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Nanocomposite Materials Properties and Applications of Silicon Carbide Polymer and Ceramic Composite Materials Sucrose *Engineering Thermoplastics* Nanodiamonds Fundamentals, Properties, and Applications of Polymer Nanocomposites Gold Well-Architectured Fluoropolymers: Synthesis, Properties and Applications Advanced Processing, Properties, and Applications of Starch and Other Bio-based Polymers Photoactive Functional Soft Materials Composite Nonwoven Materials Physical Properties and Applications of Polymer Nanocomposites Optical Properties of Materials and Their Applications Engineering Properties and Applications of Lead Alloys Carbon Nanotubes *Properties and Applications of Diamond Clay Nanoparticles* Properties and Applications of Polymer Nanocomposites *Nanocellulose: Synthesis, Structure, Properties And Applications* Biomaterials Science: Processing, Properties and Applications II Properties and Applications of Nanocrystalline Alloys from Amorphous Precursors *Properties and Applications of Elastomeric Polysulfides* Semiconductor Nanowires II: Properties and Applications *Self-Compacting Concrete: Materials, Properties and Applications* Starchy Crops Morphology, Extraction, Properties and Applications Functionalized Inorganic Semiconductor Nanomaterials: Characterization, Properties, and Applications Tin Oxide Materials *Processing, Properties, and Applications of Glass and Optical Materials* Revolution of Perovskite Polyphenols: Properties, Recovery, and Applications Alumina *Functional Marine Biomaterials* Zeolites in Catalysis Carbon Nanomaterials *Silicene* Polymer Chemistry *The Chemistry and Technology of Cellulosic Copolymers* Ionomers *Polymers in Particulate Systems*

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Metallic (magnetic and non-magnetic) nanocrystalline materials have been known for over ten years but only recent developments in the research into those complex alloys and their metastable amorphous precursors have created a need to summarize the most important accomplishments in the field. This book is a collection of articles on various aspects of metallic nanocrystalline materials, and an attempt to address this above need. The main focus of the papers is put on the new issues that emerge in the studies of nanocrystalline materials, and, in particular, on (i) new compositions of the alloys, (ii) properties of conventional nanocrystalline materials, (iii) modeling and simulations, (iv) preparation methods, (v) experimental techniques of measurements, and (vi) different modern applications. Interesting phenomena of the physics of nanocrystalline materials are a consequence of the effects induced by the nanocrystalline structure. They include interface physics, the influence of the grain boundaries, the averaging of magnetic anisotropy by exchange interactions, the decrease in exchange length, and the existence of a minimum two-phase structure at the atomic scale. Attention is also paid to the special character of the local atomic ordering and to the corresponding interatomic bonding as well as to anomalies and particularities of electron density distributions, and to the formation of metastable, nanocrystalline (or quasi-crystalline) phases built from exceptionally small grains with special properties. Another important focus of attention are new classes of materials

which are not based on new compositions, but rather on the original and special crystalline structure in the nanoscale. Clay Nanoparticles: Properties and Applications sets out the major properties of clay nanoparticles and their technological applications. The first part of the book focuses on the characterization of nanoclays, including layered, fibrous and tubular clay minerals. The second part illustrates the current and potential applications of nanoclays within material science and biotechnology. These include the development of geopolymers and bionanocomposites based on sustainable polymers filled with ecocompatible nanoclay. The potential use of nanoclays as flame retardants is also discussed, along with the correlation between the properties and potential applications of several nanoclay types. In particular, the applications explored include nanoclays as drug delivery systems and for environmental protection. The book provides a complete and multidisciplinary exploration of nanoclays, highlighting a range of perspectives within current nanotechnology research. Assesses the advantages of using nanoclays instead of conventional clay materials in product design Describes the major characterization techniques - both experimental and computational - for nanoclays Explores new fabrication techniques based on pristine and modified clay nanoparticles that are being used both in materials science and biotechnology Provides a semi-quantitative approach to recent developments in the study of optical properties of condensed matter systems Featuring contributions by noted experts in the field of electronic and optoelectronic materials and photonics, this book looks at the optical properties of materials as well as their physical processes and various classes. Taking a semi-quantitative approach to the subject, it presents a summary of the basic concepts, reviews recent developments in the study of optical properties of materials and offers many examples and applications. Optical Properties of Materials and Their Applications, 2nd Edition starts by identifying