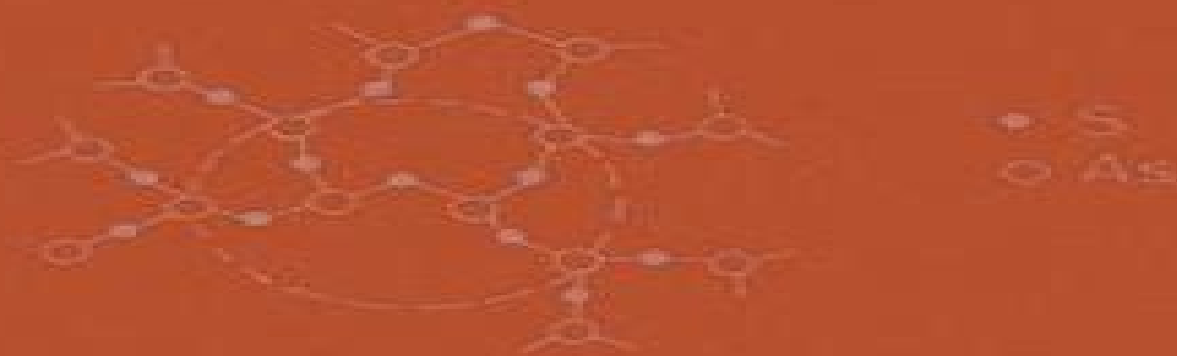


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Alexander V. Kolobov, Junji Tominaga



Non Crystalline Chalcogenides:

Non-Crystalline Chalcogenides M.A. Popescu, 2001-11-30 The earliest experimental data on an oxygen free glass have been published by Schulz Sellack in 1870 1 Later on in 1902 Wood 2 as well as Meier in 1910 3 carried out the first researches on the optical properties of vitreous selenium The interest in the glasses that exhibit transparency in the infrared region of the optical spectrum rose at the beginning of the twentieth century Firstly were investigated the heavy metal oxides and the transparency limit was extended from the case of the classical oxide glasses up to wavelength In order to extend this limit above the scientists tried the chemical compositions based on the elements of the sixth group of the Periodic Table the chalcogens sulphur selenium and tellurium The systematic research in the field of glasses based on chalcogens called chalcogenide glasses started at the middle of our century In 1950 Frerichs 4 investigated the glass and published the paper New optical glasses transparent in infrared up to 12 Several years later he started the study of the selenium glass and prepared several binary glasses with sulphur 5 Glaze and co workers 6 developed in 1957 the first method for the preparation of the glass at the industrial scale while Winter Klein 7 published reports on numerous chalcogenides prepared in the vitreous state

Non-crystalline Chalcogenides Mihai Popescu, 2002 **Physics and Applications of Non-Crystalline Semiconductors in Optoelectronics** A. Andriesh, M. Bertolotti, 2012-12-06 The Workshop on Physics and Application of Non crystalline Semiconductors in Optoelectronics was held from 15 to 17 October 1996 in Chisinau republic of Moldova and was devoted to the problems of non crystalline semiconducting materials The reports covered two main topics theoretical basis of physics of non crystalline materials and experimental results In the framework of these major topics there were treated many subjects concerning the physics of non crystalline semiconductors and their specific application optical properties of non crystalline semiconductors doping of glassy semiconductors and photoinduced effects in chalcogenide glasses and their application for practical purposes methods for investigation of the structure in non crystalline semiconductors new glassy materials for IR transmittance and optoelectronics Reports and communications were presented on various aspects of the theory new physical principles studies of the atomic structure search and development of optoelectronics devices Special attention was paid to the actual subject of photoinduced transformations and its applications Experimental investigations covered a rather wide spectrum of materials and physical phenomena As a novel item it is worth to mention the study of nonlinear optical effects in amorphous semiconducting films The third order optical nonlinearities fast photoinduced optical absorption and refraction acousto optic effects recently discovered in non crystalline semiconductors could potentially be utilised for optical signal processing The important problems of photoinduced structural transformations and related phenomena which are very attractive and actual both from the scientific and practical points of view received much attention in discussions at the conference

