Synthesis Of Amorphous Carbon Nitride By Ion Implantation

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Pure and Functionalized Carbon Based Nanomaterials

Sintering of Advanced Materials

2D Nanomaterials for Energy and Environmental Sustainability

Carbon Related Materials

Graphene Science Handbook, Six-Volume Set

Nanoscale Graphitic Carbon Nitride

Nanomaterials Handbook

Synthesis, Processing and Application of Micro and Nanostructured Materials

Diamond, Diamond-like Carbon and Related Materials

Research Photocatalytic Functional Materials for Environmental Remediation

Chemical Vapor Deposition for Nanotechnology

JJAP Reactive Sputter Deposition

Synthesis and Properties of Advanced Materials

Handbook of Carbon-Based Nanomaterials

New Developments in Crystal Growth Research

Amorphous and Nanostructured Carbon: Volume 593

Advances in Information Storage Systems

Graphene Science Handbook

Handbook of Thin Films, Five-Volume Set

Nanomaterials and Nanocomposites for Environmental Remediation

Comprehensive Materials Processing

Nanocarbons for Advanced Energy Conversion

Handbook of Industrial Diamonds and Diamond Films

B–C–N Nanotubes and Related Nanostructures

Tetrahedrally Bonded Amorphous Carbon Films

ISolar-to-Chemical Conversion Handbook of Nanophase and Nanostructured Materials:

Materials, systems and applications II

Water Pollution and Remediation: Photocatalysis

Cement-based Composites

Science and Technology for Emerging Economies

Japanese Journal of Applied Physics

Materials Modification and Synthesis by Ion Beam: Volume 438

Pure and Functionalized Carbon Based Nanomaterials

This book commemorates the “Nobel Laureate Professor Suzuki Special Symposium” at the International Union of Material Research Society–International Conference on Advanced Materials (IUMRS–ICAM2017), which was held at Kyoto University, Japan, in 2017. The book begins with a foreword by Professor Akira Suzuki. Subsequently, many authors who attended the special symposium describe the latest scientific advances in the field of carbon materials and carbon nanomaterials including polymers, carbon nanocomposites, and graphene. Carbon-based materials have recently been the focus of considerable attention, given their wide range of potential applications. Fittingly, the chapters in this book cover both experimental and theoretical approaches in several categories of carbon-related materials.

Sintering of Advanced Materials

A comprehensive volume on photocatalytic functional materials for environmental remediation. As the need for removing large amounts of pollution and contamination in air, soil, and water grows, emerging technologies in the field of environmental remediation are of increasing importance. The use of photocatalysis—a green technology with enormous
potential to resolve the issues related to environmental pollution—breaks down toxic organic compounds to mineralized products such as carbon dioxide and water. Due to their high performance, ease of fabrication, long-term stability, and low manufacturing costs, photofunctional materials constructed from nanocomposite materials hold great potential for environmental remediation. Photocatalytic Functional Materials for Environmental Remediation examines the development of high performance photofunctional materials for the treatment of environmental pollutants. This timely volume assembles and reviews a broad range of ideas from leading experts in fields of chemistry, physics, nanotechnology, materials science, and engineering. Precise, up-to-date chapters cover both the fundamentals and applications of photocatalytic functional materials. Semiconductor-metal nanocomposites, layered double hydroxides, metal-organic frameworks, polymer nanocomposites, and other photofunctional materials are examined in applications such as carbon dioxide reduction and organic pollutant degradation. Providing interdisciplinary focus to green technology materials for the treatment of environmental pollutants, this important work: Provides comprehensive coverage of various photocatalytic materials for environmental remediation useful for researchers and developers Encompasses both fundamental concepts and applied technology in the field Focuses on novel design and application of photocatalytic materials used for the removal of environmental contaminates and pollution Offers in-depth examination of highly topical green-technology solutions Presents an interdisciplinary approach to environmental remediation Photocatalytic Functional Materials for Environmental Remediation is a vital resource for researchers, engineers, and graduate students in the multi-disciplinary areas of chemistry, physics, nanotechnology, environmental science, materials science, and engineering related to photocatalytic environmental remediation.