the processes that should be described in detail and follows with the relevant classes of materials. In addition to featuring four new chapters on optoelectronic properties of organic semiconductors, recent advances in electroluminescence, perovskites, and ellipsometry, the book covers: optical properties of disordered condensed matter and glasses; concept of excitons; photoluminescence, photoinduced changes, and electroluminescence in noncrystalline semiconductors; and photoinduced bond breaking and volume change in chalcogenide glasses. Also included are chapters on: nonlinear optical properties of photonic glasses; kinetics of the persistent photoconductivity in crystalline III-V semiconductors; and transparent white OLEDs. In addition, readers will learn about excitonic processes in quantum wells; optoelectronic properties and applications of quantum dots; and more. Covers all of the fundamentals and applications of optical properties of materials Includes theory, experimental techniques, and current and developing applications Includes four new chapters on optoelectronic properties of organic semiconductors, recent advances in electroluminescence, perovskites, and ellipsometry Appropriate for materials scientists, chemists, physicists and electrical engineers involved in development of electronic materials Written by internationally respected professionals working in physics and electrical engineering departments and government laboratories Optical Properties of Materials and Their Applications, 2nd Edition is an ideal book for senior undergraduate and postgraduate students, and teaching and research professionals in the fields of physics, chemistry, chemical

engineering, materials science, and materials engineering. This is the third book in the new series "Material Research and Engineering", devoted to the science and technology of materials. "MRE" evolves from a previous series on "Reine und Angewandte Metallkunde", which was edited by Werner Koster until his eightieth birthday in 1976. For the new series, the presentation as well as the scope had to be modified. In particular, the scientific and technological links between volumes on metallic, non-metallic, and composite materials should reflect the successful development of materials science and engineering within the last two decades. Thus, the material provided by Dorre and Hlibner for the present volume is partic ularly welcome. Alumina as a ceramic material has received very large attention as an object of scientific investigation in all of its aspects. Additionally, it plays a leading role as a nonmetallic material in many fields of technical appli cation. This book deals with both aspects: in Chapter 2 (physical properties) and 3 (me chanical properties), H. Hlibner presents an outstanding documentation of what one might call the science of alumina, based on 560 literature references and 15 years of personal experience gained from experimental and theoretical work in university laboratories in Erlangen, Rio de Janeiro, and Hamburg. In Chapter 4 (fabrication) and 5 (applications), E. Self-Compacting Concrete: Materials, Properties and Applications presents the latest research on various aspects of self-compacting concrete, including test methods, rheology, strength and durability properties, SCC properties at elevated temperature, SC manufacturing with the use of SCMs, recycled aggregates and industrial by-products. Written by an international group of contributors who are closely associated with the development of self-compacting concrete, the book explores the main differences between SCC and normal concrete in terms of raw materials, fresh properties and hardened properties. Other topics discussed include the structure and practical applications of fiber reinforced SCC. Researchers and experienced engineers will find this reference to be a systematic source to SCC with its accounting of the latest breakthroughs in the field and discussions of SCC constructability, structural integrity, improved flows into complex forms, and superior strength and durability. Offers a systematic and comprehensive source of information on the latest developments in SCC technology Includes mix design procedures, tests standards, rheology, strength and durability properties Explores the properties and practical applications of SCC The specialist properties of polysulfide polymers were immediately recognised on discovery, and technology was soon developed to convert these materials into useful products. In this Rapra Review Report, the author describes the factors controlling the structure of polysulfide polymers and the properties which influence their use and performance in products. An additional indexed section containing several hundred abstracts from the Rapra Polymer Library database provides useful references for further reading. Composite nonwoven materials are versatile materials with a variety of applications, including hygiene, medicine and filtration. This important book provides a technical resource for professionals and academics in the field. It explores these materials in terms of fiber types used, manufacturing processes, structure, and physical properties. The first part of the book focuses on the use of natural and synthetic fibers in composite nonwovens, discusses their structure in terms of fiber packing and alignment, and their physical properties. Further chapters deal with the practical applications of composite nonwoven materials.

