History And Applications Of Diamond Like Carbon

What were the economic roots of modern industrialism? Were labor unions ever effective in raising workers' living standards? Did high levels of taxation in the past normally lead to economic decline? These and similar questions profoundly inform a wide range of intertwined social issues whose complexity, scope, and depth become fully evident in the Encyclopedia. Due to the interdisciplinary nature of the field, the Encyclopedia is divided not only by chronological and geographic boundaries, but also by related subfields such as agricultural history, demographic history, business history, and the histories of technology, migration, and transportation. The articles, all written and signed by international contributors, include scholars from Europe, Latin America, Africa, and Asia. Covering economic history in all areas of the world and segments of ecnomies from prehistoric times to the present, The Oxford Encyclopedia of Economic History is the ideal resource for students, economists, and general readers, offering a unique glimpse into this integral part of world history.

Here, leading scientists report on why and how diamond can be optimized for applications in bioelectronic and electronics. They cover such topics as growth techniques, new and conventional doping mechanisms, superconductivity in diamond, and excitonic properties, while application aspects include quantum electronics at room temperature, biosensors as well as diamond nanocantilevers and SAWs. Written in a review style to make the topic accessible for a wider community of scientists working in interdisciplinary fields with backgrounds in physics, chemistry, biology and engineering, this is essential reading for everyone working in environments that involve conventional electronics, biotechnology, quantum computing, quantum cryptography, superconductivity and light emission from highly excited excitonic systems.

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, bioimplants, 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.

Recent breakthroughs in the synthesis of diamond have led to increased availability at lower cost. This has spurred R&D into its characterization and application in machine tools, optical coatings, X-ray windows and light-emitting optoelectronic devices. In the longer term, diamond's high thermal conductivity and electron mobility make it potentially useful for integrated circuit applications (e.g. in heat sinks). This book draws together expertise from

some 60 researchers in the United States and Europe working on bulk and thin film diamond. All fully refereed, the contributions are combined to form a highly structured volume with reviews, evaluations, tables and illustrative material, together with expert guidance to the literature.

Cover -- Half Title -- Title -- Copyright -- Dedication -- Contents -- PREFACE -- 1 The Diamond -- 2 The Ancient World -- 3 Early Persia and the East -- 4 Medieval Europe -- 5 The Dawn of Diamond Cutting in Europe -- 6 The Fifteenth-Century Technical Revolution -- 7 Renaissance Table and Point Cuts -- 8 Renaissance Multifaceted Cuts -- 9 The Early Brilliant Cut -- 10 Diamond Cutting in London -- 11 The Value and Assessment of Diamonds -- 12 The Indian Diamond Mines -- 13 The Diamond Trade in India -- 14 Diamond Cutting in India and the East -- 15 The Eclipse of Indian Diamonds -- Epilogue -- APPENDIX: A 1675 Description of the Diamond Mines -- NOTES -- BIBLIOGRAPHY -- INDEX -- A -- B -- C -- D -- E -- F -- G -- H -- I -- J -- K -- L -- M -- N -- O -- P -- Q -- R -- S -- T -- T -- V -- W -- Y -- Z

'The Diamond Formula' offers the diamond industry and all interested parties a comprehensive text on synthetic diamonds, joining together the research, achievements, theories, experimental and analytical data by recognized experts in the field, while encompassing a gemmological interpretation. The book offers the average gemmologist, gemmological (or mineralogical) student, or interested party, a concise and easy to decipher overview of the synthesis of diamonds to date. Each of the elements and various topics have at some time been the subject of a lengthy and detailed text in their own right and references are used to ensure that the reader can follow up these leads. The text begins with the history of diamond synthesis, and the theories on which much of the early work was based, before discussing the principles on which the modern processes rely. The following chapters cover the advent of success, commercial applications, synthetic diamond products, producers, gemmological properties and identification of synthetic diamonds. The final section discusses briefly diamond synthesis by CVD and application for this technology. Comprehensive text for a wide market Easy to decipher overview of the synthesis of diamonds Detailed reference section for follow up work

This new edition presents information and knowledge on the field of biomedical devices and surgical tools. The authors look at the interactions between nanotechnology, nanomaterials, design, modeling, and tools for surgical and dental applications, as well as how nanostructured surfaces can be created for the purposes of improving cell adhesion between medical devices and the human body. Each original chapter is revised in this second edition and describes developments in coatings for heart valves, stents, hip and knee joints, cardiovascular devices, orthodontic applications, and regenerative materials such as bone substitutes. There are also 8 new chapters that address: Microvascular anastomoses Inhaler devices used for pulmonary delivery of medical aerosols Surface modification of interference screws Biomechanics of the mandible (a detailed case study) Safety and medical devices The synthesis of nanostructured material Delivery of anticancer molecules using carbon nanotubes Nano and micro coatings for medical devices This book is appropriate for engineers, material scientists, chemists, physicists, biologists, medical and dental professionals with an interest in biomedical devices and tools, and researchers in the same fields.

