

Surface Characteristics Of Fibers And Textiles

Polyolefins are one of the most widely used commercial polymers. This book reviews the most important polyolefins, including polyethylene and polypropylene. These versatile fibres are durable, chemically resistant, lightweight, economical and functional. Polyolefin fibres: industrial and medical applications provides a comprehensive review of the structure and properties of this group of fibres, together with methods to improve the functionality of polyolefins and their range of applied chemical properties as well as their production methods. The second group of chapters examines how to improve the functionality of polyolefin fibres. A final group of chapters addresses how polyolefins can be incorporated into specific applications such as industrial, medical and automotive products. Written by a distinguished team of international contributors, Polyolefin fibres: industrial and medical applications is a quintessential reference for textile technologists, fibre scientists and polymer engineers.

This work details current advances in assessing the characteristics of polymers, single fibres and fibrous systems, and associated processes based on evolving theories in the physical, chemical and mechanical sciences. It focuses on recent developments in selected characterization methods - such as Fourier transform infrared spectroscopy, Fourier transform nuclear magnetic resonance, electron diffraction, x-ray diffraction and electron microscopy - applicable to polymers, fibres and nanofibres. Natural fiber composites have experienced a renaissance over the last two decades as a response to societal demands for developing eco-friendly, biodegradable and recyclable materials. They are now being extensively used in everyday products as well as in automotive, packaging, sports and the construction industries. These fibres require surface treatments in order to improve their properties and interfacial bonding with polymer matrices, and to reduce their hydrophilic character. Chemical methods use chemical reagents to reduce fibres' hydrophilic tendency and thus improve compatibility with the matrix. They also expose more reactive groups on the fibre surface to facilitate efficient coupling with the matrix. Physical methods change structural and surface properties of the fiber and thereby influence the interfacial bonding with matrices, without extensively changing the chemical composition of the fibers. They are cleaner and simpler than the chemical methods. Surface treatments of natural fibers: surface modification and characterization provides a comprehensive overview of the surface modification methods (chemical, physical, biological) of natural fibers and its effect on properties of produced composites. The chemical mechanisms which are utilized in surface treatments are discussed in detail and how these affect the interfacial properties and characteristics of the resulting composites.

16. Fiber-reinforced polymer (FRP) composites in environmental engineering applications

Advances in Bio-Based Fiber
Kenaf Fibers and Composites
Fibers and Composites

Because we are living in an era of Green Science and Technology, developments in the field of bio- and nano- polymer composite materials for advanced structural and medical applications is a rapidly emerging area and the subject of scientific attention. In light of the continuously deteriorating environmental conditions, researchers all over the world have focused an enormous amount of scientific research towards bio-based materials because of their cost effectiveness, eco-friendliness and renewability. This handbook deals with cellulose fibers and nano-fibers and covers the latest advances in bio- and nano- polymer composite materials. This rapidly expanding field is generating many exciting new materials with novel properties and promises to yield advanced applications in diverse fields. This book reviews vital issues and topics and will be of interest to academicians, research scholars, polymer engineers and researchers in industries working in the subject area. It will also be a valuable resource for undergraduate and postgraduate students at institutes of plastic engineering and other technical institutes.

Phosphate Fibers is a singular detailed account of the discovery, chemistry, synthesis, properties, manufacture, toxicology, and uses of calcium and sodium calcium polyphosphate fibers. Author Edward J. Griffith-the inventor and developer of this safe, biodegradable material-takes a multidisciplinary approach to this subject, considering the social, legal, medical, and industrial issues surrounding the use of asbestos and other mineral fibers. This compelling study is a beneficial resource to both readers interested in mineral fibers as well as those who want to understand the complexities of bringing new substances into the modern marketplace.