Hygiene applications, such as diapers, female sanitary products, incontinence pads, and wipes are covered, as well as composite nonwoven-based medical products and filters. Composite Nonwoven Materials is an ideal reference for R&D managers in the textile industry and academic researchers in textile science. Systematic and comprehensive information on composite nonwovens Critical review of progress in research and development on composite nonwovens Comment on future research direction and ideas for product development Polymers have achieved an enviable position as the class of materials having the highest volume of production, exceeding that of both metals and ceramics. The meteoric rise in the production and utilization of polymers has been due to advances in polymer synthesis which allow the creation of specific and well-defined molecular structures, to new knowledge concerning the relationships between polymer structure and properties, and to an improved understanding of how processing can be used as a tool to develop morphological features which result in desired properties. Polymers have truly become 'engineered materials' in every sense of the term. Polymer scientists and engineers are forever seeking to modify and improve the properties of synthetic polymeric systems for use in specific applications. Towards this end they have often looked to nature for advice on how to design molecules for specific needs. An excellent illustration of this is the use of noncovalent bonding (ionic, hydrogen, and van der Waals) in lipids, proteins, and nucleic acids, where these noncovalent bonds, acting both intra and intermolecularly, precisely control the structure and thus the function of the entire system. The utilization of ionic bonding, in particular in man-made polymers has attracted widespread interest in recent years, since ionic interactions exert a similar strong influence on the structure and properties of these synthetic systems. Semiconductor Nanowires: Part B, and Volume 94 in the Semiconductor and Semimetals series, focuses on semiconductor nanowires. Includes experts contributors who review the most important recent literature Contains a broad view, including examination of semiconductor nanowires Functional Marine Biomaterials: Properties and Applications provides readers with the latest information on the diverse marine environment as a resource for many new substances, including biopolymers, bioceramics, and biominerals. As recent advances and funding has enabled scientists to begin harnessing many of these materials for biomedical applications from drug delivery to bone tissue engineering and biosensors, this important new text provides readers with a comprehensive review of these materials and their functional applications in the biomedical field. Chapters discuss the properties of the main classes of functional marine biomaterials, applications of marine products in tissue engineering, applications in drug delivery systems, and the role of marine derived materials in medical devices. Provides readers with the latest information on the diverse marine environment as a resource for many new substances, including biopolymers, bioceramics, and biominerals Presents a comprehensive review of these materials and their functional applications in the biomedical field Discusses the properties of the main classes of functional marine biomaterials, applications of marine products in tissue engineering, applications in drug delivery systems, and the role of marine derived materials in medical devices With contributed papers from the 2011 Materials Science and Technology symposia, this is a useful one-stop resource for understanding the most important issues involved in the processing, properties, and

applications of biomaterials science. Logically organized and carefully selected, the articles cover the themes of the symposia: Next Generation Biomaterials: and Surface Properties of Biomaterials. An essential reference for government labs as well as academics in mechanical and chemical engineering, materials and or ceramics, and chemistry. This book summarizes recent advances in the fabrication methods, properties, and applications of various ceramic-filled polymer matrix composites. Surface-modification methods and chemical functionalization of the ceramic fillers are explored in detail, and the outstanding thermal and mechanical properties of polymer–ceramic composites, the modeling of some of their thermal and mechanical parameters, and their major potential applications are discussed along with detailed examples. Aimed at researchers, industry professionals, and advanced students working in materials science and engineering, this work offering a review of a vast number of references in the polymer–ceramic field, this work helps readers easily advance their research and understanding of the field. Diamond exists in a variety of forms: natural crystals mined from the earth, man-made crystals now produced in large quantities, sintered to form polycrystalline blocks, and as thin films of diamond grown directly from