Coated and Laminated Textiles for Aerostats and Airships

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Nanotechnology in Textiles

Coated and Laminated Textiles

Advances in the Dyeing and Finishing of Technical Textiles

Advanced Textile Engineering Materials

Electrosprun Nanofibers

3-D Textile Reinforcements in Composite Materials

Textiles for Protection

Fibres to Smart Textiles: Advances in Manufacturing, Technologies, and Applications

offers comprehensive coverage of the fundamentals and advances in the textile and clothing manufacturing sectors. It describes the basics of fibres, yarns, and fabrics and their end use in the latest developments and applications in the field and addresses environmental impacts from textile processes and how to minimize them. This book serves as a single comprehensive source discussing textile fibres, yarn formation, filament formation techniques, woven fabric formation, knitting technologies, nonwoven manufacturing technologies, braiding technologies, and dyeing, printing, and finishing processes. Testing of textile materials, environmental impacts of textile processes and use of CAD and CAM in designing textile products are also included. The book also discusses applications including textile composites and biocomposites, technical textiles, smart textiles, and nanotextiles. With chapters authored by textile experts, this practical book offers guidance to professionals in textile and clothing manufacturing and shows how to avoid potential pitfalls in product development.

Cold weather can be a potential hazard to human health, adversely affecting physiological functions, work performance and wellbeing. Designing suitable apparel for cold environments is therefore a complex task. Textiles for cold weather apparel reviews the principles, materials and requirements of cold weather apparel and will stimulate ideas for future innovation and improved end performance. The first part of the book covers the fundamental scientific issues and types of materials suitable for cold weather clothing. Topics include how to achieve comfort and thermoregulation in cold weather clothing as well as the use of coated and laminated fabrics. It also discusses design and ergonomic aspects such as designing for ventilation. Part two discusses ways of evaluating cold weather clothing, including standards and legislation governing cold weather clothing and laboratory assessments. Part three concludes with applications including cold weather apparel for the military and footwear for cold weather conditions. With an array of international contributors, this book is a valuable reference for producers, manufacturers, retailers and all those wishing to improve and understand developments in cold weather apparel. Reviews the principles, materials and requirements of cold weather apparel Discusses design and ergonomic aspects including ventilation and insulation Examines methods used to evaluate cold weather clothing as well as standards and legislation in practice