Friction is a major issue in both the production of textiles and in the finished product. This authoritative book reviews how friction occurs and the ways it can be measured and controlled. The book begins by looking at how friction can be defined and how the structure and properties of textile fibres lead to friction behaviour. It also discusses slip-stick phenomena in textiles and ways of measuring friction in yarns and fabric. The second part of the book reviews friction in particular textiles, including cotton, wool and synthetic fibres as well as woven fabrics. These and other chapters also discuss ways of controlling friction, including fabric finishes and lubricants. With its distinguished editor and contributions from some of the world's leading authorities in the subject, Friction in textile materials is a standard reference for the textile industry and those researching this important topic. An authoritative review of friction, its management and control

In 2 Parts
Measuring, Monitoring and Modeling Concrete Properties
A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of the Requirements for the Degree of Philosophy
An Integrated Approach

Surface Treatment Methods of Natural Fibres and their Effects on Biocomposites

The topic of wettability (measured in terms of contact angle) is of tremendous interest from both fundamental and applied points of view. Wettability plays an essential role in many industrial processes, so an understanding of factors dictating wettability and how to modulate it is of paramount importance. In the last years there has been an explosive interest in superhydrophobic surfaces (i.e., surfaces with water contact angle of 150° or higher) because of their relevance/implications in many fields. Also recently there has been heightened activity in the field of electrowetting. Contact Angle, Wettability and Adhesion, Volume 6 is divided into four parts: Part 1: Fundamental Aspects; Part 2: Wettability Control/Modification; Part 3: Superhydrophobic Surfaces; and Part 4: Surface Free Energy and Relevance of Wettability in Adhesion. The topics covered include: a guide to the equilibrium contact angles maze: fundamental aspects of wetting of rough and chemically heterogeneous surfaces; Is the world basic?: wettability control/modification using various approaches: superhydrophobic surfaces and ways to impart superhydrophobicity: adsorption on superhydrophobic surfaces: solid surface energy determination: surface modification of different materials: relevance of wettability and adhesion aspects in a variety of reinforced composites. In essence, this volume reflects the cumulative wisdom of many active and renowned researchers and provides a comprehensive reference for researchers and engineers in a variety of fields.

An exploration of the surface characteristics of fibres and textiles. It emphasizes how fibre surface affects permeability, stiffness, strength, dyeing, wrinkling, and other performance characteristics to optimize production. It also illustrates methods for developing wrinkle-resistant finishes on fibre surfaces using environmentally friendly techniques.

Concern about global warming has led to renewed interest in the more sustainable use of natural fibres in composite materials. This important book reviews the wealth of recent research into improving the mechanical properties of natural-fibre thermoplastic composites so that they can be more widely used. The first part of the book provides an overview of the main types of natural fibres used in composites, how they are processed and, in particular, the way the fibre-matrix interface affects the properties of the composite. The second part discusses the increasing use of natural-fibre composites in such areas as automotive and structural engineering, packaging and the energy sector. The final part of the book discusses ways of assessing the mechanical performance of natural-fibre composites. With its distinguished editor and team of contributors, Properties and performance of natural-fibre composites is a valuable reference for all those using these important materials in such areas as automotive and structural engineering, packaging and the energy sector.

Fundamentals of Materials Science and Engineering

Lignocellulosic Fibers and Wood Handbook

Moving Towards a Green Society

Polyolefin Fibres

Developments in fiber-reinforced polymer (FRP) composites for civil engineering

"Third Edition offers the latest information on the structural, surface, mechanical, electronic, thermal, and magnetic properties of carbon fibers as well as their manufacture and industrial applications from many of the world's most distinguished specialists in the field."

Kenaf fiber is gaining attention as an alternative reinforcement for composite products due to low cost, reduced environmental impact, and attractive mechanical properties. Kenaf Fibers and Composites covers the breadth of these exciting materials, from raw material preparation to application in a variety of products. It discusses fiber characterization and properties, how to prepare kenaf-based composites, and design, manufacturing, and applications.

It also covers hybrid fiber composites, kenaf fiber thermosetting composites, kenaf fiber thermoplastic composites, kenaf fibers in various lengths, and forms and arrangements such as particulates, continuous roving, and woven fabrics. Cellulose-based kenaf composites and kenaf fiber-filled biopolymer composites are presented.