Cathodoluminescence microscopy/spectroscopy is a powerful technique providing detailed information on the shock metamorphism of target rocks, biosignatures of meteorites and mineralogy of the pre-solar grains. Moreover, it can be used as an in-situ method to classify the solid-atmospheric-liquid interactions on the surface of Mars.

Advances in Nanotechnology Research and Application: 2011 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Nanotechnology. The editors have built Advances in Nanotechnology

Research and Application: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Nanotechnology in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Advances in Nanotechnology Research and Application: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.

Every year, the world consumes more than 10,000 tons of diamond superabrasives, which are indispensable for fields such as construction, metals, ceramics, automobiles, semiconductors, computers, and cellular phones. In fact, the per capita consumption of superabrasives may be used as an indicator of a country's industrial activities. This volume presents several aspects of superhard materials, especially diamond superabrasives and their manufacture, properties, and applications, and introduces several new designs of ultrahard materials that may be harder than diamond. It discusses diamond's connection with the origin of life, in particular, the origin of the first RNA. In addition, it throws light on the concept of diamond quantum computers with neutrons of the carbon-13 isotope as quantum bits. This innovation may maintain quantum coherence with minimal interference without using complicated cryogenic cooling. Hence, it can be a robust design for future quantum computers. For those interested in the depth of the quantum mechanical world, a chapter elaborates the history of life and humanity in light of the evolution of quantum universes.

Carbon Nanomaterials: Modeling, Design, and Applications provides an in-depth review and analysis of the most popular carbon nanomaterials, including fullerenes, carbon nanotubes, graphene and novel carbon nanomaterial-based membranes and thin films, with emphasis on their modeling, design and applications. This book provides basic knowledge of the structures, properties and applications of carbon-based nanomaterials. It illustrates the fundamental structure-property relationships of the materials in both experimental and modeling aspects, offers technical guidance in computational simulation of nanomaterials, and delivers an extensive view on current achievements in research and practice, while presenting new possibilities in the design and usage of carbon nanomaterials. This book is aimed at both undergraduate and graduate students, researchers, designers, professors, and professionals within the fields of materials science and engineering, mechanical engineering, applied physics, and chemical engineering.

Diamond for Quantum Applications Part 1, Volume 103, the latest release in the Semiconductors and Semimetals series, highlights new advances in the field, with this new volume presenting interesting chapters on a variety of timely topics. Each chapter is written by an international board of authors. Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Semiconductors and Semimetals series Updated release includes the latest information on the use of diamonds for quantum applications

Diamond is an extreme material among possible atomic aggregations in nature, and as such has many extreme properties. This unique position makes it a fascinating subject

both for science and for applications. This has been particularly true in recent years, since the surprising discovery at Union Carbide (1953) of the possibility of chemical vapour deposition of diamond films at low pressures, where diamond is metastable with respect to graphite. This discovery cleared the way to the development of economical deposition techniques that have been obtaining progressively better-quality diamond, both pure and doped, in a controlled way and for a variety of applications. The remarkable properties and applications range from mechanical (the extreme hardness, tensile and compressive strength, wear performance) to thermal (the highest conductivity), optical (wide range of transparency), chemical (inertness to most chemicals), biological (biocompatibility) and electronic (high electronic carrier mobility, large band gap and dielectric breakdown strength, negative electron affinity), with the simultaneous presence of so many extraordinary qualities often resulting in added value for a given application.We are presently at a turning point in the development of diamond physics and applications. While some achievements can be considered well established, on the other hand, new opportunities and challenges are facing the scientific community, particularly with regard to novel exciting deposition processes and techniques or new properties and applications in electronics. This Enrico Fermi Course on "The Physics of Diamond" is particularly focused on the new developments and prospects, which may well constitute a reference point for a new generation of scientists at what may possibly be the beginning of a new age in diamond. The course attracted several of the most distinguished experts in the field as lecturers and an audience of almost as distinguished students and observers from 19 countries. Participation and discussions were lively to the very last day, ranging from traditional diamond physics to new diamond physics, and from well-known applications to the new exciting opportunities.The material in this volume is organized in the following way: the first part (13 lectures) is essentially devoted to growth and structure, the second part to properties and applications, with a closing lecture exploring new exotic diamonds in the distant future. The earlier lectures extensively cover the many processes of plasma chemical vapour deposition, including advanced contributions in theoretical modelling of these processes. Novel deposition mechanisms are considered: low-temperature CVD and laser-activated processes, including the so-called QQC experiments. This first part closes with a discussion of amorphous phases. In the second part, particular emphasis is placed on electronic properties and applications. This includes an extensive discussion of doping and, in addition, the promising perspectives of diamond as an electron emitter. Its newly discovered remarkable electron affinity properties lead to a new dimension in research and development, of great strategical importance for an increasing role of diamond in electronics.