This book covers material challenges and technology innovation in coated and laminated textiles for aerostat and airship. Aerostats/airships are lighter-than-air (LTA) aircraft which are generally used in defense applications and face many harsh environmental conditions. For sustaining such conditions, special requirements are there for the material to be used in aerostat/airship which generally includes a multi-layered coated/laminated textile using a textile fabric in base layer and different polymers for coating/lamination. Therefore, this book covers typical materials developed by different countries, challenges for developing material for aerostat/airship envelope and the future scope.
Features: Exclusive title on materials used for LTA (lighter than air) envelope. Discusses material challenges such as selection of suitable fiber, polymer, additive, coating/lamination technique, joint type, and sealing techniques. Includes typical materials developed by different companies and researchers worldwide. Clearly explains technical concepts using figures, schemes, and tabulated data. Includes case studies on material developed for aerostat/airship by different countries including NASA, Lockheed Martin, JAXA, ADRDE and DRDO. This book aims at Graduate Students, Researchers and Professionals in Textiles Engineering, and Aerospace Engineering"--Gore-Tex, chemical protective clothing, architectural fabrics, air bags Intensive research and development in coated-fabric materials and processes has led to new and improved products for a wide range of consumer, industrial, medical, and military applications. Coated Textiles: Principles and Applications provides the first comprehensive, up-to-daThe surface of textiles offers an important platform for functional modifications in order to meet special requirements for a variety of applications. The surface modification of textiles may be achieved by various techniques ranging from traditional solution treatment to biological approaches. This book reviews fundamental issues relating to textile surfaces and their characterisation and explores the exciting opportunities for surface modification of a range of different textiles. Introductory chapters review some important surface modification techniques employed for improved functional behaviour of textiles and the various surface characterisation methods available. Further chapters examine the different types of surface modification suitable for textiles, ranging from the use of plasma treatments and physical vapour deposition to the use of nanoparticles. Concluding chapters discuss surface modification strategies for various applications of textiles. Surface modification of textiles is a valuable resource for chemists, surface scientists, textile technologists, fibre scientists, textile engineers and textile students. Reviews fundamental issues relating to textiles surfaces and their characterisation Examines various types of surface modification suitable for textiles, including plasma treatments and nanoparticles Discusses surface modification strategies for textile applications such as expansion into technical textile applicationsSmart coatings can produce coatings that offer above and beyond the normal functions of a coating, these range from improving the performance of fabrics, producing new forms of materials to providing decoration. This book reviews a variety of topics about textile coatings and laminates and aims to provide a stimulus for developing new and improved textile products. The first part of the book introduces the fundamentals of textile coatings and laminates, addressing general areas such as coating and laminating processes and techniques, as well as base fabrics and their interaction in coated fabrics. Part two discusses different types of smart and intelligent coatings and laminates for textiles. Topics include microencapsulation technology, conductive coatings, breathable coatings and phase change materials and their application in textiles. With its highly distinguished editor and array of international contributors, Smart textile coatings and laminates is a valuable reference book for chemists, textile technologists, fibre scientists, textile engineers and all those wishing to improve and understand the developments in textile coating and laminating technology. It will also be suitable for researchers in industry or academia. Reviews a number of issues surrounding textile coatings and laminates Discusses the fundamentals of textile coatings and laminates addressing processes and techniques Examines types of smart and intelligent coatings and laminates for textiles, including microencapsulation technology, conductive and breathable coatingsStructure and Mechanics of Textile Fibre Assemblies, Second Edition, offers detailed information on all aspects of textile structure and mechanics. This new edition is updated to include the latest technology and techniques, as well as fiber assembly for major application areas. Chapters discuss the mechanics of materials and key mechanical concepts, such as stress, strain, bending and shear, but also examine structure and mechanics in-depth, including fabric type, covering yarns, woven fabrics, knitted fabrics, nonwovens, tufted fabrics, textile composites, laminated and coated textile fabrics, and braided structures. Finally, structure and mechanics are approached from the viewpoint of key applications areas. This book will be an essential source of information for scientists, technologists, engineers, designers, manufacturers and R&D managers in the textile industry, as well as academics and researchers in textiles and fiber science. Provides methodical coverage of all essential fabric types, including yarns, woven fabrics, knitted fabrics, nonwovens, tufted fabrics, textile composites, laminated and coated textile fabrics, and braided structures. Enables the reader to understand the mechanical properties and structural parameters of fabric at a highly detailed level Expanded update includes an analysis of fiber assemblies for key technical areas, such as protective fabrics and medical textilesLaminated composite materials have been used since the 1960s for structural applications. This first generation of materials were successful because of the materials' high stiffness and strength performance. The aims of this book are to describe the manufacturing processes, to highlight the advantages, to identify the main applications, to analyse the methods for prediction of mechanical properties and to focus on the key technical aspects of these materials in order to discover how better to exploit their characteristics and to overcome their disadvantages in relation to the laminated composite materials. This book covers many areas related to 3-D fabric textile technologies, and manufacturing is treated as a key issue. Theoretical aspects of micro- and
macromechanics are covered in depth, as well as properties and behaviour. Specific techniques including braiding, stitching and knitting are described and compared in order to evaluate the most attractive configurations available at the moment. Present and future applications and trends are described to illustrate that 3-D textiles are part of the real industrial world not only today but tomorrow as well. This first book to concentrate on providing a concise, representative overview of polymer microencapsulation for novel organic coatings and all its chemical and engineering aspects collates the literature hitherto spread out among journals in various disciplines. It covers all the important methods for carrying out microencapsulations, including in situ polymerization, phase separation, emulsification, grinding and spray drying. The result is a solid, introduction from first-hand practitioners working in industry and research institutions for newcomers to the field. It is equally vital reading for professionals already active in the area needing to stay abreast of developments.