carbonaceous gases. Covering a range of information from the simplest scientific information on diamond to its engineering applications, this book introduces readers to each topic at a basic level - taking readers through to the most recent developments in each field. The study of nanostructures has become, in recent years, a theme common to many disciplines, in which scientists and engineers manipulate matter at the atomic and molecular level in order to obtain materials and systems with significantly improved properties. Carbon nanomaterials have a unique place in nanoscience owing to their exceptional thermal, electrical, chemical, and mechanical properties, finding application in areas as diverse as super strong composite materials, energy storage and conversion, supercapacitors, smart sensors, targeted drug delivery, paints, and nanoelectronics. This book is the first to cover a broad spectrum of carbon nanomaterials, namely carbon nanofibers, vapor-grown carbon fibers, different forms of amorphous nanocarbons besides carbon nanotubes, fullerenes, graphene, graphene nanoribbons, graphene quantum dots, etc. in a single volume. Covering the breadth of zeolite chemistry and catalysis, this book provides the reader with a complete introduction to field, covering synthesis, structure, characterisation and applications. Beginning with the history of natural and synthetic zeolites, the reader will learn how zeolite structures are formed, synthetic routes, and experimental and theoretical structure determination techniques. Their industrial applications are covered in-depth, from their use in the petrochemical industry, through to fine chemicals and more specialised clinical applications. Novel zeolite materials are covered, including hierarchical zeolites and two-dimensional zeolites, showcasing modern developments in the field. This book is ideal for newcomers who need to get up to speed with zeolite chemistry, and also experienced researchers who will find this a modern, up-to-date guide. Many excellent volumes have been written on the chemistry of cellulose and its derivatives. Judging by the number of conferences which have been assembled to deal with the topic, cellulose and its derivatives continue to arouse great scientific interest. Matching this interest has been the development in copolymer science and technology. In both instances the driving force has been the search for products having useful, new or interesting properties. It appeared inevitable

that these two concepts would be brought together at some time in the research and development of cellulosic copolymers. That time has arrived. In assembling this text our aim was to present an informative account of the chemistry and technology of cellulosic copolymers. As such, we intended that the contents be of interest to all those concerned with the production and use of cellulosic products whether in academic or industrial circles. Sections of the text should be of value in undergraduate and post-graduate teaching, provided the student is given guidance in following the text. The volume is divided into eight chapters, each dealing with factors which are relevant to an under standing of cellulosic copolymers. Each chapter carries its own bibliography and is reasonably self-contained. This book provides solutions to many vital questions on the important property differences and advantages of individual engineering thermoplastics. It is useful for executives; managers; design, materials, and sales engineers; researchers; materials and product manufacturers; and compounders. Nanocellulose, a unique and promising natural material extracted from native cellulose, has received immense interest for its broad spectrum of applications owing to its remarkable physical properties, special surface chemistry, and excellent biological properties (biocompatibility, biodegradability and low toxicity). In attempts to meet the requirements of humanity's well-being, biomaterials scientists taking advantage of the structure and properties of nanocellulose aim to develop new and formerly non-existing materials with novel and multifunctional properties.This book highlights the importance of nanocellulose and reviews its synthesis, types, structure and properties. Further, it discusses various biofabrication approaches and applications of nanocellulose-based biomaterials in various fields such as the environment, biomedicine, optoelectronics, pharmaceutics, paper, renewable energy and the food industry. Devised to have a broad appeal, this book will be useful to beginners, who will appreciate its comprehensive approach, as well as active researchers, who will find the focus on recent advancements highly valuable. Nanodiamonds: Advanced Material Analysis, Properties and Applications illustrates the complementarity of specific techniques to fully characterize nanodiamonds from their diamond core (crystalline structure, defects, sp2 carbon, impurities, strain) to their surface (surface chemistry, stability of surface groups, reactivity, surface charge, colloidal properties). The