Application Of Super Absorbent Polymer In Flood Management

In recent years biocompatible polymers for injuries and wounds have seen advances and innovations that have outpaced the growing field's literature. In this book Dr. Jan W. Gooch, a National Research Council Research Associateship Award recipient, reveals how innovative polymer technology can be applied to the common combat and trauma wounds associated with damaged soft tissue and bleeding. The scope of his investigation spans four distinct devices for wounds, liquid and particulate barrier dressings for soft tissue wounds, sutureless tissue adhesives, antibacterial nanoemulsions, one-hand operated and automatic tourniquets for the battlefield.

The two volumes of these Proceedings contain about 200 conference papers and 10 keynote papers presented at the First International Conference on Construction Materials and Structures, held in Johannesburg, South Africa from 24 to 26 November 2014. It includes sections on Materials and characterization; Durability of construction materials; Structural implications, performance, service life; Sustainability, waste utilization, the environment; and Building science and construction.

Discusses the fundamental aspects of structure-property relationships in superabsorbent polymers, including network modeling and compressibility of ionic gels. Describes methods of preparation and specification of superabsorbenst. Presents novel methods of preparation resulting in absorbent polymers with advanced properties. Examines emerging applications of superabsorbent polymers in the construction, agriculture, food, leisure, and communications industries.

Papers presented at the 13th Symposium on title], held in Miami, Florida in November 1992. The subjects involve a wide range of disciplines of interest to formulators, basic pesticide manufacturers, applicators, and suppliers to the agrochemical industry. The volume is a compilation of the latest d Annotation Papers presented at the Twelfth ASTM Symposium on [title], held in San Diego, California, October 1991. The volume is divided into four sections: novel surfactants and their properties (four papers); pesticide formulation technologies (14 papers); pesticide packaging and management (one paper: Container Design and “Glug”); and pesticide application technologies (eight papers). Annotation copyright by Book News, Inc., Portland, OR.

Curing is one of those activities that every civil engineer and construction worker has heard of, but in reality does not worry about much. In practice, curing is often low on the list of priorities on the construction site, particularly when budgets and timelines are under pressure. Yet the increasing demands being placed on concrete mixtures also mean that they are less forgiving than in the past. Therefore, any activity that will help improve hydration and so performance, while reducing the risk of cracking, is becoming more important. Curing Concrete explains exactly why curing is so important and shows you how to best do it. The book covers: The fundamentals behind hydration How curing affects the properties of concrete, improving its long-term performance What curing technologies and techniques you can use for different applications How to effectively specify, provide, and measure curing in a project The author also gives numerous examples of how curing—or a lack of it—has affected concrete performance in real-world situations. These include examples from hot and cold climates, as well as examples related to high-performance concrete, performance parameters, and specifications and testing. Written for construction professionals who want to ensure the quality and longevity of their concrete structures, this book demonstrates that curing is well worth the effort and cost.

The ICAMEST 2015 Conference covered new developments in advanced materials and engineering structural technology. Applications in civil, mechanical, industrial and material science are covered in this book. Providing high-quality, scholarly research, addressing developments, applications and implications in the field of structural health monitoring, construction safety and management, sensors and measurements. This volume contains new models for nonlinear structural analysis and applications of modeling identification. Furthermore, advanced chemical materials are discussed with applications in mechanical and civil engineering and for the maintenance of new materials. In addition, a new system of pressure regulating and water conveyance based on small and middle hydropower stations is discussed. An experimental investigation of the ultimate strength and behavior of the three types of steel tubular K-joints was presented. Furthermore, real-time and frequency linear and nonlinear modeling performance of materials of structures contents were concluded with the notion of a fully brittle material, and this approach is implemented in the book by outlining a finite-element method for the prediction of the construction performance and cracking patterns of arbitrary structural concrete forms. This book is an ideal reference for practicing engineers in material, mechanical and civil engineering and consultants (design, construction, maintenance), and can also be used as a reference for students in mechanical and civil engineering courses.