Amorphous Chalcogenide Semiconductors and Related Materials Keiji Tanaka, Koichi Shimakawa, 2021-07-01 This book provides introductory comprehensive and concise descriptions of amorphous

chalcogenide semiconductors and related materials It includes comparative portraits of the chalcogenide and related materials including amorphous hydrogenated Si oxide and halide glasses and organic polymers It also describes effects of non equilibrium disorder in comparison with those in crystalline semiconductors Chalcogenide Abhay Kumar Singh, Tien-Chien Jen, 2021-04-26 This is introductory book for researchers scientists and students in the area of organic and inorganic composite materials This book has addressed timely the innovative topic chalcogenide multiwalled carbon nanotubes and chalcogenide bilayer graphene composite materials under a glassy regime This book will give a clear idea on the concepts of the newly established composite materials area by providing interpretations of inside physio chemical mechanism The remarkable landmark innovations related to this newly introduced research field are included in this book Additionally the possible futuristic applications in the area of nanoelectronics optoelectronics biomedical etc are also addressed **Chalcogenides** Alexander V. Kolobov, Junji Tominaga, 2012-08-22 A state of the art description of metastability observed in chalcogenide alloys is presented with the accent on the underlying physics A comparison is made between sulphur selenium based chalcogenide glasses where numerous photo induced phenomena take place entirely within the amorphous phase and tellurides where a reversible crystal to amorphous phase change transformation is a major effect Applications of metastability in devices optical memories and nonvolatile electronic phase change random access memories among others are discussed including the latest trends Background material essential for understanding current research in the field is also provided *Comprehensive Semiconductor Science and Technology* , 2011-01-28 Semiconductors are at the heart of modern living Almost everything we do be it work travel communication or entertainment all depend on some feature of semiconductor technology *Comprehensive Semiconductor Science and Technology* Six Volume Set captures the breadth of this important field and presents it in a single source to the large audience who study make and exploit semiconductors Previous attempts at this achievement have been abbreviated and have omitted important topics Written and Edited by a truly international team of experts this work delivers an objective yet cohesive global review of the semiconductor world The work is divided into three sections The first section is concerned with the fundamental physics of semiconductors showing how the electronic features and the lattice dynamics change drastically when systems vary from bulk to a low dimensional structure and further to a nanometer size Throughout this section there is an emphasis on the full understanding of the underlying physics The second section deals largely with the transformation of the conceptual framework of solid state physics into devices and systems which require the growth of extremely high purity nearly defect free bulk and epitaxial materials The last section is devoted to exploitation of the knowledge described in the previous sections to highlight the spectrum of devices we see all around us Provides a comprehensive global picture of the semiconductor world Each of the work s three sections presents a complete description of one aspect of the whole Written and Edited by a truly international team of experts **Disordered Semiconductors Second Edition** Anatoly

Popov,2018-08-01 Devices based on disordered semiconductors have wide applications It is difficult to imagine modern life without printers and copiers LCD monitors and TVs optical disks economical solar cells and many other devices based on disordered semiconductors However nowadays books that discuss disordered amorphous nanocrystalline microcrystalline