2D Nanomaterials for Energy and Environmental Sustainability

Even before it was identified as a science and given a name, nanotechnology was the province of the most innovative inventors. In medieval times, craftsmen, ingeniously employing nanometer-sized gold particles, created the enchanting red hues found in the gold ruby glass of cathedral windows. Today, nanomaterials are being just as creatively used to improve old products, as well as usher in new ones. From tires to CRTs to sunscreens, nanomaterials are becoming a part of every industry. The Nanomaterials Handbook provides a comprehensive overview of the current state of nanomaterials. Employing terminology familiar to materials scientists and engineers, it provides an introduction that delves into the unique nature of nanomaterials. Looking at the quantum effects that come into play and other characteristics realized at the nano level, it explains how the properties displayed by nanomaterials can differ from those displayed by single crystals and conventional microstructured, monolithic, or composite materials. The introduction is followed by an in-depth investigation of carbon-based nanomaterials, which are as important to nanotechnology as silicon is to electronics. However, it goes beyond the usual discussion of nanotubes and nanofibers to consider graphite whiskers, cones and polyhedral crystals, and nanocrystalline diamonds. It also provides significant new information with regard to nanostructured semiconductors, ceramics, metals, biomaterials, and polymers, as well as nanotechnology’s application in drug delivery systems, biomplants, and field-emission displays. The Nanomaterials Handbook is edited by world-renowned nanomaterials scientist Yury Gogotsi, who has recruited his fellow-pioneers from academia, national laboratories, and industry, to provide coverage of the latest material developments in America, Asia, Europe, and Australia.
Carbon Related Materials

Graphene Science Handbook, Six-Volume Set

Nanoscale Graphitic Carbon Nitride focuses on multi-functional applications including energy conversion, storage and healthcare. Polymeric graphitic carbon nitride materials have attracted much attention in recent years because of their similarity to graphene. They are composed of carbon, nitrogen and some minor hydrogen content. In contrast to graphene, g-Graphitic carbon nitride is a medium band-gap semiconductor and in that role an effective photocatalyst and chemical catalyst for a broad variety of reactions and applications. This book covers the fundamentals and applications of graphitic carbon nitride (g-C3N4) in different sectors. It also covers the application of graphitic carbon nitride-based composites with metal, metal oxides, metal sulphide and carbon-based materials. This is an important resource for researchers in the fields of materials science, engineering, energy storage and chemical engineering who want to understand how nanoscale graphitic carbon nitride is being used for a range of industrial applications and processes. Outlines the major properties of nanoscale graphitic carbon nitride, along with their major application areas Assesses the challenges of manufacturing graphitic carbon nitride on a mass scale Explains major synthesis methods for nanoscale graphitic carbon nitride

Nanoscale Graphitic Carbon Nitride

In this second volume in the first book series on nanocarbons for advanced applications the highly renowned series and volume editor has put together a top author team of internationally acclaimed experts on carbon materials. Divided into three major parts, this reference provides a current overview of the design, synthesis, and characterization of nanocarbons, such as carbon nanotubes, fullerenes, graphenes, and porous carbons for energy conversion applications. It covers such varied topics as electrocatalysts for oxygen reduction reactions in the different types of fuel cells, metal-air batteries and electrode materials for photovoltaic devices, as well as photocatalysts, electrocatalysts and photoelectrocatalysts for water splitting. Throughout, the authors highlight the unique aspects of nanocarbon materials in these fields, with a particular focus on the physico-chemical properties which lead to enhanced device performances.