relationship between physical and chemical parameters sits at the heart of what this book is about. Recent advances in the synthesis of nanodiamonds either by HPHT or detonation are covered, along with extended characterization of the core and surface of nanodiamonds, focusing on the most advanced experimental tools developed for nanoscale diagnosis. Each technique presented includes presentation of both principles and applications. This combination of advanced characterizations offers readers a better understanding of the relationship that exists between physical and chemical parameters of nanodiamonds and their properties. In particular, the role of structural defects or chemical impurities is illustrated. Toxicity of nanodiamonds for cells is also discussed, as It is an essential issue for their bioapplications. Final sections in the book cover the main promising new advances and applications of nanodiamonds, the formation of hybrids, and their use in polymer and oil composites. Provides a focused analysis of the relationship between the physical, chemical parameters, and properties of nanodiamonds Allows the reader to better understand the material characterization of nanodiamonds and how they can be most successfully

used Presents R&D scientists and engineers with the information they need to understand how nanodiamonds can be used to create more efficient products Includes novel applications, for example, the formation of hybrids based on nanodiamonds, that are covered in detail This publication provides an excellent one-stop resource for understanding the most important current issues in the research in processing, properties and applications in glass and optical materials. This book reviews the current state-of-the art of single layer silicene up to thicker silicon nanosheets, and their structure, properties and potential applications. Silicene is a newly discovered material that is one atomic layer think. It is a two-dimensional (2D) nanomaterial that is classified as a nanosheet, which has large lateral dimensions up to micrometres, but thicknesses of only nanometres or less. Silicon nanosheets are currently a very 'hot' area of research. The unique properties and morphology of such materials make them ideal for a variety of applications, including electronic devices, batteries and sensors. 2D nanosheets of silicon can be considered as analogues of graphene. As silicon is already the major component of electronic devices, the significance of nanosheets composed of silicon is that they can be more easily integrated into existing electronic devices. Furthermore, if 2D nanostructured Si can be implemented into such devices, then their size could be reduced into the nano-regime, providing unique properties different from bulk Si that is currently employed. The book is written for researchers and graduate students. Since their discovery more than a decade ago, carbon nanotubes (CNTs) have held scientists and engineers in captive fascination, seated on the verge of enormous breakthroughs in areas such as medicine, electronics, and materials science, to name but a few. Taking a broad look at CNTs and the tools used to study them, Carbon Nanotubes: Properties and Applications comprises the efforts of leading nanotube researchers led by Michael O'Connell, protégé of the late father of nanotechnology, Richard Smalley. Each chapter is a self-contained treatise on various aspects of CNT synthesis, characterization, modification, and applications. The book opens with a general introduction to the basic characteristics and the history of CNTs, followed by discussions on synthesis methods and the growth of "peapod" structures. Coverage then moves to electronic properties and band structures of single-wall nanotubes (SWNTs), magnetic properties, Raman spectroscopy of electronic and chemical behavior, and electromechanical properties and applications in NEMS (nanoelectromechanical systems). Turning to applications, the final sections of the book explore mechanical properties of SWNTs spun into fibers, sidewall functionalization in composites, and using SWNTs as tips for scanning probe microscopes. Taking a fresh look at this burgeoning field, Carbon Nanotubes: Properties and Applications points the way toward making CNTs commercially viable. Tin Oxide Materials: Synthesis, Properties, and Applications discusses the latest in metal oxides, an emerging area in electronic materials. As more is learned about this important materials system, more functionalities and applications have been revealed. This key reference on the topic covers important material that is ideal for materials scientists, materials engineers and materials chemists who have been introduced to metal oxides as a general category of materials, but want to take the next step and learn more about a specific material. Provides a complete resource on tin oxide materials systems, including in-depth discussions of properties, their synthesis, modelling methods, and applications Presents information on the well-investigated