Waste Management in the Textiles Industry explores and explains the latest technologies and best practices for an integrated approach to the management and treatment of wastes generated in this industry. Provides a strong technological analysis of the manufacturing supply chain, including spinning, fabric production, finishing, garment manufacture, and the packaging of clothing. Explains how textile technology perspectives feed into management decision-making about sustainability. Addresses the industry’s impact on air and water quality and landfill waste. The book “Frontiers and Textile Materials” will deal with the important materials that can be utilized for value-addition and functionalization of textile materials. The topics covered in this book includes the materials like enzymes, polymers, etc. that are utilized for conventional textile processing and the advanced materials like nanoparticles which are expected to change the horizons of textiles. The futuristic techniques for textile processing like plasma are also discussed. Aerostats/airships are lighter-than-air (LTA) aircraft which are generally used in defense applications and face many harsh environmental conditions. This book covers material challenges and technology innovation in coated and laminated textiles for aerostat/airship including materials used by different countries, challenges and future scope. Plasma technologies present an environmentally-friendly and versatile way of treating textile materials in order to enhance a variety of properties such as wettability, liquid repellency, dyeability and coating adhesion. Recent advances made in commercially viable plasma systems have greatly increased the potential of using plasma technology in industrial textile finishing. This pioneering book provides an essential guide to both the technology and science related to plasmas and its practical applications in the textile industry. The first part of the book discusses the science and technology behind plasmas. Chapters give detailed and comprehensive descriptions on the characteristics of plasmas and methods of control and treatment in the processing of textiles. Both low pressure cold plasma and atmospheric pressure cold plasma processes are described as well as the diagnosis and control of plasma parameters in plasma generating reactors. A chapter is devoted to the use of plasma technology to achieve nanoscale treatment of textile surfaces. The second part of the book concentrates on specific applications of plasma technologies. Chapters cover treatments for water and oil repellency of textiles, engineering of biomedical textiles and woolen finishing techniques through the use of plasma technologies. Further chapters cover the modification of fibres for use in composites and the potential use of plasma technologies for the finishing of fabrics made of man made fibres. The final chapter in the book gives a comprehensive analysis of the surface chemical and physical characterisation of plasma treated fabrics. Written by a distinguished international team of experts, Plasma technologies for textiles is an invaluable reference for researchers, scientists and technologists alike. Summarises both the science and technology of plasma processing, and its practical applications. Discusses how plasma technology improves textile properties such as wettability and liquid repelling. An invaluable reference for researchers, scientists and technologists. Understanding the techniques for joining fabrics together in a way that considers durability, strength, leak-tightness, comfort in wear and the aesthetics of the joints is critical to the production of successful, structurally secure fabric products. Joining textiles: Principles and applications is an authoritative guide to the key theories and methods used to join fabrics efficiently. Part one provides a clear overview of sewing technology. The mechanics of stitching, sewing and problems related to sewn textiles are discussed, along with mechanisms of sewing machines and intelligent sewing systems. Part two goes on to explore adhesive bonding of textiles, including principles, methods and applications, along with a review of bonding requirements in coating and laminating of textiles. Welding technologies are the focus of part three. Heat sealing, ultrasonic and dielectric textile welding are covered, as are laser seaming of fabrics and the properties and performance of welded or bonded seams. Finally, part four reviews applications of joining textiles such as seams in non-iron shirts and car seat coverings, joining of wearable electronic components and technical textiles, and the joining techniques involved in industrial and medical products including nonwoven materials. With its distinguished editors and international team of expert contributors, Joining textiles is an important reference work for textile product manufacturers, designers and technologists, fibre scientists, textile engineers and academics working in this area. Provides an authoritative guide to the key theories and methods used to efficiently join fabrics. Discusses the mechanics of stitching and
sourcing and problems related to sewn textiles, alongside mechanisms of sewing machines, and intelligent sewing systems. Explores adhesive bonding of textiles, including principles, methods and applications, along with a review of bonding requirements in coating and laminating of textiles. The sensing, adapting, responding, multifunctionality, low energy, small size and weight, ease of forming, and low-cost attributes of smart textiles and their multidisciplinary scope offer numerous end uses in medical, sports and fitness, military, fashion, automotive, aerospace, the built environment, and energy industries. The research and development on these new and high-value materials cross scientific boundaries, redefine material science design and engineering, and enhance quality of life and our environment. “Novel Smart Textiles” is a focused Special Issue that reports the latest research of this field and facilitates dissemination, networking, discussion, and debate. The use of distinctive colourants and finishes has a significant impact on the aesthetic appeal and functionality of technical textiles. Advances in the textile chemical industry facilitate production of diverse desirable