MATERIALS SCIENCE SERIES

# POLYCRYSTALLINE AND AMORPHOUS THIN FILMS AND DEVICES

EDITED BY
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# Polycrystalline And Amorphous Thin Films And Devices 198

Ruud E.I. Schropp,Miro Zeman

**Polycrystalline And Amorphous Thin Films And Devices 198:**

Silicon-Based Material and Devices, Two-Volume Set Hari Singh Nalwa,2001-06-13 This book covers a broad spectrum of the silicon based materials and their device applications This book provides a broad coverage of the silicon based materials including different kinds of silicon related materials their processing spectroscopic characterization physical properties and device applications This two volume set offers a selection of timely topics on silicon materials namely those that have been extensively used for applications in electronic and photonic technologies The extensive reference provides broad coverage of silicon based materials including different types of silicon related materials their processing spectroscopic characterization physical properties and device applications Fourteen chapters review the state of the art research on silicon based materials and their applications to devices This reference contains a subset of articles published in AP s recently released Handbook of Advanced Electronic and Photonic Materials and Devices 2000 ISBN 012 5137451 ten volumes by Dr Hari Nalwa This two volume work strives to present a highly coherent coverage of silicon based material uses in the vastly dynamic arena of silicon chip research and technology Key Features Covers silicon based materials and devices Include types of materials their processing fabrication physical properties and device applications Role of silicon based materials in electronic and photonic technology A very special topic presented in a timely manner and in a format **Organic Nanostructured Thin Film Devices and Coatings for Clean Energy** Sam Zhang,2010-06-18 Authored by leading experts from around the world the three volume Handbook of Nanostructured Thin Films and Coatings gives scientific researchers and product engineers a resource as dynamic and flexible as the field itself The first two volumes cover the latest research and application of the mechanical and functional properties of thin films an Solar Energy Update ,1981 Alternative Energy and Shale Gas Encyclopedia Jay H. Lehr,Jack Keeley,2016-04-20 A comprehensive depository of all information relating to the scientific and technological aspects of Shale Gas and Alternative Energy Conveniently arranged by energy type including Shale Gas Wind Geothermal Solar and Hydropower Perfect first stop reference for any scientist engineer or student looking for practical and applied energy information Emphasizes practical applications of existing technologies from design and maintenance to operating and troubleshooting of energy systems and equipment Features concise yet complete entries making it easy for users to find the required information quickly without the need to search through long articles **SERI Photovoltaic Advanced Research and Development Bibliography, 1982-1985** ,1986 **Polycrystalline And Amorphous Thin Films And Devices** Lawrence Kazmerski,2012-12-02 Polycrystalline and Amorphous Thin Films and Devices is a compilation of papers that discusses the electronic optical and physical properties of thin material layers and films This compilation reviews the different applications of thin films of various materials used as protective and optical coatings thermal transfer layers and selective membranes from submicron area VLSI memory units to large area energy conservation devices Some papers discuss the basic properties such as growth structure electrical and optical mechanisms that are encountered in

amorphous and polycrystalline thin semiconductor films For example experiments on electronic structure of dislocations have led to a model for the intrinsic properties of grain boundaries in polycrystalline semiconductor thin films that can have an impact on the designs of high efficiency thin film solar cells Other papers review the problems encountered in these thin layers in active semiconductor devices and passive technologies Techniques in film growth and control variables of source substrate temperature and substrate properties will determine the successful performance of the devices installed with these thin film layers This compilation can prove valuable for chemists materials engineers industrial technologists and researchers in thin film technology *Applications of Nanomaterials for Energy Storage Devices* Amit Saxena,Bhaskar Bhattacharya,Felipe Caballero-Briones,2022-11-30 Electrochemical energy storage devices are the prime interest of researchers and students This book provides a comprehensive introduction to nanomaterials and their potential applications specifically for electrochemical devices rechargeable batteries supercapacitors and so forth in a coherent and simple manner It covers fundamental concepts of nanomaterials chemical and physical methods of synthesis properties characterization methods and related applications Features Introduces the evolution of nanoparticles in electrochemical energy storage devices Provides the detailed information on step by step synthesis of nanoparticles Discusses different characterization methods structural electrical optical and thermal Includes the use of nanoparticles in various electrochemical devices Aims to bridge the gap between the material synthesis and the real application This book aims at Senior Undergraduate Graduate students in Material Chemistry Electrochemistry and Chemical Engineering and Energy Storage Metal Oxide Nanocomposite Thin Films for Optoelectronic Device Applications Rayees Ahmad Zargar,2023-09-18 METAL OXIDE NANOCOMPOSITE THIN FILMS FOR OPTOELECTRONIC DEVICE APPLICATIONS The book provides insight into the fundamental aspects latest research synthesis route development preparation and future applications of metal oxide nanocomposite thin films The fabrication of thin film based materials is important to the future production of safe efficient and affordable energy as the devices convert sunlight into electricity Thin film devices allow excellent interface engineering for high performance printable solar cells as their structures are highly reliable and stand alone systems can provide the required megawatts They have been used as power sources in solar home systems remote buildings water pumping megawatt scale power plants satellites communications and space vehicles Metal Oxide Nanocomposite Thin Films for Optoelectronic Device Applications covers the basics of advanced nanometal oxide based materials their synthesis characterization and applications and all the updated information on optoelectronics Topics discussed include the implications of metal oxide thin films which are critical for device fabrications It provides updated information on the economic aspect and toxicity with great focus paid to display applications and covers some core areas of nanotechnology which are particularly concerned with optoelectronics and the available technologies The book concludes with insights into the role of nanotechnology and the physics behind photovoltaics Audience The book will be an important volume for