The present thesis is the result of 15 years of continues efforts. The research work started in 1991 and has been completed by a final publication in 2005. The content of the thesis is composed of introductory parts (giving the reader an introduction into the later to be discussed subject) and articles published by the author. At this point the author would like to draw the attention to the fact that, due to the rather lengthy process of completion of the presented thesis, the references in the first chapters have not been updated with recent new publications on the subjects discussed and therefore reflect the knowledge state at the time the articles were written. The key subject of the thesis is carbon materials. In order to initiate the reader into the subject to be discussed in the

publications of the author, introductory chapters are found at the beginning of the present document. In the first chapter an historical overview on diamond and DLC is given. The history of diamond, starting with natural diamond and continuing with man made diamonds, is treated and examples of applications of diamond are described. Equally the history of Raman spectroscopy, an analysing method intensively used by the author, is presented. After the historic introduction, more technical background information is offered on the following subjects: carbon structure and properties ; Raman spectroscopy ; Diamond & DLC deposition methods Following these introductory chapters the scientific work accomplished by the author is presented. This is done introducing the different scientific articles published by the author. The first article deals with the deposition of diamond using the acetylene flame method. The key innovation presented by the author in this article is the use of a turbulent flame configuration, as the first researcher in this field, which allows for a quicker growth rate of the diamond deposit. The second article demonstrates the influence of flame turbulence on the growth of m.

A compelling narrative relating the dramatic history of diamond making.

The diamond is the hardest natural substance known. It is found in a type of igneous rock known as kimberlite. The diamond itself is essentially a chain of carbon atoms that have crystallized. The stone's unique hardness is a result of the densely concentrated nature of the carbon chains. Like other igneous rocks, kimberlite was formed over the course of thousands of years by volcanic action that occurred during the formation of the earth's crust. It is thought that diamonds were first discovered in India about 6,000 years ago in the riverbeds of the region. India was the only known source of the rocks for over a thousand years, until they were unearthed in Borneo around A.D. 600. During the Middle Ages, the diamond was overshadowed by some of the more colorful gems like the ruby and emerald. In the 18th century, diamond deposits were discovered in Brazil in small quantities, and later in Australia, Russia, and the United States. Block caving is the most commonly used method in excavating diamonds from kimberlite deposits. This method offers the highest yield and thus is the most cost effective. In the crushing operation, which occurs in the below-ground mining facilities, large chunks of kimberlite are broken up into more easily transportable segments. Diamonds will continue to be used in industry and hightechnology enterprises, but synthetically produced facsimiles--first manufactured in 1953--may accomplish some of the tasks originally the exclusive province of the real stone. These ""manufactured"" gems have the same properties of hardness and durability, and while they will never be as popular as the real diamond for adomment purposes, they are well suited for industrial applications.This book provides comprehensive overview on origin, exploration, and history of diamond.

Ultrananocrystalline Diamond: Syntheses, Properties, and Applications is a unique practical reference handbook that brings together the basic science of nanoscale carbon structures, particularly its diamond phase, with detailed information on nanodiamond synthesis, properties, and applications. Here you will learn about UNCD in its two forms, as a dispersed powder made by