Chalcogenide Glasses J-L Adam,X. Zhang,2014-02-14 The unique properties and functionalities of chalcogenide glasses make them promising materials for photonic applications Chalcogenide glasses are transparent from the visible to the near infrared region and can be moulded into lenses or drawn into fibres They have useful commercial applications as components for lenses for infrared cameras and chalcogenide glass fibres and optical components are used in waveguides for use with lasers for optical switching chemical and temperature sensing and phase change memories Chalcogenide glasses comprehensively reviews the latest technological advances in this field and the industrial applications of the technology Part one outlines the preparation methods and properties of chalcogenide glasses including the thermal properties structure and optical properties before going on to discuss mean coordination and topological constraints in chalcogenide network glasses and the photo induced phenomena in chalcogenide glasses This section also covers the ionic conductivity and physical aging of chalcogenide glasses deposition techniques for chalcogenide thin films and transparent chalcogenide glass ceramics Part two explores the applications of chalcogenide glasses Topics discussed include rare earth doped chalcogenide glass for lasers and amplifiers the applications of chalcogenide glasses for infrared sensing microstructured optical fibres for infrared applications and chalcogenide glass waveguide devices for all optical signal processing This section also discusses the control of light on the nanoscale with chalcogenide thin films chalcogenide glass resists for lithography and chalcogenide for phase change optical and electrical memories The book concludes with an overview of chalcogenide glasses as electrolytes for batteries Chalcogenide glasses comprehensively reviews the latest technological advances and applications of chalcogenide glasses and is an essential text for academics materials scientists and electrical engineers working in the photonics and optoelectronics industry Outlines preparation methods and properties and explores applications of chalcogenide glasses Covers the ionic conductivity and physical aging of chalcogenide glasses deposition techniques for chalcogenide thin films and transparent chalcogenide glass ceramics Discusses the control of light on the nanoscale with chalcogenide thin films chalcogenide glass resists for lithography and chalcogenide for phase change optical and electrical memories

Semiconducting Chalcogenide Glass II Robert Fairman,Boris Ushkov,2004-12-17 Chalcogenide glass is made up of many elements from the Chalcogenide group The glass is transparent to infrared light and is useful as a semiconductor in many electronic devices For example chalcogenide glass fibers are a component of devices used to perform laser surgery The properties of chalcogenide glass result not only from their chemical composition and atomic structure but also from the impact of numerous external factors A comprehensive survey is presented of the properties of chalcogenide glass under various external impacts Practical recommendations are presented for a wide range of applications Part II is the second part

of a three volume work within the Semiconductors and Semimetals series The first collective monograph written by Eastern European scientists on the electrical and optical properties of chalcogenide vitreous semiconductors CVS Contributions by B G Kolomiets who discovered the properties of chalcogenide glass in 1955 Provides objective evidence and discussion by authors from opposing positions *World Scientific Reference Of Amorphous Materials, The: Structure, Properties, Modeling And Main Applications (In 3 Volumes)*, 2020-12-28 Amorphous solids including glassy and non crystalline solids are ubiquitous since the vast majority of solids naturally occurring in our world are amorphous Although the field is diverse and complex this three volume set covers the vast majority of the important concepts needed to understand these materials and their principal practical applications One volume discusses the most important subset of amorphous insulators namely oxide glasses the other two volumes discuss the most important subsets of amorphous semiconductors namely tetrahedrally coordinated amorphous semiconductors and amorphous and glassy chalcogenides Together these three volumes provide a comprehensive set of theoretical concepts and practical information needed to become conversant in the field of amorphous materials They are suitable for advanced graduate students postdoctoral research associates and researchers wishing to change fields or sub fields The topics covered in these three volumes include 1 concepts for understanding the structures of amorphous materials 2 techniques to characterize the structural electronic and optical properties of amorphous materials 3 the roles of defects in affecting the electronic and optical properties of amorphous materials and 4 the concepts for understanding practical devices and other applications of amorphous materials Applications discussed in these volumes include transistors solar cells displays bolometers fibers non volatile memories vidicons photoresists and optical disks

Applications of Chalcogenides: S, Se, and Te Gurinder Kaur Ahluwalia, 2016-11-02 This book introduces readers to a wide range of applications for elements in Group 16 of the periodic table such as optical fibers for communication and sensing X ray imaging electrochemical sensors data storage devices biomedical applications photovoltaics and IR detectors the rationale for these uses the future scope of their applications and expected improvements to existing technologies Following an introductory section the book is broadly divided into three parts dealing with Sulfur Selenium and Tellurium The sections cover the basic structure of the elements and their compounds in bulk and nanostructured forms properties that make these useful for various applications followed by applications and commercial products As the global technology revolution necessitates the search for new materials and more efficient devices in the electronics and semiconductor industry Applications of Chalcogenides S Se and Te is an ideal book for a wide range of readers in industry government and academic research facilities looking beyond silicon for materials used in the electronic and optoelectronic industry as well as biomedical applications **Semiconducting Chalcogenide Glass I** Robert Fairman, Boris Ushkov, 2004-05-10 Chalcogenide glass is made up of many elements from the Chalcogenide group The glass is transparent to infrared light and is useful as a semiconductor in many electronic devices For example chalcogenide glass fibers are a component of devices