SnO_2, but also includes discussions on its emerging stoichiometries, such as SnO and Sn_3O_4 Includes the most relevant applications in varistors, sensing devices, fuel cells, transistors, biological studies, and much more This book provides a comprehensive collection of the latest information on nanomaterials and nanocomposites. It covers material synthesis, processing, structure characterization, properties and applications. It presents a coherent treatment of how composite properties depend on nanostructure, and covers cutting-edge topics like bionanocomposites for sustainable development. This book summarizes many developments in the field making it an ideal resource for researchers from industry, academia, government and private research institutions. The aim of the present edited book is to furnish scientific information about manufacturing, properties, and application of clay and carbon based polymer nanocomposites. It can be used as handbook for undergraduate and post graduate courses (for example material science and engineering, polymer science and engineering, rubber technology, manufacturing engineering, etc.) as well as as reference book for research fellows and professionals. Polymer nanocomposites have received outstanding importance in the present decade because of their broad range of high-performance applications in various areas of engineering and technology due to their special material properties. A great interest is dedicated to nanofiller based polymeric materials, which exhibit excellent enhancement in macroscopic material properties (mechanical, thermal, dynamic mechanical, electrical and many more) at very low filler contents and can therefore be used for the development of next-generation composite materials. This book provides an up-to-date overview of the economic, chemical, physical, analytical and engineering aspects of the subject, gathering together information which would otherwise be scattered over a wide variety of sources. In this book, we explore an eclectic mix of articles that highlight some new potential applications of SiC and different ways to achieve specific properties. Some articles describe well-established processing methods, while others highlight phase equilibria or machining methods. A resurgence of interest in the structural arena is evident, while new ways to utilize the interesting electromagnetic properties of SiC continue to increase. Because of the increasing need for ever better performing materials endowed with specific properties, macromolecular engineering has become a useful tool for designing well-architectured polymers (telomers, telechelics, stars, dendrimers, alternating, block- and graftcopolymers). These polymers are nowadays seeing an enormous growth. Among them, fluoropolymers are seen as high value added materials in many applications ranging from surfactants, optical fibers, biomaterials, coatings, to membranes for fuel cells. Indeed, the relationship between structure of the monomer to the properties of the polymers is of increasing interest so that these properties are tuned for the most appropriate applications. As most fluoropolymers are prepared from radical synthesis, this book devotes various parts on the use of the controlled radical (or pseudo-living) polymerisation of fluoromonomers leading to discoveries of thermoplastic elastomers or original surfactants for polymerisation in supercritical CO_2. Well-Architectured Fluoropolymers: Synthesis, Properties and Applications is composed of five chapters starting with a general introduction outlining basic concepts. Emphasis is placed on recent developments, and each chapter describes comprehensive techniques of synthesis of well-defined fluorotelomers or polymers, their properties, characterisations, and their applications,

for immediate use by today’s engineers, industrial and academic scientists, and researchers. The book has been arranged to enable self-managed reading and learning. It is both a source of data and a reference. On the synthesis, properties and applications of fluoropolymers: remarkable, high value added materials applied in surfactants, optical fibres, biomaterials, coatings and membranes for fuel cells For immediate use by today's engineers, industrial and academic scientists, and researchers Written to enable self-managed reading and learning, being both a source of data and a reference This book is focused primarily on polymer nanocomposites, based on the author's research experience as well as open literature. The environmental health and safety aspects of nanomaterials and polymer nanocomposites, risk assessment and safety standards, and fire toxicity of polymer nanocomposites, are studied. In the final chapter, a brief overview of opportunities, trends, and challenges of polymer nanocomposites are included. Throughout the book, the theme is developed that polymer nanocomposites are a whole family of polymeric materials whose properties are capable of being tailored to meet specific applications. This volume serves as a general introduction to students and researchers just entering the field and to scholars from