Natural/Biofiber composites are emerging as a viable alternative to glass fiber composites, particularly in automotive, packaging, building, and consumer product industries, and becoming one of the fastest growing additives for thermoplastics. Natural Fibers, Biopolymers, and Biocomposites provides a clear understanding of the present state

Contact Angle, Wettability and Adhesion

Interfacial Science and Applications

Natural Fibers, Biopolymers, and Biocomposites

Smart Coatings on Fibers and Textiles

Polymer Composites, Macro- and Microcomposites

Most literature pertaining to carbon fibers is of a theoretical nature. Carbon Fibers and their Composites offers a comprehensive look at the specific manufacturing of carbon fibers and graphite fibers into the growing surge of diverse applications that include flameproof materials, protective coatings, biomedical and prosthetics application

Wool Fiber Reinforced Polymer Composites is an in-depth and practical exploration of wool-based composites, covering everything from the morphology of wool fiber to the industrial applications of wool composites. Wool has emerged in the top position for this role because of its unique characteristics. While fine wool is too costly for many such applications, coarse wool of greater than 35 microns fiber length is globally under-utilized. This pioneering book describes every form of wool composite, woven, nonwoven, felt and fiber, including different fabrication methods. In unique detail, the international team of expert contributors describe the morphology, structure and properties of wool, methods for the chemical modification of wool, different forms of wool-polymer composites, and many exciting emerging applications. Provides technical details on a wide range of applications of wool-fiber polymer composites, including in construction and medicine Draws on an interdisciplinary panel of experts from fields such as textiles, polymer science and chemistry to create a guide for readers of all backgrounds Describes wool characterization techniques in detail
Plant Fibers, their Composites, and Applications provides a systematic and comprehensive account of recent research into plant fibers, including the synthesis of plant fiber reinforced polymer composites, characterization techniques, and a broad spectrum of applications. Plant fibers have generated great interest among material scientists due to their characteristics, which include availability, low cost, biodegradability, easy processability, excellent thermo-mechanical properties, low acoustic properties. They have been proven to be excellent replacements for synthetic fibers and have found applications in advanced polymer composites. Coverage includes every stage of working with plant fibers, including synthesis, processing, characterization, applications, recycling, and life cycle assessment of plant fibers and their composites. Drawing on work from leading researchers in industry, academia, government and private research institutions across the globe, this is a definitive one-stop reference for anyone working with plant fibers. Addresses emerging applications of plant fiber reinforced polymer composites in automotive, aerospace and construction and building applications Provides detailed coverage of the modern processing technologies and synthesis for plant fibers and their composites Includes valuable technical information relating to a range of new and nonconventional plant fibers

Molecular Characterization of Composite Interfaces

Part II:

Powders and Fibers

Cellulose Fibers: Bio- and Nano-Polymer Composites

Renewable Materials for Today's Environment

This book is devoted to advanced composite materials based on carbon fibers issued from different precursors and various matrices. Written by internationally recognized specialists, Fibers and Composites is divided into three main parts. The first presents an alternative way to process and prepare carbon fibers issued from either natural or art

This book is an extended version of the proceedings of the Symposium on Polymer Composites, Interfaces, which was held under the auspices of the Division of Polymer Chemistry, American Chemical Society (ACS) during the annual ACS meeting in Seattle, March, 1983. The importance of the interface in composite materials has been recognized since the inception of modern composite technology. Specifically, silane coupling agents were developed for glass fiber reinforced compOSites at a very early date. Ever since then the diversity of composite materials and the development of various surface treatment methods have led to the establishment of an "interface art." A trial-and-error approach has dominated the interfacial aspects of composite technology until very recently. With the advent of modern analytical techniques for surface characterization, it became possible to study detailed surface and interface structures. It was hoped that this symposium would catalyze such a fundamental and scientific approach in composite studies. For this reason, the symposium was structured to verify the influence of interfacial structures on the mechanical and physical performance of composites and to improve our knowledge of the microstructure of composite interfaces. As the word "composite" indicates, interdisciplinary interaction is indispensable for proper understanding of multiphase systems.