A thorough, up-to-date examination of the science and practical application of superabsorbent polymers. Modern Superabsorbent Polymer Technology takes a comprehensive look at the structure, properties, and uses of superabsorbent polymers. Prepared by editors with over 20 years of experience in the field, it offers a unified approach to polymer science technologies and examines the key interrelationships between structure, properties, behavior, and applications. This book draws on the best and most relevant scientific papers from academia and industry, as well as numerous patents and patent applications. The result is a compact, centralized source of information on superabsorbent polymers that no polymer or chemical engineer will want to be without. Discusses synthetic chemistry and the effects of synthesis on the structure of superabsorbent polymers * Describes and compares industrial practices of the major manufacturers of superabsorbent polymers * Features analytical methods for evaluation of the properties and behavior of superabsorbent polymers * Explores structural and property relationships of crosslinked super-absorbent polymers * Surveys new superabsorbent polymer forms and types— including fibers, foams, and biodegradable superabsorbents * Covers current and emerging applications in personal care products, horticulture, construction, and other areas. The Frontiers in Materials Editorial Office team is delighted to present the inaugural "Frontiers in Materials: Rising Stars" article collection, showcasing the high-quality work of internationally recognized researchers in the early stages of their independent careers. All Rising Star researchers featured within this collection were individually nominated by the Journal's Chief Editors in recognition of their potential to influence the future directions in their respective fields. The work presented here highlights the diversity of research performed across the entire breadth of the materials science and engineering field, and presents advances in theory, experiment and methodology with applications to compelling problems. This Editorial features the corresponding author(s) of each paper published within this important
collection, ordered by section alphabetically, highlighting them as the great researchers of the future. The Frontiers in Materials Editorial Office team would like to thank each researcher who contributed their work to this collection. We would also like to personally thank our Chief Editors for their exemplary leadership of this article collection; their strong support and passion for this important, community-driven collection has ensured its success and global impact. Laurent Mathey, PhD Journal Development Manager.

Sugar Acids—Advances in Research and Application: 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Tartrates. The editors have built Sugar Acids—Advances in Research and Application: 2013 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Tartrates in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Sugar Acids—Advances in Research and Application: 2013 Edition has been produced by the world’s leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/. The recent explosion of interdisciplinary research has fragmented the knowledge base surrounding renewable polymers. The Chemistry of Bio-based Polymers 2nd edition brings together, in one volume, the research and work of Professor Johannes Fink, focusing on biopolymers that can be synthesized from renewable polymers. After introducing general aspects of the field, the book’s subsequent chapters examine the chemistry of biodegradable polymer systems, including the synthesis of low molecular compounds. Various categories of biopolymers are detailed including vinyl-based polymers, acid and lactone polymers, ester and amide polymers, carbohydrate-related polymers and others. Procedures for the preparation of biopolymers and biodegradable polyesters are arranged by chemical methods and in vitro biological methods, with discussion of the issue of “plastics from bacteria.” The factors influencing the degradation and biodegradation of polymers used in food packaging, exposed to various environments, are detailed at length. The book covers the medical applications of bio-based polymers, concentrating on controlled drug delivery, temporary prostheses, and scaffolds for regenerative medicine. Polymers for the transportation industry, processes for fabricating biofuels and argues for localized biorefineries, as biomass feedstocks are more efficiently handled locally. Research and Applications in Structural Engineering, Mechanics and Computation contains the Proceedings of the Fifth International Conference on Structural Engineering, Mechanics and Computation (SEMC 2013, Cape Town, South Africa, 2-4 September 2013). Over 420 papers are featured. Many topics are covered, but the contributions may be seen to fall into three categories. The first is the field of polymer materials, the second is the field of polymer applications, and the third is the field of polymer processing.