other subfields seeking information. This book covers the design, synthesis, properties, and applications of functional photoactive soft materials, including aspects of polymers, block copolymers, elastomers, biomaterials, liquid crystals, chemical and physical gels, colloids, and host-guest systems. It combines, in a unified manner, authoritative accounts describing various structural and functional aspects of photoactive soft materials. Photoactive Functional Soft Materials: Preparation, Properties, and Applications: * Brings together the state-of-the-art knowledge on photoactive functional soft materials in a unified manner * Covers a vibrant research field with tremendous application potential in areas such as optoelectronics, photonics, and energy generation * Appeals to a large interdisciplinary audience because it is highly useful for researchers and engineers working on photonics, optoelectronics, imaging and sensing, nanotechnology, and energy materials Photoactive Functional Soft Materials: Preparation, Properties and Applications focuses on the design and fabrication of photoactive functional soft materials for materials science, nanophotonics, nanotechnology, and biomedical applications. Advanced Processing, Properties, and Applications of Starch and Other Bio-based Polymers presents the latest cutting-edge research into the processing and applications of bio-based polymers, for novel industrial applications across areas including biomedical and electronics. The book is divided into three sections, covering processing and manufacture, properties, and applications. Throughout the book, key aspects of sustainability are considered, including improved utilization of available natural resources, sustainable design possibilities, cleaner production processes, and waste management. Focuses on starch-based polymers, examining the latest advances in processing and applications with this valuable category of biopolymer Highlights industrial sustainability considerations at all steps of the process, including when sourcing materials, designing and producing products, and dealing with waste Supports the processing and development of starch and other bio-based polymers with enhanced functionality for advanced applications Starchy Crops Morphology, Extraction, Properties and Applications is the first volume of the "Underground Starchy Crops of South American Origin" book series. Organized in five volumes, this series

brings information on the applied level of producing and using starch from a range of plants grown in tropical and subtropical areas that have South American origin. This book presents the characteristics and properties of starches for raw materials grown in tropical climates. It allows comparing starches from 3 types of storage organs, roots, tubers and rhizomes, with different morphological structures and physiology. It contains the methodologies of extraction and analysis, describing the commercial process with the commercial equipment's and its by-products and wastes. It also includes topics on fraud detection, nutritional aspects, and starch structure. Edited by a team of experts with solid background on starch extraction research, the books are aimed at all those involved in research and development as well as quality control and legislation in the field of starch. Offers an overview on the applied level of producing and using starch from a range of plants grown in tropical and subtropical areas that have South America origin Brings physiological differences of starch and how it relates to their performance and application Thoroughly explores the structure of starch polysaccharides, analyses, industrial modifications, extraction, processing, applications, adulteration, and economic and legislative aspects This eBook is a collection of articles from a Frontiers Research Topic. Frontiers Research Topics are very popular trademarks of the Frontiers Journals Series: they are collections of at least ten articles, all centered on a particular subject. With their unique mix of varied contributions from Original Research to Review Articles, Frontiers Research Topics unify the most influential researchers, the latest key findings and historical advances in a hot research area! Find out more on how to host your own Frontiers Research Topic or contribute to one as an author by contacting the Frontiers Editorial Office: frontiersin.org/about/contact. Polymer nanocomposites are polymer matrices reinforced with nano-scale fillers. This new class of composite materials has shown improved mechanical and physical properties. The latter include enhanced optical, electrical and dielectric properties. This important book begins by examining the characteristics of the main types of polymer nanocomposites, then reviews their diverse applications. Part one focuses on polymer/nanoparticle composites, their synthesis, optical properties and electrical conductivity. Part two describes the electrical, dielectric and thermal behaviour of polymer/nanoplatelet composites, whilst polymer/nanotube composites are the subject of