used to perform laser surgery This book is a comprehensive survey of the current state of science and technology in the field of chalcogenide semiconductor glasses While the majority of the book deals with properties of chalcogenide glass chapters also deal with industrial applications synthesis and purification of chalcogenide glass and glass structural modification The first individual or collective monograph written by Eastern European scientists known to Western readers regarding structural and chemical changes in chalcogenide vitreous semiconductors CVS Chapters written by B G Kolomiets who discovered the properties of chalcogenide glass in 1955 Provides evidence and discussion for problems discussed by authors from opposing positions

Amorphous Chalcogenides Rong Ping Wang, 2014-03-05 This book provides a comprehensive overview of the chalcogenide glass science and various applications based on the glasses It starts with a review on the glass forming ability of various systems followed by a discussion on the structural and physical properties of various chalcogenide glasses and their application in integrated optics The chapters have been contributed by prominent experts from all over the world and therefore the book presents the recent research advances in the area This book will appeal to anyone who is involved in glass science and technology and glass application

Amorphous Insulators and Semiconductors M.F. Thorpe, M.I. Mitkova, 1997-01-31 The aim of this NATO ASI has been to present an up to date overview of current areas of interest in amorphous materials In order to limit the material to a manageable amount the meeting was concerned exclusively with insulating and semiconducting materials The lectures and seminars fill the gap between graduate courses and research seminars The lecturers and seminar speakers were chosen as experts in their respective areas and the lectures and seminars that were given are presented in this volume During the first week of the meeting an emphasis was placed on introductory lectures mainly associated with questions relating to the glass formation and the structure of glasses The second week focused more on research seminars Each day of the meeting about four posters were presented during the coffee breaks and these formed an important focus for discussions The posters are not reproduced in this volume as the editors wanted to have only larger contributions to make this volume more coherent This volume is organized into four sections starting with general considerations of the glass forming ability and techniques for the preparation of different kinds of glasses

Structural and Chemical Features of Chalcogenides Suresh Sagadevan, 2024-07-03 Investigate the chalcogenides with this comprehensive consideration of their structural and chemical characteristics This book provides a deep dive for researchers material scientists and inquisitive minds Explore the bonding patterns and atomic arrangements that define chalcogenides Unravel the unique crystal structures of various chalcogenide families from layered wonders to complex networks Gain a thorough understanding of the factors governing chalcogenide formation and composition Have an impact on structural and chemical features by the electrical optical and other properties of chalcogenides Implement the vast applications of chalcogenides in fields ranging from photonics and electronics to energy storage and catalysis Learn the structural and chemical features of chalcogenides to provide a rich understanding of these versatile materials positioning you

to unlock their potential for groundbreaking advancements

Metastable States in Amorphous Chalcogenide Semiconductors Victor I. Mikla, Victor V. Mikla, 2009-12-24 This book presents experimental results on the structural and electronic metastable states in Se rich chalcogenides Coverage includes states in the mobility gap structural transformation photocrystallization and many potential related applications

Amorphous Semiconductors Sándor Kugler, Koichi Shimakawa, 2015-02-12 Understanding the structural unit of crystalline solids is vital in determining their optical and electronic properties However the disordered nature of amorphous semiconductors where no long range order is retained makes it difficult to determine their structure using traditional methods This book shows how computer modelling can be used to overcome the difficulties that arise in the atomic scale identification of amorphous semiconductors The book explains how to generate a random structure using computer modelling providing readers with the techniques to construct realistic material structures It shows how the optical and electronic properties are related to random structures Readers will be able to understand the characteristic features of disordered semiconductors The structural and electronic modifications by photon irradiation are also discussed in detail This book is ideal for both physicists and engineers working in solid state physics semiconductor engineering and electrical engineering