This book summarizes the recent advances in the science and engineering of polymer-gel-based materials in different fields. It also discusses the extensive research developments for the next generation of smart materials. It takes an in-depth look at the current perspectives and market opportunities while pointing to new possibilities and applications. The book addresses important topics such as stimuli responsive polymeric nanoparticles for cancer therapy; polymer gel containing metallic materials; chemotherapeutic applications in oncology; conducting polymer-based gels and their applications in biological sensors; imprinted polymeric gels for pharmaceutical and biomedical purposes; applications of biopolymeric gels in the agricultural sector; application of polymer gels and their nanocomposites in electrochemistry; smart polyelectrolyte gels as a platform for biomedical applications; agro-based polymer gels and their application in purification of industrial water wastes; polymer gel composites for bio-applications. It will be of interest to researchers working in both industry and academia. In recent years, there has been a veritable explosion of research and development in consumer-oriented fields that utilize polymeric materials which absorb large amounts of water. These fields encompass the preparation, characterization and commercialization of separation systems, pharmaceutical and personal care products such as infant diapers, feminine products, incontinence products and many other related areas. The polymeric materials utilized in these applications are known as absorbent or superabsorbent materials because of their ability to swell rapidly and to retain large volumes of water, urine and other biological fluids. The aim of this book is to introduce the fundamentals of polymer structure and swelling as related to polymers used for these superabsorbent materials. In the field of absorbence, particular attention is given to crosslinked structures which swell to more than fifty times their initial weight in water or electrolytic solutions. The book also provides descriptions of novel applications of superabsorbent materials as well as a detailed analysis of water transport in crosslinked polymers. Absorbent Polymer Technology should be of interest to chemists, polymer scientists, chemical engineers, and industrial scientists working with swellable polymeric systems in personal care, pharmaceutical, agricultural waste treatment and separation industries. This book includes selected papers from the ICGSCE 2014 with focus on the current trends of global resources used to meet the growing demands to improve life style coupled with environmental and social problems related to the resource consumption with emphasis to move towards sustainable development. It provides a platform for scientists and academicians from local and international universities and industries to promote, share and discuss various new issues and developments in different areas of Chemical Engineering with respect to global sustainability. Under the sustainability umbrella the topics covered are; alternative energy sources, alternative feedstock for energy and chemicals, alternative raw materials for household commodity, green process with minimal environmental impact, process intensification, water minimization, recycling of wastes and providing quality water, food and medicines. Other topics covered include: 1. Oil and gas, Biofuel, Fuel cell, Renewable energy 2. Green technology, Sustainability, Environmental, Carbon sequestration, Carbon footprint, Natural resources 3. Chemical processes, Separation technology, Biotechnology, Nanotechnology, Food technology, Particle technology, Corrosion, Pharmaceutical, Phytochemical, Oleochemical 4. Process modeling, Process Simulation, Process control 5. Advanced material, Polymer, Catalyst, Enzyme 6. Policy, Regulations, Strategy and implementation, Safety. Management of science, Engineering education, Process Safety and Loss Prevention. Environmental and chemical risk assessment, Transportation risk analysis, Inherent safety.

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Application of Super Absorbent Polymers (SAP) in Concrete Construction State-of-the-Art Report Prepared by Technical Committee 225-SAP Springer Science & Business Media

Concise Encyclopedia of Composite Materials draws its material from the award-winning Encyclopedia of Materials: Science and Technology, and includes updates and revisions not available in the original set. This customized collection of articles provides a handy reference for materials scientists and engineers with an interest in composite materials made from polymers, metals, ceramics, carbon, biocomposites, nanocomposites, wood, cement, fibers, etc. Brings together articles from the Encyclopedia of Materials: Science & Technology that focus on the essentials of composite materials, including recent updates. Every article has been commissioned and written by an internationally recognized expert and provides a concise overview of a particular aspect of the field Enables rapid reference; extensive bibliographies, cross-referencing and indexes guide the user to the most relevant reading in the primary literature Covers areas of active research, such as biomaterials and porous materials

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 phytotoxins through micro and nanocapsulated 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.

Hydrogels are networks of polymer chains which can produce a colloidal gel containing over 99 per cent water. The superabsorbency and permeability of naturally occurring and synthetic hydrogels give this class of materials an amazing array of uses. These uses range from wound dressings and skin gels to oxygen-permeable contact lenses to biodegradable delivery systems for drugs or pesticides and scaffolds for tissue engineering and regenerative medicine. Biomedical Applications of Hydrogels Handbook provides a comprehensive description of this diverse class of materials, covering both synthesis and properties and a broad range of research and commercial applications. The Handbook is divided into four sections: Stimuli-Sensitive Hydrogels, Hydrogels for Drug Delivery, Hydrogels for Tissue Engineering, and Hydrogels with Unique Properties. Key Features: Provides comprehensive coverage of the basic science and applications of a diverse class of materials Includes both naturally occurring and synthetic hydrogels Edited and written by world leaders in the field. Renowned experts give all essential aspects of the techniques and applications of graft copolymers based on polysaccharides. Polysaccharides are the most abundant natural organic materials and polysaccharide-based graft copolymers are of great importance and widely used in various fields. Natural polysaccharides have recently received more attention due to their advantages over synthetic polymers by being non-toxic, biodegradable and available at low cost. Modification of polysaccharides through graft copolymerization improves the properties of polysaccharides. Grafting is known to improve the characteristic properties of the backbones. Such properties include water repellency, thermal stability, flame resistance, dye-ability and resistance towards acid-base attack and abrasion. Polysaccharides and their graft copolymers find extensive applications in diversified fields. Applications of modified polysaccharides include drug delivery devices, controlled release of fungicides, selective water absorption from oil-water emulsions, purification of water etc.