This state-of-the-art volume covers the latest and future trends in measuring, monitoring and modeling the properties of cement based materials. The book contains 94 papers and presents the latest research work of renowned experts. It acts as a survey of the most up-to-date research in the field.

An International Symposium dedicated to Professor Surendra P. Shah, Northwestern University, USA

Effect of Pulp and Paper Processing on the Surface Characteristics of Wood Pulp Fibers

Surface Characteristics of Fibers and Textiles

Modern Textile Characterization Methods

A Comparative Assessment of Selected Reinforced Composite Fibers

This revised Sixth Edition presents the basic fundamentals on a level appropriate for college students who have completed their freshmen calculus, chemistry, and physics courses. All subject matter is presented in a logical order, from the simple to the more complex. Each chapter builds on the content of previous ones. In order to expedite the learning process, the book provides: "Concept Check" questions to test conceptual understanding End-of-chapter questions and problems to develop understanding of concepts and problem-solving skills End-of-book Answers to Selected Problems to check accuracy of work End-of chapter summary tables containing key equations and equation symbols A glossary for easy reference

The extraordinary growth in the production and use of man-made fibers over the past fewdecades has focused attention on the surface properties of fibers and textiles. This volumecombines surface science and technology in its presentation of the substantial progressthat has been made in the technology related to the surface characteristics of natural,synthetic, and glass fibers and textiles.Adopting an interdisciplinary approach , the coverage places emphasis upon the wetting,soiling, staining, frictional, and adhesive properties of fibers and fabrics, as well asphenomena related to these properties. The book offers critical reviews which describeexperimental facts, theories, and processes. Symbols are clearly defined in each chapter.Among the subjects covered are the surface properties of glass fibers, soil release, stainand water repellance, friction of fabrics, bonding of nonwovens, and the wetting of fibers.Surface Characteristics of Fibers and Textiles, Part II is an outstanding textbook forcourses dealing with surface chemistry, the mechanical properties of textiles, textiletechnology, and polymer chemistry . It is also a valuable reference book designed to makecurrent knowledge on these subjects accessible to industrial and academic researchers.

Carbon fiber is an oft-referenced material that serves as a means to remove mass from large transport infrastructure. Carbon fiber composites, typically plastics reinforced with the carbon fibers, are key materials in the 21st century and have already had a significant impact on reducing CO2 emissions. Though, as with any composite material, the interface where each component meets, in this case the fiber and plastic, is critical to the overall performance. This text summarizes recent efforts to manipulate and optimize the interfacial interaction between these dissimilar materials to improve overall performance.

Carbon Fibers

Carbon Fibers, Third Edition,

Surface Treatment of Textiles

Phosphate Fibers

Formation, Structure, and Applications

This chapter presents dozens of select environmental engineering applications of fiber-reinforced polymer (FRP) composite materials with emphasis on their environmental benefits, followed by discussions on durability of composites. Significance of design codes and specifications in promoting and advancing the applications of FRP composites is addressed. With ever increasing attention toward a sustainable built environment, FRP composites have potential to be selected as a material for construction. Carbon Fibers presents an up-to-date review of the progress pertaining to the formation of carbon fibers from rayon, acrylic, and pitch precursors. The book emphasizes the preparation, characterization, and properties of commercial materials. It also considers the compressive properties of carbon fibers, the lack of correlation between surface characterization and fiber-matrix interactions, and the discrepancy between surface composition as determined by XPS and the reaction of carbon fibers with epoxy resin.