Nanomaterials Handbook

The preparation of stoichiometric sp(sup 2)-bonded amorphous carbon nitride a-C3N4 in gram quantities was successfully achieved by performing a solid-state reaction of cyanuric halides C3N3X3 (X=Cl, F) with lithium nitride L3N at temperatures 300–380 deg C. Addition of boron precursors, e. g., NaBF4, resulted in preparation of a nitrogen-rich BC-N powder of approximately B3C3N7 composition and showing thermal stability up to temperatures of 1000 deg C. The densification of micronized powders by cold isothermal pressing has produced disk-shaped ceramics of C3N4 and B-C-N materials, being lighter than graphite and boron nitride h-BN, respectively. Further modification of the reaction by
introduction of porous substrates and templates has led to preparation of a previously unknown material - sphere-shaped nanoscale-size carbon nitride built by stacking of curved C3N4 layers. Preliminary high pressure/high temperature experiments with the C3N4 powder as precursor have demonstrated that the structure of carbon nitride changes under pressures of 8 to 12 Gpa from amorphous to a more ordered graphite-like one, retaining the C3N4 stoichiometry at temperatures up to 500 deg C and losing nitrogen at higher temperatures. The overall amorphous morphology of the carbon nitride has so far precluded the generation of a secondary electron emission by this material during the tests performed. Continuing attempts to prepare crystalline carbo-nitride phases both by the high pressure treatment of amorphous powder precursors and by an appropriate synthetic routes designed are in progress in our laboratory.

Synthesis, Processing and Application of Micro and Nanostructured Materials

Diamond, Diamond-like Carbon and Related Materials

This book describes in a comprehensive manner latest studies conducted by various research groups worldwide focusing on carbon and related nanomaterials. Fourteen chapters of this book deal with a number of key research topics and applications of pure and functionalized carbon nanomaterials and their hybrid nanocomposites. Specifically, the authors have presented interdisciplinary investigations including: (i) carbon nanoparticles and layers synthesis, (ii) analytical aspects of carbon nanomaterials and their characterisation under different conditions as well as (iii) various applications of carbon nanoparticles. They have reported and summarised key applications of carbon particles or nanoobjects in pharmacy, biomedicine, agriculture and food industry, water treatment, physicochemical analysis, optoelectronics, electronic and magnetic materials for supercapacitors or radar adsorbing materials, tribology, chromatography, electrophoresis, bioanalysis, nanobiocatalysis, biofuels production as well as environmental remediation.

Materials Research

Diamond-based composites, with their advantages of hardness, high Young's modulus and the like, have demonstrated new and unusual features, such as stability to high temperatures and pressure shocks and a large internal surface that can be controlled to offer customised electrical, magnetic and optical properties, leading to efficient filters, absorbents, sensors and other tools for environmental control and monitoring. The current book covers the synthesis of materials, their characterization and properties, trends in high pressure and high temperature technologies, low pressure technologies, basic principles of DBC material science, and future developments in electronics, optics, industrial tools and components, biotechnology, and medicine. Wide band-gap materials are considered, ranging from molecular clusters, nanophase materials, growth, processing and synthesis. The processing of composite based materials can be classified into six basic methods: in situ growth, high pressure/high temperature catalytic conversion; mix and sinter (c-BN plus metal-ceramic polymer mix); direct sintering; direct polymeric conversion; shock detonation; and SHS sintering.
Chemical vapor deposition (CVD) techniques have played a major role in the development of modern technology, and the rise of nanotechnology has further increased their importance, thanks to techniques such as atomic layer deposition (ALD) and vapor liquid solid growth, which are able to control the growth process at the nanoscale. This book aims to contribute to the knowledge of recent developments in CVD technology and its applications. To this aim, important process innovations, such as spatial ALD, direct liquid injection CVD, and electron cyclotron resonance CVD, are presented. Moreover, some of the most recent applications of CVD techniques for the growth of nanomaterials, including graphene, nanofibers, and diamond-like carbon, are described in the book.

Chemical Vapor Deposition for Nanotechnology

Examines both mined and synthetic diamonds and diamond films. The text offers coverage on the use of diamond as an engineering material, integrating original research on the science, technology and applications of diamond. It discusses the use of chemical vapour deposition grown diamonds in electronics, cutting tools, wear resistant coatings, thermal management, optics and acoustics, as well as in new products.

JJAP

This book presents the status quo of the structure, preparation, properties and applications of tetrahedrally bonded amorphous carbon (ta-C) films and compares them with related film systems. Tetrahedrally bonded amorphous carbon films (ta-C) combine some of the outstanding properties of diamond with the versatility of amorphous materials. The book compares experimental results with the predictions of theoretical analyses, condensing them to practicable rules. It is strictly application oriented, emphasizing the exceptional potential of ta-C for tribological coatings of tools and components.