Optical Properties of Materials and Their Applications Jai Singh, 2020-01-07 Provides a semi quantitative approach to recent developments in the study of optical properties of condensed matter systems Featuring contributions by noted experts in the field of electronic and optoelectronic materials and photonics this book looks at the optical properties of materials as well as their physical processes and various classes Taking a semi quantitative approach to the subject it presents a summary of the basic concepts reviews recent developments in the study of optical properties of materials and offers many examples and applications Optical Properties of Materials and Their Applications 2nd Edition starts by identifying the processes that should be described in detail and follows with the relevant classes of materials In addition to featuring four new chapters on optoelectronic properties of organic semiconductors recent advances in electroluminescence perovskites and ellipsometry the book covers optical properties of disordered condensed matter and glasses concept of excitons photoluminescence photoinduced changes and electroluminescence in noncrystalline semiconductors and photoinduced bond breaking and volume change in chalcogenide glasses Also included are chapters on nonlinear optical properties of photonic glasses kinetics of the persistent photoconductivity in crystalline III V semiconductors and transparent white OLEDs In addition readers will learn about excitonic processes in quantum wells optoelectronic properties and applications of quantum dots and more Covers all of the fundamentals and applications of optical properties of materials Includes theory experimental techniques and current and developing applications Includes four new chapters on optoelectronic properties of organic semiconductors recent advances in electroluminescence perovskites and ellipsometry Appropriate for materials scientists chemists physicists and electrical engineers involved in development of electronic materials Written by internationally respected professionals working in

physics and electrical engineering departments and government laboratories Optical Properties of Materials and Their Applications 2nd Edition is an ideal book for senior undergraduate and postgraduate students and teaching and research professionals in the fields of physics chemistry chemical engineering materials science and materials engineering

Photo-Induced Metastability in Amorphous Semiconductors Alexander V. Kolobov, 2006-12-13 A review summarising the current state of research in the field bridging the gaps in the existing literature All the chapters are written by world leaders in research and development and guide readers through the details of photo induced metastability and the results of the latest experiments and simulations not found in standard monographs on this topic A useful reference not only for graduates but also for scientific and industrial researchers With a foreword of Kazunobu Tanaka

This book delves into Non Crystalline Chalcogenides. Non Crystalline Chalcogenides is a crucial topic that must be grasped by everyone, ranging from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Non Crystalline Chalcogenides, encompassing both the fundamentals and more intricate discussions.

1. The book is structured into several chapters, namely:
 - Chapter 1: Introduction to Non Crystalline Chalcogenides
 - Chapter 2: Essential Elements of Non Crystalline Chalcogenides
 - Chapter 3: Non Crystalline Chalcogenides in Everyday Life
 - Chapter 4: Non Crystalline Chalcogenides in Specific Contexts
 - Chapter 5: Conclusion
2. In chapter 1, the author will provide an overview of Non Crystalline Chalcogenides. The first chapter will explore what Non Crystalline Chalcogenides is, why Non Crystalline Chalcogenides is vital, and how to effectively learn about Non Crystalline Chalcogenides.
3. In chapter 2, this book will delve into the foundational concepts of Non Crystalline Chalcogenides. The second chapter will elucidate the essential principles that must be understood to grasp Non Crystalline Chalcogenides in its entirety.
4. In chapter 3, the author will examine the practical applications of Non Crystalline Chalcogenides in daily life. The third chapter will showcase real-world examples of how Non Crystalline Chalcogenides can be effectively utilized in everyday scenarios.
5. In chapter 4, this book will scrutinize the relevance of Non Crystalline Chalcogenides in specific contexts. This chapter will explore how Non Crystalline Chalcogenides is applied in specialized fields, such as education, business, and technology.
6. In chapter 5, this book will draw a conclusion about Non Crystalline Chalcogenides. The final chapter will summarize the key points that have been discussed throughout the book.

The book is crafted in an easy-to-understand language and is complemented by engaging illustrations. It is highly recommended for anyone seeking to gain a comprehensive understanding of Non Crystalline Chalcogenides.

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