The updated and expanded second edition of this book explores the physical and mechanical properties of carbon fibers and their composites, their manufacture and processing, and their current and emerging applications. Over 10 chapters, the book describes manufacturing methods, surface treatment, composite interfaces, and microstructure-property relationships with underlying fundamental physical and mechanical principles. It discusses the application of carbon materials in wind energy, oil and gas, infrastructure, defence, and the aerospace, automotive and semiconductor industries. This new edition introduces chapters related to the manufacturing of carbon/carbon composites (C/C composites), antioxidant characteristics of C/C composites, and their applications. Furthermore, it addresses the effect of graphene and carbon nanotubes on the physical and chemical properties of carbon fibers. A final chapter looks at the emerging and future prospects of carbon fibers.

Fundamentals of Adhesion and Interfaces

(In Two Parts).

Friction in Textile Materials

Carbon Fibers and Their Composites

Effect of Drawing Atmosphere on Surface Characteristics of Glass Fibers

New analytical methods have provided further insight into the structure, surface characteristics, and chemistries of increasingly small particles. However, current literature offers information on only a limited number of powders being investigated. Written by renowned scientists in the field, Powders and Fibers: Interfacial Science and Application

Advances in Bio-Based Fibres: Moving Towards a Green Society describes many novel natural fibers, their specific synthesis and characterization methods, their environmental sustainability values, their compatibility with polymer composites, and a wide range of innovative commercial engineering applications. As bio-based fiber polymer composites possess excellent mechanical, electrical and thermal properties, along with highly sustainable properties, they are an important technology for manufacturers and materials scientists seeking to improve the sustainability of their industries. This cutting-edge book draws on the latest industry practice and academic research to provide advice on technologies with applications in industries, including packaging, automotive, aerospace, biomedical and structural engineering. Provides technical data on advanced material properties, including electrical and rheological Gives a comprehensive guide to appraising and applying this technology to improve sustainability Includes advice on the latest modelling techniques for designing with these materials

The first systematic reference on the topic with an emphasis on the characteristics and dimension of the reinforcement. This first of three volumes, authored by leading researchers in the field from academia, government, industry, as well as private research institutions around the globe, focuses on macro and micro composites. Clearly divided into three sections, the first offers an introduction to polymer composites, discussing the state of the art, new challenges, and opportunities of various polymer composite systems, as well as preparation and manufacturing techniques. The second part looks at macro systems, with an emphasis on fiber reinforced polymer composites, textile composites, and polymer hybrid composites. Likewise, the final section deals with micro systems, including micro particle reinforced polymer composites, the synthesis, surface modification and characterization of micro particulate fillers and flakes as well as filled polymer micro composites, plus applications and the recovery, recycling and life cycle analysis of synthetic polymeric composites.

Plant Fibers, their Composites, and Applications

Carbon Fibers and Their Composite Materials

Properties and Performance of Natural-Fibre Composites

Wool Fiber Reinforced Polymer Composites

The Surface Characteristics and Analysis of Flax Fibres

This book will focus on lignocellulosic fibres as a raw material for several applications. It will start with wood chemistry and morphology. Then, some fibre isolation processes will be given, before moving to composites, panel and paper manufacturing, characterization and aging.

Smart textiles are the textiles that are sensitive to any environmental conditions and can respond accordingly. Using passive and active coatings to generate high sensitivity to textiles is among the most recent research trends by engineers around the World. This has resulted in expansion in the application of smart textiles in various industrial fields including medicals, electronics and protective clothing. The aim of this special issue is to introduce the most state-of-the-art research and review articles by distinguished researchers in the field of smart coatings on textiles. The guest editor hopes that content will be useful for researchers, students and companies for continuation of research and development with the concept of smart textiles.

Textiles are commonly constituted of natural and synthetic fibers for normal applications. To impart functional or aesthetic effects on the textiles, the surface characteristics in the fiber play an important role. Therefore, surface treatment or modification is a possible way to provide value-added properties to textiles. The textile material/fiber surface can be treated or modified physically and/or chemically to achieve different desired effects. This book will provide an open forum to draw the attention of academic researchers and industrial experts to looking into different aspects of the surface treatment of textiles.

Industrial and Medical Applications