Reactive Sputter Deposition

This comprehensive book systematically covers the fundamentals in solar energy conversion to chemicals, either fuels or chemical products. It includes natural photosynthesis with emphasis on artificial processes for solar energy conversion and utilization. The chemical processes of solar energy conversion via homogeneous and/or heterogeneous photocatalysis has been described with the mechanistic insights. It also consists of reaction systems toward a variety of applications, such as water splitting for hydrogen or oxygen evolution, photocatalytic CO2 reduction to fuels, and light driven N2 fixation, etc. This unique book offers the readers a broad view of solar energy utilization based on chemical processes and their perspectives for future sustainability.
Synthesis and Properties of Advanced Materials

Handbook of Carbon-Based Nanomaterials

This five-volume handbook focuses on processing techniques, characterization methods, and physical properties of thin films (thin layers of insulating, conducting, or semiconductor material). The editor has composed five separate, thematic volumes on thin films of metals, semimetals, glasses, ceramics, alloys, organics, diamonds, graphites, porous materials, noncrystalline solids, supramolecules, polymers, copolymers, biopolymers, composites, blends, activated carbons, intermetallics, chalcogenides, dyes, pigments, nanostructured materials, biomaterials, inorganic/polymer composites, organoceramics, metallocenes, disordered systems, liquid crystals, quasicrystals, and layered structures. Thin films is a field of the utmost importance in today’s materials science, electrical engineering and applied solid state physics; with both research and industrial applications in microelectronics, computer manufacturing, and physical devices. Advanced, high-performance computers, high-definition TV, digital camcorders, sensitive broadband imaging systems, flat-panel displays, robotic systems, and medical electronics and diagnostics are but a few examples of miniaturized device technologies that depend the utilization of thin film materials. The Handbook of Thin Films Materials is a comprehensive reference focusing on processing techniques, characterization methods, and physical properties of these thin film materials.

New Developments in Crystal Growth Research

Comprehensive Materials Processing provides students and professionals with a one-stop resource consolidating and enhancing the literature of the materials processing and manufacturing universe. It provides authoritative analysis of all processes, technologies, and techniques for converting industrial materials from a raw state into finished parts or products. Assisting scientists and engineers in the selection, design, and use of materials, whether in the lab or in industry, it matches the adaptive complexity of emergent materials and processing technologies. Extensive traditional article-level academic discussion of core theories and applications is supplemented by applied case studies and advanced multimedia features. Coverage encompasses the general categories of solidification, powder, deposition, and deformation processing, and includes discussion on plant and tool design, analysis and characterization of processing techniques, high-temperatures studies, and the influence of process scale on component characteristics and behavior. Authored and reviewed by world-class academic and industrial specialists in each subject field Practical tools such as integrated case studies, user-defined process schemata, and multimedia modeling and functionality Maximizes research efficiency by collating the most important and established information in one place with integrated applets linking to relevant outside sources.

Amorphous and Nanostructured Carbon: Volume 593
Advances in Information Storage Systems (AISS), volumes 9 & 10, are special volumes which contain selected papers regarding not only information storage but also information equipment in general and related technologies. The papers were presented at the International Conference on Micromechatronics for Information and Precision Equipment (MIPE '97). MIPE '97 was held in Tokyo, Japan, from 20 to 23 July 1997, as one of the memorial events of the Centennial Grand Congress of the Japan Society of Mechanical Engineers. Information and precision equipment is fast-changing high technology, and is necessary for the development of an international multimedia society and essential for the innovation of conventional machines as well as the creation of new sophisticated machines for future medical, biological and cosmic industries in the 21st century. Information and precision equipment can improve their performances by analyzing, designing, fabricating, controlling and then utilizing a smaller and smaller world in space and time. Micromechatronics is not only a major interdisciplinary engineering but also the principle of innovation in such machines. In the light of this, the scope of MIPE '97 ranged from the micromechanics and micromechatronics of information storage, input/output devices, and precision equipment to microtechnologies related to information equipment. The papers in AISS special volumes are mainly related to information storage, particularly magnetic recording storage. But some of them are related to printer, paper-feeding-mechanism and micromachine technologies, which will directly or indirectly contribute future information devices. The papers contained in this series are of international archival quality and are refereed according to rigorous journal standards. Volume 9 contains papers on the mechanics and tribology of magnetic recording storage systems (mainly hard disk drives), while papers on the micromechatronics of the head-positioning system in magnetic disk storage are compiled in Volume 10 together with papers on optical disk storage and others.