detonation techniques and as a chemical vapor deposited film. You will also learn about the superior mechanical, tribological, transport, electrochemical, and electron emission properties of UNCD for a wide range of applications including MEMS, NEMS, surface acoustic wave (SAW) devices, electrochemical sensors, coatings for field emission arrays, photonic and RF switching, biosensors, and neural prostheses, and more. This ôEverything about Ultra-nanocrystalline Diamondö book with 16 chapters is written by leading experts worldwide. It is for everyone who researches carbon nanostructures, everyone who produces them, everyone who characterizes them, and everyone who builds devices using them.
Diamond for Quantum Applications Part Two, Volume 104, the latest release in the Semiconductors and Semimetals series, highlights new advances in the field, with this new volume presenting interesting chapters on a variety of timely topics including Color center formation by deterministic single ion implantation, Diamond and Its Investigation by Advanced TEM, Fundaments of photo-electric readout of spin states in diamond, Integrated quantum photonic circuits with polycrystalline diamond, Diamond Membranes, and Diamond nanophotonic and opt mechanics. Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Semiconductors and Semimetals series Updated release includes the latest information on the use of diamonds for quantum applications
Diamond offers many advantages over other wide-bandgap materials and thus is a very important material in engineering applications. It can be used in high-speed electronics and response systems as well as high-power laser windows, protective coatings, electrochemical sensors, and more. This book examines the properties, advantages, and potential applications of diamonds in engineering and other fields.
The book gives an overview on the current development status of synthetic diamond films and their applications. Its initial part is devoted to discuss the different types of conductive diamond electrodes that have been synthesized, their preparation methods, and their chemical properties and characterization. The electrochemical properties of diamond films in different scientific areas, with special attention in electroanalysis, are further described. Different strategies to modify these electrodes are also discussed as important technologies with ability to change their electrochemical characteristics for a more specific electroanalytical use. The second part of the book deals with practical applications of diamond electrodes to the industry, organic electrosynthesis, electrochemical energy technology, and biotechnology. Special emphasis is made on the properties of these materials for the production of strong oxidizing species allowing the fast mineralization of organics and their use for water disinfection and decontamination. Recent biotechnological development on biosensors, microelectrodes, and nanostructured electrodes, as well as on neurochemistry, is also presented. The book will be written by a large number of internationally recognized experts and comprises 24 chapters describing the

characteristics and theoretical fundaments of the different electrochemical uses and applications of synthetic diamond films.

Power Electronics Device Applications of Diamond Semiconductors presents state-of-the-art research on diamond growth, doping, device processing, theoretical modeling and device performance. The book begins with a comprehensive and close examination of diamond crystal growth from the vapor phase for epitaxial diamond and wafer preparation. It looks at single crystal vapor deposition (CVD) growth sectors and defect control, ultra high purity SC-CVD, SC diamond wafer CVD, heteroepitaxy on Ir/MqO and needle-induced large area growth, also discussing the latest doping and semiconductor characterization methods, fundamental material properties and device physics. The book concludes with a discussion of circuits and applications, featuring the switching behavior of diamond devices and applications, high frequency and high temperature operation, and potential applications of diamond semiconductors for high voltage devices. Includes contributions from today's most respected researchers who present the latest results for diamond growth, doping, device fabrication, theoretical modeling and device performance Examines why diamond semiconductors could lead to superior power electronics Discusses the main challenges to device realization and the best opportunities for the next generation of power electronics

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 world's most comprehensive, well documented, and well illustrated book on this subject. With extensive index. 28 cm. Free of charge in digital format on Google Books.

The use of diamond for electronic applications is not a new idea. As early as the 1920's diamonds were considered for their use as photoconductive detectors. However limitations in size and control of properties naturally limited the use of diamond to a few specialty applications. With the development of diamond synthesis from the vapor phase has come a more serious interest in developing diamond-based electronic devices. A unique combination of extreme properties makes diamond partiCularly well suited for high speed, high power, and high temperature applications. Vapor phase deposition of diamond allows large area films to be deposited, whose properties can potentially be controlled. Since the process of diamond synthesis was first realized, great progress have been made in understanding the issues important for growing diamond and fabricating electronic devices. The quality of both intrinsic and doped diamond has improved greatly to the point that viable applications are being developed. Our understanding of the properties and limitations has also improved greatly. While a number of excellent references review the general properties of diamond, this volume summarizes the great deal of literature related only to electronic properties and applications of diamond. We concentrate only on diamond; related materials such as diamond-like carbon (DLC) and other wide bandgap semiconductors are not treated here. In the first chapter Profs. C. Y. Fong and B. M. Klein discuss the band structure of single-crystal diamond and its relation to electronic properties.

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.

This book on nanodiamonds is the first of its kind. Nanodiamonds are indispensable for polishing industrial materials (e.g., computer hard drives and read heads) and advanced ceramics (e.g., silicon carbide and gem diamond). The book is valuable for those dealing with nanodiamonds as well as for those interested in a general education of nanosize materials. 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

A riveting look at the science, technology and people involved in overcoming early impracticalities of the fledgling chemical vapor deposition (CVD) synthesis method and its development in today's state of commercial readiness. Provides insights into numerous vapor phase techniques. Surveys the synthesis, structure, properties and applications of diamondlike carbon. Details current and rapidly emerging applications, manufacturing and markets.