electronics and electrical engineers nanotechnologists materials scientists inorganic chemists in academic research and those in industries exploring the applications of nanoparticles in semiconductors power electronics and more *Thin film transistors. 1. Amorphous silicon thin film transistors* Yue Kuo,2004 This is the first reference on amorphous silicon and polycrystalline silicon thin film transistors that gives a systematic global review of all major topics in the field These volumes include sections on basic materials and substrates properties fundamental device physics critical fabrication processes structures a Si H dielectric metallization catalytic CVD and existing and new applications The chapters are written by leading researchers who have extensive experience with reputed track records Thin Film Transistors provides practical information on preparing individual functional a Si H TFTs and poly Si TFTs as well as large area TFT arrays Also covered are basic theories on the a Si H TFT operations and unique material characteristics Readers are also exposed to a wide range of existing and new applications in industries **Amorphous and Microcrystalline Silicon Solar Cells: Modeling, Materials and Device Technology** Ruud E.I. Schropp,Miro Zeman,2016-07-18 Amorphous silicon solar cell technology has evolved considerably since the first amorphous silicon solar cells were made at RCA Laboratories in 1974 Scien tists working in a number of laboratories worldwide have developed improved alloys based on hydrogenated amorphous silicon and microcrystalline silicon Other scientists have developed new methods for growing these thin films while yet others have developed new photovoltaic PV device structures with im proved conversion efficiencies In the last two years several companies have constructed multi megawatt manufacturing plants that can produce large area multijunction amorphous silicon PV modules A growing number of people be lieve that thin film photovoltaics will be integrated into buildings on a large scale in the next few decades and will be able to make a major contribution to the world s energy needs In this book Ruud E I Schropp and Miro Zeman provide an authoritative overview of the current status of thin film solar cells based on amorphous and microcrystalline silicon They review the significant developments that have occurred during the evolution of the technology and also discuss the most im portant recent innovations in the deposition of the materials the understanding of the physics and the fabrication and modeling of the devices Springer Handbook of Semiconductor Devices Massimo Rudan,Rossella Brunetti,Susanna Reggiani,2022-11-10 This Springer Handbook comprehensively covers the topic of semiconductor devices embracing all aspects from theoretical background to fabrication modeling and applications Nearly 100 leading scientists from industry and academia were selected to write the handbook s chapters which were conceived for professionals and practitioners material scientists physicists and electrical engineers working at universities industrial R D and manufacturers Starting from the description of the relevant technological aspects and fabrication steps the handbook proceeds with a section fully devoted to the main conventional semiconductor devices like e g bipolar transistors and MOS capacitors and transistors used in the production of the standard integrated circuits and the corresponding physical models In the subsequent chapters the scaling issues of the semiconductor device technology are addressed followed by the

