thin films suitable as barrier layers, self-sensing nanomaterials, and membranes for water purification. The fourth volume reviews green composite materials — including green raw materials — such as biobased carbon fibers, regenerated cellulose fibers and thermoplastic and thermoset polymers (e.g. PLA, bio-based polyolefines, polysaccharide polymers, natural rubber, bio-based polyurethane, lignin polymer, and furfurylalcohol). The most important composite processing technologies are described, including: preregs of green composites, compounding, liquid composite molding, foaming, and compression molding. Industrial applications, especially for green transportation and the electronics industry, are also described. This four-volume set is a must-have for anyone keen to acquire knowledge on novel bionanomaterials — including structure-property correlations, isolation and purification processes of nanofibers and nanocrystals, their important characteristics, processing technologies, industrial up-scaling and suitable industry applications. The handbook is a useful reference not only for teaching activities but also for researchers who are working in this field.

**Eco-friendly Polymer Nanocomposites** - Vijay Kumar Thakur 2015-07-20

This book contains precisely referenced chapters, emphasizing environment-friendly polymer nanocomposites with basic fundamentals, practicality and alternatives to traditional nanocomposites through detailed reviews of different environmental friendly materials procured from different resources, their synthesis and applications using alternative green approaches. The book aims at explaining basics of eco-friendly polymer nanocomposites from different natural resources and their chemistry along with practical applications which present a future direction in the biomedical, pharmaceutical and automotive industry. The book attempts to present emerging economic and environmentally friendly polymer nanocomposites that are free from side effects studied in the traditional nanocomposites. This book is the outcome of contributions by many experts in the field from different disciplines, with various backgrounds and expertises. This book will appeal to researchers as well as students from different disciplines. The content includes industrial applications and will fill the gap between the research works in laboratory to practical applications in related industries.

**Cellulose-Reinforced Nanofibre Composites** - Mohammad Jawaid 2017-06-06

Cellulose-Reinforced Nanofibre Composites: Production, Properties and Applications presents recent developments in, and applications of, nanocellulose as reinforcement in composite and nanocomposite materials. Written by leading experts, the book covers properties and applications of nanocellulose, including the production of nanocellulose from different biomass resources, the usefulness of nanocellulose as a reinforcement for polymer and paper, and major challenges for successful scale-up production in the future. The chapters draw on cutting-edge research on the use of nanosized cellulose reinforcements in polymer composites that result in advanced material characteristics and significant enhancements in physical, mechanical and thermal properties. The book presents an up-to-date review of the major innovations in the field of nanocellulose and provides a reference material for future research in biomass based composite materials, which is timely due to the sustainable, recyclable and eco-friendly demand for highly innovative materials made from biomass. This book is an ideal source of information for scientific and industrial researchers working in materials science. Gathers together a broad spectrum of research on nanocellulose, with emphasis on the outstanding reinforcing potential when nanocellulose is included into a polymer matrix or as an additive to paper. Demonstrates systematic approaches and investigations from processing, design, characterization and applications of nanocellulose. Presents a useful reference and technical guide for nanocomposite materials R&D sectors, university academics and postgraduate students (Masters and PhD) and industrialists working in material commercialization.

**Nanocellulose: A Multipurpose Advanced Functional Material** - Guang Yang 2021-11-18

Drs. Ullah and Yang hold patents related to cellulose material. All other Topic Editors declare no competing interests with regard to the Research Topic subject. This Research Topic is dedicated to Prof. Lina Zhang on the occasion of her 80th Birthday, in gratitude, esteem, and affection.
**Nanobiotechnology**-Sougata Ghosh 2021-05-20

Nanobiotechnology: Microbes and Plant Assisted Synthesis of Nanoparticles, Mechanisms and Applications covers in detail the green synthesis of nanostructures of tailor-made size, shape and physico-chemical and opto-electronic properties. The rationale behind the selection of bacteria, cyanobacteria, algae, fungi, virus and medicinal plants for the synthesis of biologically active exotic nanoparticles for biomedical applications is also part of this book. It also explores metal recovery, bioconversion, detoxification and removal of heavy metals using nanobiotechnology and discusses the potential of nanobiotechnology to address environmental pollution and toxicity. The book further covers the economic and commercial aspects of such green nanobiotechnology initiatives, its current status in intellectual property rights like patents filed so far globally, technology transfers, and market potential. This information enables one to decipher the scope of biogenic nanoparticles and its prospects. Provides an overview on the general and applied aspects on nanotechnology. Gives the scope of exploring bacteria, fungi, algae, virus and medicinal plants for the synthesis of exotic nanoparticles. Furnishes a comprehensive report on the underlying molecular mechanisms behind the biosynthesis of nanoparticles. Outlines sustainable alternative strategies of bioremediation of heavy metals, metal recovery, detoxification and bioconversion using nanobiotechnology. Explores the promises of patenting, technology transfer and commercialization potential of biogenic nanoparticles.