THE INDUSTRY THAT FORGED THE MODERN WORLD Throughout history metals and raw materials have underpinned human activity. So it is that the industry responsible for extracting these materials from the ground - mining - has been ever present throughout the history of civilisation, from the ancient world of the Egyptians and Romans, to the industrial revolution and the British Empire, and through to the present day, with mining firms well represented on the world's most important stock indexes including the FTSE100. This book traces the history of mining from those early moments when man first started using tools to the present day where metals continue to underpin economic activity in the post industrial age. In doing so, the history of mining methods, important events, technological developments, the important firms and the sparkling personalities that built the industry are examined in detail. At every stage, as the history of mining is traced from 40,000BC to the present day, the level of detail increases in accordance with the greater social and industrial developments that have played

out as time has progressed. This means that a particular focus is given to the period since the industrial revolution and especially the 20th century. A look is also taken into the future in an effort to chart the direction this great industry might take in years to come. Many books have been written about mining; the majority have focused on a particular metal, geographical area, mining event or mining personality, but 'The History of Mining' has a broader scope and covers all of these essential and fascinating areas in one definitive volume.

Contributions from well known and respected researchers throughout the world Thorough coverage of electronic and opto-electronic materials that today's electrical engineers, material scientists and physicists need Interdisciplinary approach encompasses research in disciplines such as materials science, electrical engineering, chemical engineering, mechanical engineering, physics and chemistry

This book examines the interaction between nano tools and nano materials. It explains the use of appropriate tools in surgery for a variety of applications and provides a complete description of clinical procedures accompanied by photographs. Coverage also presents the latest developments in surface coatings technology such as chemical vapor deposition for use on complex cutting tools for biomedical applications.

This book is a review of the science and technology of the element carbon and its allotropes: graphite, diamond and the fullerenes. This field has expanded greatly in the last three decades stimulated by many major discoveries such as carbon fibers, low-pressure diamond and the fullerenes. These carbon materials are very different in structure and properties. Some are very old (charcoal), others new (the fullerenes). They have different applications and markets and are produced by different segments of the industry.

Ten years after the first volume, this book highlights the important contribution Raman spectroscopy makes as a non-destructive method for characterising the chemical composition of objects with archaeological and historical importance. The original book was ground-breaking in its concept, but the past ten years have seen some advancement into new areas, consolidation of some of the older ones and novel applications involving portable instrumentation, on site in museums and in the field. This new volume maintains the topic at the cutting edge, the Editors have approached prominent contributors to provide case-studies sorted into themes. Starting with a Foreword from the British Museum Director of Scientific Research and an Introduction from the Editors, which offer general background information and theoretical context, the contributions then provide global perspectives on this powerful analytical tool. Aimed at scientists involved in conservation, conservators and curators who want to better understand their collections at a material level and researchers of cultural heritage.

Carbon is light-weight, strong, conductive and able to mimic natural materials within the body, making it ideal for many uses within biomedicine. Consequently a great deal of research and funding is being put into this interesting material with

a view to increasing the variety of medical applications for which it is suitable. Diamond-based materials for biomedical applications presents readers with the fundamental principles and novel applications of this versatile material. Part one provides a clear introduction to diamond based materials for medical applications. Functionalization of diamond particles and surfaces is discussed, followed by biotribology and biological behaviour of nanocrystalline diamond coatings, and blood compatibility of diamond-like carbon coatings. Part two then goes on to review biomedical applications of diamond based materials, beginning with nanostructured diamond coatings for orthopaedic applications. Topics explored include ultrananocrystalline diamond for neural and ophthalmological applications, nanodiamonds for drug delivery systems, and diamond nucleation and seeding techniques for tissue regeneration. Finally, the book concludes with a discussion of diamond materials for microfluidic devices. With its distinguished editors and international team of expert contributors, Diamond-based materials for biomedical applications is an authoritative guide for all materials scientists, researchers, medical practitioners and academics investigating the properties and uses of diamond based materials in the biomedical environment. Presents the fundamental principles and novel applications of this versatile material Discusses the functionalization of diamond particles and surfaces, biotribology and biological behaviour of nanocrystalinediamond coatings and blood compatibility of diamond-like carbon coatings Reviews nanostructured diamond coatings for orthopaedic coatings