Construction industry like any other area of economic and social life undergoes continuous alterations and improvements in order to successfully comply with the requirements of sustainable development. Consumers demand more durable, less labour and service intensive materials at a competitive price. To meet these expectations numerous new composite materials have been developed over the last couple of decades, including cementitious materials modified by superabsorbent polymers (SAP). The paper presents part of the larger research project on the performance of cementitious mortars containing two types of superabsorbent polymers (SAP) as the internal curing agent. SAP A is a copolymer of acrylamide and acrylic acid and SAP B is a polymer based on acrylic acid. Research work presented in this paper involves macro and micro scale characterisation of polymer modified mortars. The microstructural features were studied with application of the Mercury Intrusion Porosimetry and the Scanning Electron Microscopy techniques. Analyses of pore size distribution in mortars of different ages are accompanied by the analyses of strength and autogenous shrinkage development as well as early density changes in immature mortars by the X-ray absorption method. The investigations confirmed the positive effect of SAP A on the reduction of autogenous shrinkage and microcrack propagation. Limited absorption/desorption abilities of SAP B cannot reassure continuous supply of water and hence the performance of SAP B mortars was comparable with the reference samples. The effect of both SAPs on strength development proved to be negligible. The book gathers the peer-reviewed contributions presented at the 3rd International Conference on Application of Superabsorbent Polymers (SAP) and Other New Admixtures towards Smart Concrete, held in Skukuza, South Africa, on November 25-27, 2019. It features papers focusing on the behavior of SAP in concrete (in particular the absorption behavior) as well as the effect of SAP on fresh and hardened concrete properties. It also covers topics such as other modern admixtures, in particular rheology-modifying admixtures, including the recently emerging field of bio- or waste-derived admixtures. The conference builds on the experience and summarizes the activities of the RILEM Technical Committee 260-RSC “Recommendations for Use of Superabsorbent Polymers in Concrete Construction” and addresses other prominent research activities in the field of concrete admixtures. This book is concerned with polymeric hydrogels, which are considered as one of the most promising types of new polymer-based materials. Each chapter in this book describes a selected class of polymeric hydrogels, such as superabsorbent hybrid nanohydrogels, conducting polymer hydrogels, polysaccharide-based or protein-based hydrogels, or gels based on synthetic polymers. In this way, the book also addresses some of the fascinating properties and applications of polymeric hydrogels: they are three-dimensional, hydrophilic, polymeric networks that can absorb, swell and retain large quantities of water or aqueous fluids. In combination with metal nanoparticles, nanofibers or nanocontainers, which may be embedded in the gels, they find widespread applications, ranging from agriculture, and waste water treatment, over electronics, to pharmaceutical and biomedical applications. Applications mentioned in this book include electro sensors, capacitors, electromechanical actuators, and even artificial muscles. The main goal of the book was to gather current knowledge of recent advances in polymer science and technology, the physical characterization and advanced performance attributes of both synthetic and biological polymeric materials. The volume covers six broad topics such as rubber science and technology, composites, textiles, adhesive and coatings, process modelling and simulations, testing and instrumentation.

This book presents five chapters, organised into two sections, on the latest developments in acrylate polymers materials in terms of properties, new ideas in design, synthesis and detailed applications. Section I presents three chapters on acrylate polymer properties and advanced applications such as pH dependence acrylate-derivative polyelectrolyte properties and polymer material classification as acrylic...
heat resistant glass and polycarbonate antiballistic glass. Section II includes two chapters on acrylic-based materials in the form of hydrogels, interpenetrated polymer networks, composites and nanocomposites for biomedical and bioengineering applications such as tissue engineering, antimicrobial therapy, orthopaedics and ophthalmologic devices. Polyethylene Glycols—Advances in Research and Application: 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Hydrogel. The editors have built Polyethylene Glycols—Advances in Research and Application: 2013 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Hydrogel in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Polyethylene Glycols—Advances in Research and Application: 2013 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.