properties, and are therefore of great interest in the production of textile products with enhanced performance characteristics. Drawing on key research, Advances in the dyeing and finishing of technical textiles details important advances in this field and outlines their development for a range of applications. Part one reviews advances in dyes and colourants, including chromic materials, optical effect pigments and microencapsulated colourants for technical textile applications. Other types of functional dyes considered include UV-absorbant, anti-microbial and water-repellent dyes. Regulations relating to the use of textile dyes are discussed before part two goes on to investigate such advances in finishing techniques as chemical finishing, softening treatments and the use of enzymes. Surfactants, Inkjet printing of technical textiles and functional finishes to improve the comfort and protection of apparel are also explored. The use of nanotechnology in producing hydrophobic, super-hydrophobic and antimicrobial finishes is dealt with alongside coating and lamination techniques, before the book concludes with a discussion of speciality polymers for the finishing of technical textiles. With its distinguished editor and international team of expert contributors, Advances in the dyeing and finishing of technical textiles is a comprehensive guide for all those involved in the development, production and application of technical textiles, including textile chemists, colour technologists, colour quality inspectors, product developers and textile finishers. Discusses important advances in the textile chemical industry. Considers developments in various dyes and colourants used in the industry, including water repellent, functional and anti-microbial dyes. Chapters also examine advances in finishing techniques, the use of nanotechnology and speciality polymers in technical textiles. The technical developments in the sports clothing industry have resulted in the use of functional textiles for highly-specialised performances in different sports. Developments include thermal and functional properties and coated and laminated clothes. With bio- and smart materials providing such a strong focus in the textile industry generally, companies are going for ‘value-added’ textiles, such as in-built sensors which monitor performance. In-built wear comfort is a growing market trend and includes clothing which improve the skin’s performance. Written by a distinguished editor and a team of authors from the cutting edge of textile research, Textiles in sport discusses high-performance, high-function and intelligent textiles for sportswear. Invaluable for a broad range of readers. Discusses high-performance, high-function and intelligent textiles for sportswear. In today’s climate there is an increasing requirement for protective textiles, whether for personal protection, protection against the elements, chemical, nuclear or ballistic attack. This comprehensive book brings together the leading protective textiles experts from around the world. It covers a wide variety of themes from materials and design, through protection against specific hazards, to specific applications. This is the first book of its kind to give a complete coverage of textiles for protection. Covers a wide variety of themes from materials and design, through protection against specific hazards, to specific applications. The first book of its kind to give a complete coverage of textiles for protection. Written by leading protective textiles experts from around the world. This important book provides a comprehensive account of the advances that have occurred in fire science in relation to a broad range of materials. The manufacture of fire retardant materials is an active area of research, the understanding of which can improve safety as well as the marketability of a product. The first part of the book reviews the advances that have occurred in improving the fire retardancy of specific materials, ranging from developments in phosphorus and halogen-free flame retardants to the use of nanocomposites as novel flame retardant systems. Key environmental issues are also addressed. The second group of chapters examines fire testing issues and regulations. A final group of chapters addresses the application of fire retardant materials in such areas as composites, automotive materials, military fabrics and aviation materials. With its distinguished editors and array of international contributors, this book is an essential reference for producers, manufacturers, retailers and all those wishing to improve fire retardancy in materials. It is also suitable for researchers in industry or academia. Reviews advances in improving the retardancy of materials. Addresses key environmental issues. Examines fire testing issues and regulations and the challenges involved. The first edition of Handbook of Technical Textiles has been an essential purchase for professionals and researchers in this area since its publication in 2000.
With revised and updated coverage, including several new chapters, this revised two volume second edition reviews recent developments and new technologies across the field of technical textiles. Volume 2 – Technical Textile Applications offers an indispensable guide to established and developing areas in the use of technical textiles. The areas covered include textiles for personal protection and welfare, such as those designed for ballistic protection, personal thermal and fire protection, and medical applications; textiles for industrial, transport and engineering applications, including composite reinforcement and filtration; and the growing area of smart textiles. Comprehensive handbook for all aspects of technical textiles Provides updated, detailed coverage of processes, fabric structure, and applications Ideal resource for those interested in high-performance textiles, textile processes, textile processing, and textile applications Many of the original, recognized experts from the first edition update their respective chaptersThis important book provides a guide to the fundamentals and latest developments in smart technology for textiles and clothing. The contributors represent a distinguished international panel of experts and the book covers many aspects of cutting edge research and development. Smart