description of novel concept based semiconductor devices The last section illustrates the numerical simulation methods ranging from the fabrication processes to the device performances Each chapter is self contained and refers to related topics treated in other chapters when necessary so that the reader interested in a specific subject can easily identify a personal reading path through the vast contents of the handbook *Thin-Film Crystalline Silicon Solar Cells* Rolf Brendel,2011-02-15 This introduction to the physics of silicon solar cells focuses on thin cells while reviewing and discussing the current status of the important technology An analysis of the spectral quantum efficiency of thin solar cells is given as well as a full set of analytical models This is the first comprehensive treatment of light trapping techniques for the enhancement of the optical absorption in thin silicon films Advanced Characterization Techniques for Thin Film Solar Cells Daniel Abou-Ras,Thomas Kirchartz,Uwe Rau,2016-07-13 The book focuses on advanced characterization methods for thin film solar cells that have proven their relevance both for academic and corporate photovoltaic research and development After an introduction to thin film photovoltaics highly experienced experts report on device and materials characterization methods such as electroluminescence analysis capacitance spectroscopy and various microscopy methods In the final part of the book simulation techniques are presented which are used for ab initio calculations of relevant semiconductors and for device simulations in 1D 2D and 3D Building on a proven concept this new edition also covers thermography transient optoelectronic methods and absorption and photocurrent spectroscopy *Thin Film Solar Cells* Jef Poortmans,Vladimir Arkhipov,2006-10-02 Thin film solar cells are either emerging or about to emerge from the research laboratory to become commercially available devices finding practical various applications Currently no textbook outlining the basic theoretical background methods of fabrication and applications currently exist Thus this book aims to present for the first time an in depth overview of this topic covering a broad range of thin film solar cell technologies including both organic and inorganic materials presented in a systematic fashion by the scientific leaders in the respective domains It covers a broad range of related topics from physical principles to design fabrication characterization and applications of novel photovoltaic devices

*Alternative Fuels and the Environment* Frances S. Sterrett,1994-10-12 Alternative Fuels and the Environment evaluates the timely issue of renewable alternative resources to fossil fuels and nuclear energy such as solar anemoelectric hydroelectric and geothermal energy These alternative power sources not only have the advantage of being renewable but they are also economically attractive and have minimal adverse environmental impact such as the waste emission of SO2 NOx or greenhouse gases This book analyzes the harnessing of the sun s energy by photochemical reactions artificial photosynthesis and photovoltaic electric power generation It further discusses how hydrogen as fuel is produced by solar photoelectrolysis of water and how wind turbines generate electricity while ocean thermal energy produces electric power and fresh water Geothermal energy and hydroelectric power are also renewable sources of electricity Biofuels and biomass are useful as energy sources and surplus land is usable for woody herbaceous high yield energy crop production The book

also investigates reformulated gasoline with oxygenated fuels such as ethanol or methanol Tetrahedrally Bonded Amorphous Carbon Films I Bernd Schultrich,2018-03-10 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 **Ellipsometry of Functional Organic Surfaces and Films** Karsten Hinrichs,Klaus-Jochen Eichhorn,2013-10-24 Ellipsometry is the method of choice to determine the properties of surfaces and thin films It provides comprehensive and sensitive characterization in contactless and non invasive measurements This book gives a state of the art survey of ellipsometric investigations of organic films and surfaces from laboratory to synchrotron applications with a special focus on in situ use in processing environments and at solid liquid interfaces In conjunction with the development of functional organic meta and hybrid materials for new optical electronic sensing and biotechnological devices and fabrication advances the ellipsometric analysis of their optical and material properties has progressed rapidly in the recent years *Amorphous and Crystalline Silicon Carbide II* Mahmud M. Rahman,Cary Y.-W. Yang,Gary L. Harris,2012-12-06 This volume contains written versions of the papers presented at the Second Inter national Conference on Amorphous and Crystalline Silicon Carbide and Related Materials ICACSC 1988 which was held at Santa Clara University on Decem ber 15 and 16 1988 The conference followed the First ICACSC held at Howard University Washington DC in December 1987 and continued to provide an in ternational forum for discussion and exchange of ideas and results covering the current status of research on SiC and related materials ICACSC 1988 attracted 105 participants from five countries The substantial increase in the number of papers compared with the previous year is an indication of the growing interest in this field Of the 45 papers presented at the conference 36 refereed manuscripts are included in this volume while the remaining 9 appear as abstracts The six invited papers provide detailed reviews of recent results on amorphous and crystalline silicon carbide materials and devices as well as diamond thin films The volume is divided into six parts each covering an important theme of the conference **Energy Research Abstracts** ,1993 *Technology and Electronic Properties of Diamond Film Microsensors for Thermal Signals* Ashraf Masood,1992

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