**Advances in Information Storage Systems**

In the context of climate change and fossil fuel pollution, solar energy appears as a cheap and sustainable fuel for many environmental applications, yet the efficiency of techniques has to be improved. This book reviews recent methods and applications of photocatalysis for the treatment of wastewater containing bacteria, heavy metals, organic pollutants, dyes and tannery effluents. Basics of water pollution, polluted river ecosystems and membranes are also detailed.

**Graphene Science Handbook**

Synthesis and Properties of Advanced Materials provides an overview of some of the most exciting developments in advanced materials. The book contains review papers based on tutorial lectures given at The First Pan American Advanced Study Institute held in Merida, Mexico, 1995. Each paper serves as a comprehensive introduction and review to the topic covered. Topics included: diamond and related materials, nanocrystalline metals and ceramics, Co-based alloys for biomedical applications, high-temperature superconductivity materials, composite materials, cement-based materials, ion-implanted ceramics and structural ceramics. Each chapter emphasizes the relationships among processing parameters, microstructure and properties. Synthesis and Properties of Advanced Materials provides an excellent review of the state of the art in advanced materials for the working engineer or researcher. Students will also find this text an accessible
introduction to the field.

Handbook of Thin Films, Five-Volume Set

Contributed articles with reference to India.

Nanomaterials and Nanocomposites for Environmental Remediation

Comprehensive Materials Processing

The book is focused on nanostructured materials, which have been well-studied in various fields from life to materials sciences. Nanostructured science has the potential to help make revolutionary discoveries based on modifying the properties of these materials compared with micro-structured materials. Nanostructured materials are the key to discovering new products based on new technologies. This book is focused on presenting new state-of-the-art methods for the synthesis and processing of nanostructured materials. These materials can be used in both in life and materials science with applications from biomedical devices, drug delivery systems, medical imaging with multiferoic materials, high-energy batteries, capacitors, superconductors, and aerospace components.

Nanocarbons for Advanced Energy Conversion

Sintering is a method for manufacturing components from ceramic or metal powders by heating the powder until the particles adhere to form the component required. The resulting products are characterised by an enhanced density and strength, and are used in a wide range of industries. Sintering of advanced materials: fundamentals and processes reviews important developments in this technology and its applications Part one discusses the fundamentals of sintering with chapters on topics such as the thermodynamics of sintering, kinetics and mechanisms of densification, the kinetics of microstructural change and liquid phase sintering. Part two reviews advanced sintering processes including atmospheric sintering, vacuum sintering, microwave sintering, field/current assisted sintering and photonic sintering. Finally, Part three covers sintering of aluminium, titanium and their alloys, refractory metals, ultrahard materials, thin films, ultrafine and nanosized particles for advanced materials. With its distinguished editor and international team of contributors, Sintering of advanced materials: fundamentals and processes reviews the latest advances in sintering and is a standard reference for researchers and engineers involved in the processing of ceramics, powder metallurgy, net-shape manufacturing and those using advanced materials in such sectors as electronics, automotive and aerospace engineering. Explores the thermodynamics of sintering including sinter bonding and densification Chapters review a variety of sintering methods including atmosphere, vacuum, liquid phase and microwave sintering Discusses sintering of a variety of materials featuring refractory metals, super hard materials and functionally graded materials
Handbook of Industrial Diamonds and Diamond Films