**Functional Nanostructures for Sensors, Optoelectronic Devices and Drug Delivery**-Maria Angela Castriciano 2020-12-04

Nanoparticles and nanostructured materials represent an active area of research and impact in many application fields. The recent progress obtained in the synthesis of nanomaterials, and the fundamental understanding of their properties, has driven significant advances for their technological applications. The Special Issue “Functional Nanostructures for Sensors, Optoelectronic Devices and Drug Delivery” aims to provide an overview of the current research activities in the field of nanostructured materials with a particular emphasis on their potential applications for sensors, optoelectronic devices and biomedical systems. The Special Issue includes submission of original research articles and comprehensive reviews that demonstrated or summarized significant advances in the above-mentioned research fields. The Special Issue is made up of fifteen original research articles and three comprehensive reviews covering various topics of nanostructured materials and relative characterization from fundamental research to technological applications. More than 100 scientists from universities and research institutions lent their expertise and shared their research activities to ensure the success of this Special Issue.

**Handbook of Antimicrobial Coatings**-Atul Tiwari 2017-09-22

Handbook of Antimicrobial Coatings is the first comprehensive work on the developments being made in the emerging field of antimicrobial coatings. Crucial aspects associated with coating research are presented in the form of individual chapters. Particular close attention has been given to essential aspects necessary to understand the properties of novel materials. The book introduces the reader to progress being made in the field, followed by an outline of applications in different areas. Various methods and techniques of synthesis and characterization are detailed as individual chapters. Chapters provide insight into the ongoing research, current trends and technical challenges in this rapidly progressing field. The covered topics were chosen so that they can be easily understood by new scholars as well as advanced learners. No book has been written on this topic thus far with so much crucial information for materials scientists, engineers and technologists. Offers the first comprehensive work on developments being made in the emerging field of antimicrobial coatings Features updates written by leading experts in the field of anti-microbial coatings Includes discussions of coatings for novel materials Provides various methods and techniques of synthesis and characterization detailed in individual chapters

**Emergent Research on Polymeric and Composite Materials**-Somasekhar, R. 2017-09-13

Innovative textile materials are used for numerous applications. Understanding the properties of such materials is imperative to ensure proper utilization. Emergent Research on Polymeric and Composite Materials is an
essential reference work featuring the latest scholarly research on the synthesis, characterizations, and physico-chemical properties of textile materials. Including coverage on a range of topics such as nanomaterials, ceramics, and clays, this book is ideally designed for researchers, academicians, industries, and students seeking current research on emerging developments and applications of polymeric and composite materials.

**Polymers for Agri-Food Applications** - Tomy J. Gutiérrez 2019-08-02 This book presents an exhaustive analysis of the trends in the development and use of natural and synthetic polymer systems aimed at sustainable agricultural production. The polymers have allowed the development of controlled and released systems of agrochemicals such as pesticides, fertilizers and phytohormones through micro and nanoencapsulated systems, which protect and stimulate the growth of crops at low costs and without damage to the environment. Hydrogel systems from natural and synthetic polymers have also had their place in the agricultural industry, since they allow to maintain the humidity conditions of the crops for their correct development in drought times. Mulch films made of polymers have also become important in the control of weeds and pests in crops, as well as the use of edible coatings applied to fruits and vegetables during post-harvest, which reduce the losses of these perishable foods. Currently, the systems indicated, as well as others, are already used on a large scale. However, research studies in this area have been limited compared to other polymer applications. This book collects useful information for researchers, students and technologies related to the polymer technology and agri-food production. In this book, world-renowned researchers have participated, including associate editors of important journals, as well as researchers working in the area of research and development (R&D) of leading agri-food industries in the manufacture of agricultural inputs.

