

## Biopolymers And Biotech Admixtures For Eco Efficient Construction Materials Woodhead Publishing Series In Civil And Structural Engineering

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Biopolymers And Biotech Admixtures For and bacteria and assess their suitability as an admixture biotechnology for cement-based materials. The research activities will enhance the long-term durability of cement-based materials and promote ...

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Experimental Study of Biomimetic Antifreeze Polymers for Improved Durability of Cementitious Binders  
Combinatorial library A set of organic or inorganic compounds, plasmids, microorganisms, vectors or biopolymers, e.g. polynucleotides ... See for example Nature Biotechnology (1997), 15, pages 29-34: ...

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CPC Definition - Subclass C40B  
The use of materials for applications not provided for elsewhere, e.g. sealing materials, drilling fluids. The use of materials in general having specific properties, not provided for elsewhere, e.g.

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Since 1930 more than 100,000 new chemical compounds have been developed and insufficient information exists on the health assessment of 95 percent of these chemicals in which a relevant percentage are used in construction products. For instance Portland cement concrete, the most used material on the Planet (10,000 million tons/year that in the next 40 years will increase around 100 %) currently used in around 15% of total concrete production contains chemicals used to modify their properties, either in the fresh or hardened state. Biopolymers are materials that are developed from natural resources. They reduce dependence on fossil fuels and reduce carbon dioxide emissions. There is a worldwide demand to replace petroleum-based materials with renewable resources. Currently bio-admixtures represent just a small fraction of the chemical admixtures market (around 20%) but with environmental awareness for constituents in construction materials generally growing (the Construction Products Regulation is being enforced in Europe since 2013), the trend towards bio-admixtures is expected to continue. This book provides an updated state-of-the-art review on biopolymers and their influence and use as admixtures in the development of eco-efficient construction materials. Provides essential knowledge for researchers and producers working on the development of biopolymer-modified construction materials Discusses the various types of biopolymers currently available, their different production techniques, their use as bio-admixtures in concretes and mortars and applications in other areas of civil engineering such as soil stability, wood preservation, adhesives and coatings All contributions are made from leading researchers, who have intensive involvement in the design and use of biopolymers in construction materials

Biopolymers and Their Industrial Applications: From Plant, Animal, and Marine Sources to Functional Products is a detailed guide to the use of biopolymers for advanced applications across a range of key industries. In terms of processing and cost, bio-based polymers are becoming increasingly viable for an ever-broadening range of novel industrial applications. The book begins with an overview of biopolymers, explaining resources, demands, sustainability, life cycle assessment (LCA) modeling and simulation, and classifications. Further in-depth chapters explore the latest techniques and methodologies for isolation and physicochemical characterization, materials selection, and processing for blends and composites. Chapters 6 to 14 each focus on the preparation and applications of biopolymers in a specific industrial area, including food science and nutraceuticals, medicine and pharmaceuticals, textiles, cosmeceutical, packaging, adhesives and automotive, 3D printing, super capacitor and energy storage devices, and environmental applications. The final chapter compares and analyzes biopolymers alongside synthetic polymers, also offering valuable insight into social, economic, and environmental aspects. This is an essential resource for those seeking to understand, research, or utilize biopolymers in industrial applications. This includes researchers, scientists, and advanced students working in biopolymers, polymer science, polymer chemistry, biomaterials, materials science, nanotechnology, composites, and biotechnology. This is a highly valuable book for scientists, R&D professionals, designers, and engineers across multiple industries and disciplines, who are looking to utilize biopolymers for components and products. Introduces a broad range of industrial application areas, including food, medicine, textiles, cosmetics, packaging, automotive, 3D printing, energy, and more Offers an industry-oriented approach, addressing challenges and explaining the preparation and application of biopolymers for functional products and parts Considers important factors such as resources, classification, sustainability, and life cycle assessment (LCA) modeling and simulation Compares and analyzes biopolymers alongside synthetic polymers, also offering valuable insight into social, economic, and environmental aspects

Advanced Processing, Properties, and Applications of Starch and Other Bio-based Polymers presents the latest cutting-edge research into the processing and applications of bio-based polymers, for novel industrial applications across areas including biomedical and electronics. The book is divided into three sections, covering processing and manufacture, properties, and applications. Throughout the book, key aspects of sustainability are considered, including improved utilization of available natural resources, sustainable design possibilities, cleaner production processes, and waste management. Focuses on starch-based polymers, examining the latest advances in processing and applications with this valuable category of biopolymer Highlights industrial sustainability considerations at all steps of the process, including when sourcing materials, designing and producing products, and dealing with waste Supports the processing and development of starch and other bio-based polymers with enhanced functionality for advanced applications