There has been tremendous development in the science of carbon in past years. First came the development of the chemical vapor deposition of diamond, followed by the discovery of a new class of molecules— the fullerenes. Carbon nanotubes were discovered and techniques were developed to deposit new phases of amorphous carbon containing mainly sp3 bonding. This book brings together scientists and engineers from all areas of carbon research, both sp2 and sp3 bonded, from the fully amorphous to nanostructured carbon, to the highly ordered nanotubes. It covers a range of subjects including the synthesis and properties of nanotubes, as well as diamond-like carbon deposition and properties. Applications range from nanotubes for hydrogen storage, to electrochemical double-layer capacitors (supercapacitors), field emission displays, hard coatings, and carbon coatings for magnetic storage technology. The book deals with the growth, characterization, properties and applications of nanotubes and field emission from all varieties of carbon, amorphous and diamond-like carbon growth, properties and applications. It also contains papers on diamond, silicon carbide, carbon nitride and beryllium films.

B-C-N Nanotubes and Related Nanostructures

This thesis describes novel strategies for the rational design of several cutting-edge high-efficiency photocatalysts, for applications such as water photooxidation, reduction, and overall splitting using a Z-Scheme system. As such, it focuses on efficient strategies for reducing energy loss by controlling charge transfer and separation, including novel faceted forms of silver phosphate for water photooxidation at record high rates, surface-basic highly polymerised graphitic carbon nitride for extremely efficient hydrogen production, and the first example of overall water splitting using a graphitic carbon nitride-based Z-Scheme system. Photocatalytic water splitting using solar irradiation can potentially offer a zero-carbon renewable energy source, yielding hydrogen and oxygen as clean products. These two ‘solar’ products can be used directly in fuel cells or combustion to provide clean electricity or other energy. Alternatively they can be utilised as separate entities for feedstock-based reactions, and are considered to be the two cornerstones of hydrogenation and oxidation reactions, including the production of methanol as a safe/portable fuel, or conventional catalytic reactions such as Fischer-Tropsch synthesis and ethylene oxide production. The main driving force behind the investigation is the fact that no photocatalyst system has yet reported combined high efficiency, high stability, and cost effectiveness; though cheap and stable, most suffer from low efficiency.

Tetrahedrally Bonded Amorphous Carbon Films I

This book highlights plasma science and technology-related research and development work at institutes and universities networked through Asian African Association for Plasma Training (AAAPT) which was established in 1988. The AAAPT, with 52 member institutes in 24 countries, promotes the initiation and intensification of plasma research and development through cooperation and technology sharing. With 13 chapters on fusion-relevant, laboratory and industrial plasmas for wide range of applications and basic research and a chapter on AAAPT network, it demonstrates how, with collaborations,
high-quality, industrially relevant academic and scientific research on fusion, industrial and laboratory plasmas and plasma diagnostics can be successfully pursued in small research labs. These plasma sciences and technologies include pioneering breakthroughs and applications in (i) fusion relevant research in the quest for long-term, clean energy source development using high-temperature, high-density plasmas and (ii) multibillion-dollar, low-temperature, non-equilibrium and thermal industrial plasmas used in processing, synthesis and electronics.

**Solar-to-Chemical Conversion**

This book offers an international discussion of materials science issues related to ion-beam modification and processing. In addition to work on optical materials, metals, insulators and polymers, two areas of considerable interest are electronic materials and hard coatings. Substantial attention is focused on silicon technology and critical microstructural issues pertaining to ion-beam processing of silicon, such as transient-enhanced diffusion (TED) and defect/damage behavior, are examined. The emergence of plasma ion implantation (PII) as a major breakthrough for shallow-implant, large-area processing together with the issue of hard coatings is also featured. Considerable discussion centers on the synthesis of novel metastable materials such as carbon nitride, amorphous carbon (DLC), multilayers and nanophases. Topics include: silicon; compound semiconductors, wide bandgap materials, silicides; plasma ion implantation, low-energy deposition techniques; nanocrystalline and other optical materials; polymers; novel applications and techniques; nitride films and hard coatings and oxidation and corrosion behavior.