fibres, fabrics and clothing starts with a review of the background to smart technology and goes on to cover a wide range of the material science and fibre science aspects of the technology including: Electrically active polymeric materials and the applications of nonionic polymer gel and elastomers for artificial muscles; Thermally sensitive fibres and fabrics; Cross-linked polyl fibrous substrates stimuli-responsive interpenetrating polymer network hydrogel; Permeation control through stimuli-responsive polymer membranes; optical fibre sensors, hollow fibre membranes for gas separation; integrating fibre-formed components into textile structures; Wearable electronic and photonic technologies; Adaptive and responsive textile structures (ARTS); Biomedical applications including the applications of scaffolds in tissue engineering It is essential reading for academics in textile and materials science departments, researchers, designers and engineers in the textiles and clothing product design field. Product managers and senior executives within textile and clothing manufacturing will also find the latest insights into technological developments in the field valuable and fascinating. This volume contains select papers presented during the Functional Textiles and Clothing Conference 2020 held at Indian Institute of Technology Delhi. The volume covers recent developments, challenges and opportunities in the field of functional and protective clothing; functional printing and finishing; sustainable production and supply chain; and testing and characterisation. This volume will be of interest to researchers, professional engineers, entrepreneurs, and market stakeholders interested in functional textiles and clothing. Coatings and laminates allow for the introduction of smart functionalities for textile products. They are suitable for a wide range of textile applications and can contribute to improving product performance. This pioneering book is a valuable reference and stimulus for developing and improving coated and laminated textile products. The first section of the book covers the fundamentals of coatings and laminates. Themes range from coating and laminating processing and production techniques to testing and quality assurance. The remainder of the book covers different types of smart coatings and laminates such as intelligent weatherproof coatings, phase change coatings, and nanotechnology based coatings. Joining and welding are two of the most important processes in manufacturing. These technologies have vastly improved and are now extensively used in numerous industries. This book covers a wide range of topics, from arc welding (GMAW and GTAW), FSW, laser and hybrid welding, and magnetic pulse welding on metal joining to the application of joining technologies for textile products. The analysis of temperature and phase transformation is also incorporated. This book also discusses the issue of dissimilar joint between metal and ceramic, as well as the technology of diffusion bonding. Initially written to pull together scattered literature in polymer science and textile technology, the first edition of Coated Textiles: Principles and Applications became a gold standard resource in this field. Completely revised and updated, this second edition reflects not only the latest developments in the field, but also explores future possibilities. The book covers the materials used in coatings and their chemistry, textile substrates, coating methods, properties of fabrics after coating, rheology of coating, applications of coated fabrics, and test methods in chronological order. New topics in the Second Edition: · Coating with stimulus-sensitive polymers and intelligent textiles · Nanomaterial coating to produce soil-resistant fabrics · Breathable coating for health care garments · Adhesives and foam for laminates · Research trends such as temperature-adaptable fabrics, silicone coating for airbag fabrics, healthcare garments, intumescent coating, coating materials, and coating methods The author provides a detailed discussion that includes diverse applications of coated fabrics, rheology, smart coating, physical properties of coated fabrics, as well as the underlying principles of test methods. The book includes applications and explores coating with functional materials such as dyes, fragrances, phase change materials, smart polymers and nanomaterials for special applications. With applications in defense, transportation, healthcare, architecture, space, sports, environmental pollution control, and other diverse end-product uses, coated textiles is a multibillion dollar industry. Following in the footsteps of its bestselling predecessor, the second edition compiles information from various sources into one convenient, easily accessible resource. Electronically Active Textiles (e-textiles) are a
type of textile material that has some form of electronic functionality. This can be achieved by attaching electronics onto the surface of the textile, incorporating electronic components as part of the fabrication of the textile itself, or by integrating electronics into the yarns or fibers that comprises the textile. The addition of electronic components can give textiles a wide range of new functions from lighting or heating to advanced sensing capabilities. As such, e-textiles have provided a platform for developing a range of new novel products in fields, such as healthcare, sports, protection, transport, and communications. The purpose of this volume is to report on the advances in the integration of electronics into textiles, and presents original research in the field of e-textiles as well as a comprehensive review of the evolution of e-Textiles. Topics include the fabrication and illumination of e-textiles and the use of e-textiles for temperature sensing. Technical yarns are produced for the manufacture of technical textiles. As the range of technical textiles is rapidly increasing, an understanding of the range of yarns available and their properties is important, in order to be able to meet the requirements of the intended end-use. Part one of the book begins by reviewing the advances in yarn production. Topics examine the advances in textile yarn spinning, modification of textile yarn structures, yarn hairiness and its reduction and coatings for