The book defines the differences between synthetic and natural superabsorbent polymers. It describes polymerization techniques, processing strategies and the use and importance of smart SAPs. It also includes SAP design to aid in selection of the best SAP for a specific application. The book is an indispensable resource for any academics and industrials interested in SAPs.

This book gathers peer-reviewed contributions presented at the 3rd RILEM Spring Convention and Conference, held at Guimarães and hosted by the University of Minho, Portugal, on March 9-14, 2020. The theme of the Conference was “Ambitioning a Sustainable Future for Built Environment: comprehensive strategies for unprecedented challenges”, which was aimed at discussing current challenges and impacts of the built environment on sustainability. The present volume is dedicated to the topic “New materials and structures for ultra-durability”, which covers current scientific and technological developments aimed at improving knowledge about degradation mechanisms in construction materials, as well as to the development of new materials with extreme durability. Novel special materials for extreme environments or extreme loading conditions are also included, as well as novel approaches to improve the performance and durability of currently common construction materials. The following subtopics are included: general purpose, constructions, infrastructures and facilities; extreme environments and extreme events; transport and deterioration mechanisms, characterization and mitigation; Supplementary Cementitious Materials, admixtures, additions and other emerging material optimization strategies; smart materials for durable structures.

The use of internal curing and specifically the use of super absorbent polymers has recently become an important topic in concrete research. Internal curing has been shown to reduce autogenous shrinkage in concrete mixtures, especially in high-strength mixtures where the water to cement ratio is low. Super absorbent polymer has not been studied in regards to its effect on pervious concrete. This research was conducted to examine the effectiveness of a commercially available super absorbent polymer in both standard and pervious concrete. The testing was initially conducted on mortar mixtures, followed by standard and high-strength concrete mixtures, and finally pervious concrete mixtures. Several tests were conducted including compressive strength, autogenous and total shrinkage, restrained shrinkage, moisture loss, abrasion, as well as others. The results followed similar trends as much of the previous research conducted on standard and high-strength mixtures containing super absorbent polymer. The pervious concrete containing super absorbent polymer showed an improvement in compressive strength, abrasion resistance, moisture loss, and total shrinkage compared to a control pervious mixture. If long term testing shows an improvement in the durability of pervious concrete containing super absorbent polymer, the applications for pervious concrete could be significantly increased.

This Special Issue focuses on the current state-of-the-art of “Polymer Clay Nano-Composites” for biomedical, anticorrosion, antibacterial, and other applications. Clay–polymer composite nanomaterials represent an emerging area of research. Loading polymers with clay particles essentially enhances the composite strength features. Of particular interest are different nano-assembly methods, such as silane mono and multilayers, polyelectrolyte layer-by-layer assembly, and others. An important development was reached for tubular and fibrous clay nanoparticles, such as halloysite, sepiolite, and imogolite. Polymer clay nanoparticles can be prepared as sheets with 1-nm thickness and width of a few hundred nm (e.g., kaolin and montmorillonite). Fibrous clays significantly reinforce the nano-composites in the assembly with biopolymers and other green polymers, leading to functional hybrid bio nano-composites. The scope of this Special Issue comprehensively includes the synthesis and characterization of polymer clay nano-composites used for several applications, including nano-clay polymer composites and hybrid nano-assemblies.

The electrospinning method has the unique ability to produce structured polymeric fibers on the micro or nano scale and to generate novel materials for food and healthcare purposes. The potential of electrospun nanofibers for human healthcare applications is promising, for example, in tissue/organ repair and regeneration, in medical diagnostics and instrumentation, and as vectors to deliver drugs and therapeutics, as biocompatible and biodegradable medical implant devices, as protective fabrics against environmental and infectious agents in hospitals and general surroundings. Furthermore, considerable effort has been directed toward developing scaffolds using biodegradable and biocompatible synthetic, natural polymers or renewable materials that enhance in vitro cell growth, while killing pathogenic bacteria cells. This Special Issue “Electrospun Polymer Nanofibers for Food and Health Applications” will cover the latest research of electrospun nanofibers in this field including shape-memory electrospun fibre meshes with programmable cell orientation, water-absorbing nano?ber meshes for e?cient removal of excess water from kidney failure patients, and hydrogel nano?bers which can be used as a drug carrier for methylene blue.

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