**Handbook of Nanophase and Nanostructured Materials: Materials, systems and applications II**

Carbon nanotubes (CNTs) and Boron nitride nanotubes (BNNTs) are part of the so-called B-C-N material system, which includes novel nanostructures of carbon (C), doped-carbon, boron (B), boron nitride (BN), carbon nitride (CNx), boron-carbon nitride (BxCyNz), and boron carbide (BxCy). BNNTs and CNTs are structurally similar and share extraordinary mechanical properties, but they differ in chemical, biological, optical, and electrical properties. Therefore, hybrid nanotubes constructed of B, C, N elements are expected to form a new class of nanotubes with tunable properties between those of CNTs and BNNTs. In addition, these B-C-N nanostructures will further enhance and complement the applications of CNTs and BNNTs. With contributions from leading experts, B-C-N Nanotubes and Related Nanostructures is the first book to cover all theoretical and experimental aspects of this emerging material system, and meets the need for a comprehensive summary of the tremendous advances in research on B-C-N materials in recent years.

**Water Pollution and Remediation: Photocatalysis**

This monograph focuses on recent development of nanomaterials and nanocomposites for pollution measurement and their control in water, air, and soil. The contents incorporate carbon-based, metal-based, and metal-organic framework based nanomaterials and nanocomposites for emerging contaminants (pharmaceuticals and personal care products) degradation, disinfection, and other traditional pollutants degradation and removal. The book also offers updated literature for
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researchers and academicians working in the field of environmental remediation by nanomaterials. Readers will learn about different metal and non-metal based nanoparticles for environmental remediation. It will be a useful guide for professionals, and post-graduate students involved in material science & engineering, chemical engineering and environmental nanotechnology research.

Cement-Based Composites

Handbook of Carbon-Based Nanomaterials provides a comprehensive overview of carbon-based nanomaterials and recent advances in these specialized materials. This book opens with a brief introduction to carbon, including the different forms of carbon and their range of uses. Each chapter systematically covers a different type of carbon-based nanomaterial, including its individual characteristics, synthesis techniques and applications in industry, biomedicine and research. This book offers a broad handbook on carbon-based nanomaterials, detailing the materials aspects, applications and recent advances of this expansive topic. With its global team of contributing authors, Handbook of Carbon-Based Nanomaterials collates specific technical expertise from around the world, for each type of carbon-based nanomaterial. Due to the broad nature of the coverage, this book will be useful to an interdisciplinary readership, including researchers in academia and industry in the fields of materials science, engineering, chemistry, energy and biomedical engineering. Covers a range of carbon-based nanomaterials, including graphene, fullerenes and much more.

Describes key properties, synthesis techniques and characterization of each carbon-based nanomaterial Discusses a range of applications of carbon-based nanomaterials, from biomedicine to energy applications

Amorphous Nanomaterials

New Developments In Crystal Growth


Examines the Low Resistivity, High Mobility, and Zero Bandgap of Graphene The Graphene Science Handbook is a six-volume set that describes graphene’s special structural, electrical, and chemical properties. The book considers how these properties can be used in different applications (including the development of batteries, fuel cells, photovoltaic cells, and supercapacitors based on graphene) and produced on a massive and global scale. Volume One: Fabrication Methods Volume Two: Nanostructure and Atomic Arrangement Volume Three: Electrical and Optical Properties Volume Four: Mechanical and Chemical Properties Volume Five: Size-Dependent Properties Volume Six: Applications and Industrialization This handbook describes the fabrication methods of graphene; the nanostructure and atomic arrangement of graphene; graphene’s electrical and optical properties; the mechanical and chemical properties of graphene; the size effects in graphene, characterization, and applications based on size-affected properties; and the application and industrialization of graphene. Volume two is dedicated to nanostructure and atomic arrangement and covers: The potential applications of graphene heterostructures, particularly, graphene/h-BN heterostructures Atomic-scale defects in graphene
Investigation into High Efficiency Visible Light Photocatalysts for Water Reduction and Oxidation