Part three. The processing and industrial applications of these nanocomposite materials are discussed in Part four, including uses in fuel cells, bioimaging and sensors as well as the manufacture and applications of electrospun polymer nanocomposite fibers, nanostructured transition metal oxides, clay nanofiller/epoxy nanocomposites, hybrid epoxy-silica-rubber nanocomposites and other rubber-based nanocomposites. Polymer nanocomposites: Physical properties and applications is a valuable reference tool for both the research community and industry professionals wanting to learn about the these materials and their applications in such areas as fuel cell, sensor and biomedical technology. Examines the characteristics of the main types of polymer nanocomposites and reviews their diverse applications Comprehensively assesses polymer/nanoparticle composites exploring experimental techniques and data associated with the conductivity and dielectric characterization A specific section on polymer/nanotube composites features electrical and dielectric behaviour of polymer/carbon nanotube composites Polyphenols: Properties, Recovery, and Applications covers polyphenol

properties, health effects and new trends in recovery procedures and applications. Beginning with coverage of the metabolism and health effects of polyphenols, the book then addresses recovery, analysis, processing issues and industrial applications. The book not only connects the properties and health effects of polyphenols with recovery, processing and encapsulation issues, but also explores industrial applications that are affected by these aspects, including both current applications and those under development. Covers the properties and health effects of polyphenols, along with trends in recovery procedures and applications Addresses recovery, analysis and processing issues Concludes with coverage of the industrial applications of polyphenols This volume presents advanced synthesis techniques for fabricating Perovskite materials with enhanced properties for applications such as energy storage devices, photovoltaics, electrocatalysis, electronic devices, photocatalysts, sensing, and biomedical instruments. The book attempts to fill a gap in the published literature and provide a detailed reference on Perovskite materials. This book will be of use to graduate students and academic and industrial researchers in the fields of solid-state chemistry, physics, materials science, and chemical engineering. This book provides a comprehensive introduction to the study of polymers. Special emphasis is given to the characteristics that set polymers apart from small molecules, as studied in classic chemistry courses. The various branches of polymer science are introduced and discussed in a systematic manner, starting from basic chemical structures, continuing through supermolecular organization and physical properties. Specific examples are used throughout to illustrate how end usage relates to the principles under discussion. A series of chapters is devoted to case studies describing the principal classes of synthetic polymers. Content includes: - Polymerization - Characterization of Polymers - Rheological Description of Polymer Melts - Structural Development - Properties - Compounding and Extrusion Processes - Molding processes - Additional Methods of Manufacture - Commodity Polymers - Engineering Thermoplastics - Neat Stuff Focusing on the uses of lead in pure or alloy form for engineering applications, this text presents data on the physical, mechanical, corrosive, accoustic, damping and nuclear properties of lead and lead alloys. It organizes information according to alloy type in tables, graphs and text, and examines the processing of commercially available lead products, including casting, rolling, extrusion, machining, welding and mechanical joining techniques. "Presents the latest research on the flow and structure of complex particulate sustemsions, the adsorption behavior of polymers, and the consolidation behavior and mechanical properties of films. Highlights recent advances in polymer functionality, conformation, and chemistry for biological, biomedical, and industrial applications."

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- Properties And Applications Of Silicon Carbide
- Polymer And Ceramic Composite Materials

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- Engineering Thermoplastics
- Nanodiamonds
- Fundamentals Properties And Applications Of Polymer Nanocomposites
- Gold
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- Functionalized Inorganic Semiconductor Nanomaterials Characterization Properties And Applications
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- Processing Properties And Applications Of Glass And Optical Materials
- Revolution Of Perovskite
- Polyphenols Properties Recovery And Applications
- Alumina
- Functional Marine Biomaterials
- Zeolites In Catalysis
- Carbon Nanomaterials
- Silicene
- Polymer Chemistry
- The Chemistry And Technology Of Cellulosic Copolymers
- Ionomers
- Polymers In Particulate Systems