**Food Biosynthesis** - Alexandru Mihai Grumezescu 2017-06-19 Food Biosynthesis, Volume One in the Handbook of Food Bioengineering series, describes the main aspects related to the biological production of synthetic ingredients and natural foods, highlighting the impact of bacteria and plants in the biosynthesis of key food components. Biosynthesis methods could help solve issues like food shortages, providing consumers with preferred ‘natural’ food options. This book represents how biologically synthesized ingredients, such as vanilla flavoring, soy, milk and egg substitutes can be utilized as a desired option future foods. It is ideal for scientists and researchers who want to improve their knowledge on the field of food biosynthesis. Presents practical approaches of biosynthesis and the impact of biological origin on the field of food engineering Offers alternative applications to produce natural foods Includes processes and techniques to produce health promoting foods Discusses the positive effects of biosynthesis on microbial production to enhance food safety Offers a variety of perspectives on biosynthesis and its benefits for food ingredient production.

**Bioinspired Materials Science and Engineering** - Guang Yang 2018-07-04 An authoritative introduction to the science and engineering of bioinspired materials Bioinspired Materials Science and Engineering offers a comprehensive view of the science and engineering of bioinspired materials and includes a discussion of biofabrication approaches and applications of bioinspired materials as they are fed back to nature in the guise of biomaterials. The authors also review some biological compounds and shows how they can be useful in the engineering of bioinspired materials. With contributions from noted experts in the field, this comprehensive resource considers biofabrication, biomacromolecules, and biomaterials. The authors illustrate the bioinspiration process from materials design and conception to application of bioinspired materials. In addition, the text presents the multidisciplinary aspect of the concept, and contains a typical example of how knowledge is acquired from nature, and how in turn this information contributes to biological sciences, with an accent on biomedical applications. This important resource: Offers an introduction to the science and engineering principles for the development of bioinspired materials Includes a summary of recent developments on biotemplated formation of inorganic materials using natural templates Illustrates the fabrication of 3D-tumor invasion models and their potential application in drug assessments.
Explores electroactive hydrogels based on natural polymers. Contains information on turning mechanical properties of protein hydrogels for biomedical applications. Written for chemists, biologists, physicists, and engineers, Bioinspired Materials Science and Engineering contains an indispensable resource for an understanding of bioinspired materials science and engineering.

**Rheology and Processing of Polymer Nanocomposites** - Sabu Thomas 2016-08-25
Rheology and Processing of Polymer Nanocomposites examines the current state of the art and new challenges in the characterization of nanofiller/polymer interactions, nanofiller dispersion, distribution, filler-filler interactions and interfaces in polymer nanocomposites. A one-stop reference resource for important research accomplishments in this area, it benefits academics, researchers, scientists, and engineers in the field of polymer nanocomposites in their daily work.

**Nanotechnology Applications in Food** - Alexandru Grumezescu 2017-02-22
Nanotechnology Applications in Food: Flavor, Stability, Nutrition, and Safety is an up-to-date, practical, applications-based reference that discusses the advantages and disadvantages of each application to help researchers, scientists, and bioengineers know what and what not to do to improve and facilitate the production of food ingredients and monitor food safety. The book offers a broad spectrum of topics trending in the food industry, such as pharmaceutical, biomedical, and antimicrobial approaches in food, highlighting current concerns regarding safety, regulations, and the restricted use of nanomaterials. Includes how nanobiosensors are useful for the detection of foodborne pathogens. Discusses applications of nanotechnology from flavor and nutrition, to stability and safety in packaging. Includes nano and microencapsulation, nanoemulsions, nanosensors, and nano delivery systems. Identifies practical applications of nanoscience for use in industry today.