Official Gazette of the United States Patent and Trademark Office

Because of unique water properties, humidity affects materials and many living organisms, including humans. Humidity control is important in various fields, from production management to creating a comfortable living environment. The range of materials that can be used in the development of humidity sensors is very broad, and the third volume of the Handbook of Humidity Measurement offers an analysis on various humidity-sensitive materials and sensor technologies used in the fabrication of humidity sensors and methods acceptable for their testing. Additional features include: numerous strategies for the fabrication and characterization of humidity-sensitive materials and sensing structures used in sensor applications, methods and properties to develop smaller, cheaper, more robust, and accurate devices with better sensitivity and stability, a guide to sensor selection and an overview of the humidity sensor market, and new technology solutions for integration, miniaturization, and specificity of the humidity sensor calibration. Handbook of Humidity Measurement, Volume 3: Sensing Materials and Technologies provides valuable information for practicing engineers, measurement experts, laboratory technicians, project managers in industries and national laboratories, and university students and professors interested in solutions to humidity measurement tasks. Despite the fact that this book is devoted to the humidity sensors, it can be used as a basis for understanding fundamentals of any gas sensor operation and development.
Handbook of Humidity Measurement, Volume 3

This Special Issue on “Cement-Based Composites: Advancements in Development and Characterization” presents the latest research and advances in the field of cement-based composites. This Special Issue covers a variety of experimental studies related to fiber-reinforced, photocatalytic, lightweight, and sustainable cement-based composites. Moreover, simulation studies are presented in this Special Issue to provide fundamental knowledge of designing and optimizing the properties of cementitious composites. The presented publications in this Special Issue show the most recent technology in the cement-based composite field.

Diamond Based Composites

Plasma Science and Technology for Emerging Economies

In this valuable work, all aspects of the reactive magnetron sputtering process, from the discharge up to the resulting thin film growth, are described in detail, allowing the reader to understand the complete process. Hence, this book gives necessary information for those who want to start with reactive magnetron sputtering, understand and investigate the technique, control their sputtering process and tune their existing process, obtaining the desired thin films.

Japanese Journal of Applied Physics

Materials Modification and Synthesis by Ion Beam: Volume 438

A valuable overview covering important fundamental and applicative aspects of amorphous nanomaterials! Amorphous nanomaterials are very important in non-crystalline solids, which have emerged as a new category of advanced materials. Compared to the crystalline counterpart, amorphous nanomaterials with isotropic nature always exhibit fast ion diffusion, relieved strain, and higher reactivity, enabling such materials to exhibit high performance in mechanics and catalysis, as well as other interesting properties. Amorphous Nanomaterials: Preparation, Characterization, and Applications covers the fundamental concept, synthesis, characterization, properties, and applications of nanoscaled amorphous materials. It starts with the introduction of amorphous materials, then gives a global view of the history, structure, and growth mechanism of amorphous nanomaterials. Subsequently, some powerful techniques to characterize amorphous materials, such as X-ray absorption fine structure spectroscopy, spherical aberration electron microscope, in-situ-Transmission Electron Microscope, Electron Energy Loss Spectroscopy, and some other defect characterization technologies are included. Furthermore, the emerging innovative methods to fabricate well-defined, regularshaped amorphous nanomaterials, including zero-, one-, two-, and three-dimensional amorphous nanomaterials are systematically
introduced. The fascinating properties and applications related to amorphous nanomaterials including the applications in electrocatalysis, batteries, supercapacitors, photocatalysis, mechanics, etc., are presented. It will greatly help the researchers to find professional answers related to amorphous materials. Great topic: amorphous nanomaterials are a very large and important field in both academia and industry Comprehensive: in-depth discussion of various important aspects, from both a fundamental and an applied point of view, on the chemistry, physics and technological importance of the amorphous nanomaterials are presented Vitally needed: the understanding of the fundamentals of amorphous nanomaterials is a prerequisite for devising new applications of such materials Highly relevant: amorphous nanomaterials have found specific applications in chemistry, catalysis, physics, sensing, batteries, supercapacitors, and engineering Amorphous Nanomaterials is a vital resource for materials scientists, inorganic and physical chemists, solid state chemists, physicists, catalytic and analytical chemists, as well as organic chemists.

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