This book presents the first comprehensive text on construction biomaterials and bioprocesses. It details aspects of construction biotechnology, a new interdisciplinary area involving applications of environmental and industrial microbiology and biotechnology in geotechnical and civil engineering. It also critically reviews all existing and potential construction biotechnology processes. It discusses a number of topics including the biotechnological production of new construction materials such as self-healing concrete, construction biocomposites, construction bioplastics, and biotechnological admixtures to cement. It also addresses construction-related processes like biocementation, bioclogging, soil surface fixation and biosealing, microbial cements and grouts, the biocoating of construction material surfaces, the microbiology and biosafety of the construction environment, the prevention of biocorrosion as well as biodeterioration and biofouling in civil engineering. Biomediated precipitation of calcium, magnesium, and iron compounds as carbonates, phosphates, sulphides, and silicate minerals in soil for its clogging and strengthening are considered from geotechnical, chemical, and microbiological points of view. It offers an overview of the basic microbiology that will enable civil engineers to perform the construction biogeochemical processes. Design principles and considerations for different field implementations are discussed from a practical point of view. The book can be used as a textbook for graduate and senior undergraduate students in biotechnology, civil engineering and environmental engineering as well as a reference book for researchers and practitioners working in this new interdisciplinary area.

With daily signals, Nature is communicating us that its unconscious wicked exploitation is no more sustainable. Our socio-economic system focuses on production increasing without considering the consequences. We are intoxicating ourselves on a daily bases just to allow the system to perpetuate itself. The time to switch into more natural solutions is come and the scientific community is ready to offer more natural product with comparable performance then the market products we are used to deal with. This book collects a broad set of scientific examples in which research groups from all over the world, aim to replace fossil fuel-based solutions with biomass derived materials. In here, some of the most innovative developments in the field of bio-materials are reported considering topics which goes from biomass valorization to the synthesis of high performing bio-based materials.

Bio-based Materials and Biotechnologies for Eco-efficient Construction fills a gap in the published literature, discussing bio-based materials and biotechnologies that are crucial for a more sustainable construction industry. With comprehensive coverage and contributions from leading experts in the field, the book includes sections on Bio-based materials and biotechnologies for infrastructure applications, Bio-based materials and biotechnologies for building energy efficiency, and other applications, such as using biotechnology to reduce indoor air pollution, for water treatment, and in soil decontamination. The book will be an essential reference resource for academic researchers, civil engineers, contractors working in construction works, postgraduate students and other professionals. Focuses on sustainability and green concepts in construction Discusses recent trends on bio-based materials and biotechnologies for eco-efficient construction Covers many important aspects, including infrastructure applications, energy efficiency for building construction, and air, water and soil related problems

Discover a comprehensive and current overview of microbial bioprospecting written by leading voices in the field In Bioprospecting of Microorganism-Based Industrial Molecules, distinguished researchers and authors Sudhir P. Singh and Santosh Kumar Upadhyay deliver global perspectives of bioprospecting of biodiversity. The book covers diverse aspects of bioprospecting of microorganisms demonstrating biomass value of nutraceutical, pharmaceutical, biomedical, and bioenergetic importance. The authors present an amalgamation of translational research on biosource utilization and ecological sustainability that will further the reader's knowledge of the applications of different microbial diversity and reveal new avenues of research investigation. Readers will also benefit from: A thorough introduction to microbial biodiversity and bioprospecting An exploration of anti-ageing and skin lightening microbial products and microbial production of anti-cancerous biomolecules A treatment of UV protective compounds from algal biodiversity and polysaccharides from marine microalgal sources Discussions of microbial sources of insect toxic proteins and the role of microbes in bio-surfactants production Perfect for academics, scientists, researchers, graduate and post-graduate students working and studying in the areas of microbiology, food biotechnology, industrial microbiology, plant biotechnology, and microbial biotechnology, Bioprospecting of Microorganism-Based Industrial Molecules is an indispensable guide for anyone looking for a comprehensive overview of the subject.

This book comprises a collection of chapters on green biopolymer nanocomposites. The book discusses the preparation, properties, and applications of different types of biodegradable polymers. An overview of recent advances in the fabrication of biopolymers nanocomposites from a variety of sources, including organic and inorganic nanomaterials, is presented. The book highlights the importance and impact of eco-friendly green nanocomposites, both environmentally and economically. The contents of this book will prove useful for students, researchers, and professionals working in the field of nanocomposites and green technology.

Dynamics of Advanced Sustainable Nanomaterials and Their Related Nanocomposites at the Bio-Nano Interface highlights the most recent research findings (conducted over the last 5-6 years) on the dynamics of nanomaterials, including their multifaceted, advanced applications as sustainable materials. In addition, special attributes of these materials are discussed from a mechanistic and application point-of-view, including their sustainability and interfacial interactions at the bio-nano interface and different applications. This book presents an important reference resource on advanced sustainable nanomaterials for chemical, nano-, and materials technologists who are looking to learn more about advanced nanocomposites with sustainable attributes. Finally, the book examines the emerging market for sustainable materials and their advanced applications, with a particular focus on the bio-nano interface and their future outlook. Features detailed information on the fundamentals of bio-nano interfacial interactions in sustainable nanomaterials Includes advanced applications of these materials that will help the end user select the appropriate materials for their desired application Features extensive information on the dynamics of these materials, helping the end user extend their work into new applications

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