technical textile yarns. The second group of chapters describes the range of technical yarns, such as electro-conductive textile yarns, novel yarns and plasma treated yarns for biomedical applications. Technical sewing threads and biodegradable textile yarns are also discussed. Technical textile yarns provides essential reading for yarn and fabric manufacturers, textile scientists, technicians, engineers and technologists, covering a wide range of areas within textile applications. This book will also be an important information source for academics and students. Provides a comprehensive overview of the variety of technical textile yarns available along with individual characteristics and production methods. Documents advances in textile yarn spinning and texturising featuring compact, rotor and friction spinning. Assesses different types of technical yarns including plasma-treated yarns for biomedical applications and hybrid yarns for thermoplastic composites. Coating and laminating are methods of both improving and modifying the physical properties and appearance of fabric. They have also facilitated the development of entirely new products and have led to innovations in the area of "smart" materials. Coating and lamination cuts across virtually every product group of the textile industry, including composites, where the scope for future development is extremely wide. This book helps bridge the gap between the two disciplines of textile technology and polymer chemistry, both of which are necessary for success in this area of technical textiles, and it also touches on the related textile processes of fabric impregnation and foam finishing. The author emphasizes the factors influencing selection of materials and process machinery, especially with regard to environmental issues such as global warming. Product descriptions, production and test methods, and standards are discussed in detail. Coated and Laminated Textiles is a valuable source of reference that embraces apparel, medical, military, and industrial applications. Coating and laminating are methods of both improving and modifying the physical properties and appearance of fabric. They have also facilitated the development of entirely new products and have led to innovations in the area of 'smart' materials. Coating and lamination cuts across virtually every product group of the textile industry, including composites where the scope for future development is extremely wide. This book helps bridge the gap between the two disciplines of textile technology and polymer chemistry, both of which are necessary for success in this area of technical textiles, and it also touches on the related textile processes of fabric impregnation and foam finishing. The manufacturing processes of coated and laminated fabrics involve materials such as solvent- and water-based resins and adhesives, films, foams and hot melt adhesives. In an increasingly environmentally-conscious world, control and handling of potentially toxic materials are becoming very important tasks for plant managers. The author emphasises the factors influencing selection of materials and process machinery -- especially with reference to environmental issues including global warming. Product descriptions, production and test methods and standards are discussed in detail, and the book will be a valuable source of reference, embracing apparel, domestic, medical, military and industrial applications. In recent times, polymer nanocomposites have attracted a great deal of scientific interest due to their unique advantages over conventional plastic materials, such as superior strength, modulus, thermal stability, thermal and electrical conductivity, and gas barrier. They are finding real and fast-growing applications in wide-ranging fields such as automotive, aerospace, electronics, packaging, and sports. This book focuses on the development of polymer nanocomposites as an advanced material for textile applications, such as fibers, coatings, and nanofibers. It compiles and details cutting-edge research in the science and nanotechnology of textiles with special reference to polymer nanocomposites in the form of invited chapters from scientists and subject experts from various institutes from all over the world. They include authors who are actively involved in the research and development of polymer nanocomposites with a wide range of functions—including antimicrobial, flame-retardant, gas barrier, shape memory, sensor, and energy-scavenging—as well as medical applications, such as tissue engineering and wound dressings, to create a new range of smart and intelligent textiles. Edited by Mangala Joshi, a prominent nanotechnology researcher at the
premier Indian Institute of Technology, Delhi, India, this book will appeal to anyone involved in nanotechnology, nanocomposites, advanced materials, polymers, fibers and textiles, and technical textiles. Provides the state-of-the-art on wearable technology for smart clothing. The book gives a coherent overview of recent development on flexible electronics for smart clothing with emphasis on wearability and durability of the materials and devices. It offers detailed information on the basic functional components of the flexible and wearable electronics including sensing, systems-on-a-chip, interacting, and energy, as well as the integrating and connecting of electronics into textile form. It also provides insights into the compatibility and integration of functional materials, electronics, and the clothing technology. Flexible and Wearable Electronics for Smart Clothing offers comprehensive coverage of the technology in four parts. The first part discusses wearable organic nano-sensors, stimuli-responsive electronic skins, and flexible thermoelectrics and thermoelectric textiles. The next part examines textile triboelectric nanogenerators for energy harvesting, flexible and wearable solar cells and supercapacitors, and flexible and wearable lithium-ion batteries. Thermal and humid management for next-generation textiles, functionalization of fiber materials for washable smart wearable textiles, and flexible microfluidics for wearable electronics are covered in the next section. The last part introduces readers to piezoelectric materials and devices based flexible bio-integrated electronics, printed electronics