**Advanced Green Composites** - Anil N. Netravali 2018-10-16
Most composites, particularly those made using thermoset resins, cannot be recycled or reused. As a result, most of them end up in landfills at the end of their useful life which is neither sustainable nor environment-friendly. Various laws enacted by Governments around the world and heightened global awareness about sustainability and global warming is changing this situation. Significant research is being conducted in developing and utilizing sustainable fibers and resins, mostly derived from plant, to fabricate ‘Green’ composites. The significant progress in the past 20 or so years in this field has led to the development of green composites with high strength or so called Advanced Green Composites. More interestingly, green composites have also acquired various different properties such as fire resistance, transparency, barrier to gases and others. The term ‘advanced’ which only included high strength and stiffness now includes all these special properties. The world is on the cusp of a major change, and once fully developed, such composites could be used in applications ranging from automobiles to sporting goods, from circuit boards to housing and from furniture to packaging. This book, by presenting the state-of-the-art developments in many aspects of advanced green composites adds significantly to the knowledge base that is critical for their success of expanding their use in applications never seen before. The chapters are written by world’s leading researchers and present in-depth information in a simple way. This provides readers and researchers the latest developments in the field of ‘Green’ resins (with ways of strengthening them), High Strength Green Fibers (including micro and nano-cellulose fibrils/fibers) and Green Composites in the first...
few chapters. The introductory chapter summarizes the consequences of using conventional, petroleum-based materials and the need for green composites as well as the progress being made in this field. After that the book delves into Advanced Green Composites in a broader sense and includes chapters on High Strength Green Composites, Self-healing Green Composites, Transparent Green Composites, All-cellulose composites, Toughened Green Composites, Green Biofoams, Bioinspired Shape Memory Composites, etc. The chapters are written by the experts who are highly respected in their fields.

Комбуча. Чайный гриб. Самая полная энциклопедия рецептов—Ханна Крум 2020-11-12 Комбуча! Это приятный газированный напиток, который благотворно влияет на организм, повышая иммунитет, улучшая пищеварение. Эксперты по комбуче Ханна Крум и Алекс Лагори рассказывают, как легко, недорого и безопасно приготовить вкусный чайный гриб у себя дома! Знаете ли вы, что комбучу можно использовать как маску или крем для лица? Помимо альтернативного использования, в книге вы найдете понятные и подробные инструкции по приготовлению комбучи, а также необычные рецепты алкогольных и безалкогольных коктейлей, смуси, закусок, сладостей и многое другое! Книга сопровождается необычными фактами о чайном грибе, интересными историческими справками и научными исследованиями. Книга обязательна к прочтению как новичкам, так и давним любителям комбучи!

Nanocellulose Polymer Nanocomposites—Vijay Kumar Thakur 2014-10-28 Biorenewable polymers based nanomaterials are rapidly emerging as one of the most fascinating materials for multifunctional applications. Among biorenewable polymers, cellulose based nanomaterials are of great importance due to their inherent advantages such as environmental friendliness, biodegradability, biocompatibility, easy processing and cost effectiveness, to name a few. They may be produced from biological systems such as plants or be chemically synthesised from biological materials. This book summarizes the recent remarkable achievements witnessed in green technology of cellulose based nanomaterials in different fields ranging from biomedical to automotive. This book also discusses the extensive research developments for next generation nanocellulose-based polymer nanocomposites. The book contains seventeen chapters and each chapter addresses some specific issues related to nanocellulose and also demonstrates the real potentialities of these nanomaterials in different domains. The key features of the book are: Synthesis and chemistry of nanocellulose from different biorenewable resources Different characterization of nanocellulosic materials and their respective polymer nanocomposites Physico-chemical, thermal and mechanical investigation of nanocellulose based polymer nanocomposites Provides elementary information and rich understanding of the present state-of-art of nanocellulose-based materials Explores the full range of applications of different nanocellulose-based materials.

Carbon-Based Nanosensor Technology—Christine Kranz 2019-02-13 Carbon nanomaterials have gained relevance in chem/bio sensing applications owing to their unique chemical, mechanical, electrical, and thermal characteristics. Written by leading experts in the field, this book discusses selected, state-of-the-art carbon-based nanomaterials, including nanodiamonds, graphene nanodots, carbon nanopores, and nanocellulose. It presents examples of chem/bio sensing applications ranging from biomedical studies, such as DNA sequencing and neurotransmitter sensing, to heavy-metal detection in environmental monitoring scenarios, and reviews the unique properties of carbon-based nanomaterials with respect to targeted sensing applications. Further, it highlights exciting future applications. Providing comprehensive information for practitioners and scientists working in the field of carbon nanomaterial technologies and their application, it is also a valuable resource for advanced students of analytical chemistry, biochemistry, electrochemistry, materials science, and micro-/nanotechnology and -sensing.