for smart clothes, and the materials and processes for stretchable and wearable e-textile devices. - Presents the most recent developments in wearable technology such as wearable nanosensors, logic circuit, artificial intelligence, energy harvesting, and wireless communication - Covers the flexible and wearable electronics as essential functional components for smart clothing from sensing, systems-on-a-chip, interacting, energy to the integrating and connecting of electronics - Of high interest to a large and interdisciplinary target group, including materials scientists, textile chemists, and electronic engineers in academia and industry. Flexible and Wearable Electronics for Smart Clothing will appeal to materials scientists, textile industry professionals, textile engineers, electronics engineers, and sensor developers. This book presents a global view of the development and applications of technical textiles with the description of materials, structures, properties, characterizations, functions and relevant production technologies, case studies, challenges, and opportunities. Technical textile is a transformative research area, dealing with the creation and studies of new generations of textiles that hoist many new scientific and technological challenges that have never been encountered before. The book emphasizes more on the principles of textile science and technology to provide solutions to several engineering problems. All chapter topics are exclusive and selectively chosen and designed, and they are extensively explored by different authors having specific knowledge in each area. Active Coatings for Smart Textiles presents the latest information on active materials and their application to textiles in the form of coatings and finishes for the purpose of improving performance and creating active functional effects. This important book provides detailed coverage of smart coating types, processes, and applications. After an introduction to the topic, Part One introduces various types of smart and active coatings, including memory polymer coatings, durable and self-cleaning coatings, and breathable coatings. Technologies and related processes for the application of coatings to textiles is the focus of Part Two, with chapters devoted to microencapsulation technology, plasma surface treatments, and nanotechnology-based treatments. The book ends with a section on applications of smart textiles with responsive coatings, which are increasingly finding commercial niches in sportswear, protective clothing, medical textiles, and architecture. Introduces various types of smart and active coatings for textiles. Covers technologies and application processes for the coating and finishing of textiles Reviews commercial applications of such coatings, including in sportswear, protective clothing, medical textiles and architecture. The manufacture and processing of textiles is a complex and essential industry requiring many diverse skills to ensure profitability. New products are continually being developed, and reflect the energy and innovation of those working in the field. This book focuses on the technological aspects of the chemical processing of textiles, and on the modifications necessary for specific work environments. Coverage ranges from fibre structure and its relationship to tensile properties, textile aesthetics, comfort physiology, and end-use performance, through to the effect of domestic processing by the consumer on the textile product. The industry is constantly under environmental pressure, and the book examines the nature of environmental control and the development of alternative technology to produce less environmental impact. In order to provide a balanced view of the current situation, authors have been drawn from academia, research institutes and industry to produce a text that will be useful to both industrial readers and university students. In conclusion I would like to thank the authors for their dedication and their contributions. Smart Textiles and Their Applications outlines the fundamental principles of applied smart textiles, also reporting on recent trends and research developments. Scientific issues and proposed solutions are presented in a rigorous and constructive way that fully presents the various results, prototypes, and case-studies obtained from academic and industrial laboratories worldwide. After an introduction to smart textiles and their applications from the editor, Part One reviews smart textiles for medical purposes, including their use in health monitoring, treatment delivery, and...
assistive technologies. Part Two covers smart textiles for transportation and energy, with chapters covering smart textiles for the monitoring of structures and processes, as well as smart textiles for energy generation. The final section considers smart textiles for protection, security, and communication, and includes chapters covering electrochromic textile displays, textile antennas, and smart materials for personal protective equipment. Scientific issues and proposed solutions are presented in a rigorous and constructive way regarding various results, prototypes, and case-studies obtained from academic and industrial laboratories worldwide. Useful for researchers and postgraduate students, and also for existing companies and start-ups that are developing products involving smart textiles. Authored and edited by an international team who are experts in the field ensure comprehensive coverage and global relevance. This book presents a comprehensive treatment of both functional and decorative textiles used in the automotive industry including seat covers, headliners, airbags, seat belts and tyres. Written in a clear, concise style it explains material properties and the way in which they influence manufacturing processes as well as providing practical production details. The subject treatment cuts across the disciplines of textile chemistry, fabric and plastics technology and production engineering. Environmental effects and recycling are also covered. It is aimed at the design and process engineer in industry as well as researchers in universities and colleges. Quality engineers will also benefit from the book's sections on identifying problems and material limitations.

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