



# Amorphous Semiconductors

**National Research Council (U.S.). Ad  
Hoc Committee on the Fundamentals  
of Amorphous Semiconductors**

## **Amorphous Semiconductors:**

*Amorphous Semiconductors* Sándor Kugler, Koichi Shimakawa, 2015-02-12 This book explains how to use computer modelling to understand amorphous semiconductors for researchers in solid state physics and semiconductor engineering

**Fundamentals of Amorphous Semiconductors** National Research Council (U.S.). Ad Hoc Committee on the Fundamentals of Amorphous Semiconductors, 1972  
**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  
**The Physics and Applications of Amorphous Semiconductors**

Arun Madan, M. P. Shaw, 2012-12-02 This comprehensive detailed treatise on the physics and applications of the new emerging technology of amorphous semiconductors focuses on specific device research problems such as the optimization of device performance The first part of the book presents hydrogenated amorphous silicon type alloys whose applications include inexpensive solar cells thin film transistors image scanners electrophotography optical recording and gas sensors The second part of the book discusses amorphous chalcogenides whose applications include electrophotography switching and memory elements This book will serve as an excellent reference source for solid state scientists and engineers and as a useful self contained introduction to the field for graduate students  
*Optical Properties of Crystalline and Amorphous*

*Semiconductors* Sadao Adachi, 2012-12-06 *Optical Properties of Crystalline and Amorphous Semiconductors Materials and Fundamental Principles* presents an introduction to the fundamental optical properties of semiconductors This book presents tutorial articles in the categories of materials and fundamental principles Chapter 1 optical properties in the reststrahlen region Chapter 2 those in the interband transition region Chapters 3 and 4 and at or below the fundamental absorption edge Chapter 5 *Optical Properties of Crystalline and Amorphous Semiconductors Materials and Fundamental Principles* is presented in a form which could serve to teach the underlying concepts of semiconductor optical properties and their implementation This book is an invaluable resource for device engineers solid state physicists material scientists and students specializing in the fields of semiconductor physics and device engineering  
**Advances in Amorphous**

**Semiconductors** Jai Singh, Koichi Shimakawa, 2003-04-10 Amorphous materials differ significantly from their crystalline

counterparts in several ways that create unique issues in their use This book explores these issues and their implications and provides a full treatment of both experimental and theoretical studies in the field Advances in Amorphous Semiconductors covers a wide range of studies on hydrogenated amorphous silicon amorphous chalcogenides and some oxide glasses It reviews structural properties properties associated with the charge carrier phonon interaction defects electronic transport photoconductivity and some applications of amorphous semiconductors The book explains a number of recent advances in semiconductor research including some of the editors own findings It addresses some of the problems associated with the validity of the effective mass approximation whether  $K$  is a good quantum number and the concepts of phonons and excitons It also discusses recent progress made in understanding light induced degradations in amorphous semiconductors which is seen as the most limiting problem in device applications The book presents a comprehensive review of both experimental and theoretical studies on amorphous semiconductors which will be useful to students researchers and instructors in the field of amorphous solids

**Amorphous Semiconductors** Kazuo Morigaki, Sandor Kugler, Koichi Shimakawa, 2016-12-20

Amorphous semiconductors are substances in the amorphous solid state that have the properties of a semiconductor and which are either covalent or tetrahedrally bonded amorphous semiconductors or chalcogenide glasses Developed from both a theoretical and experimental viewpoint Deals with amongst others preparation techniques structural optical and electronic properties and light induced phenomena Explores different types of amorphous semiconductors including amorphous silicon amorphous semiconducting oxides and chalcogenide glasses Applications include solar cells thin film transistors sensors optical memory devices and flat screen devices including televisions

Physics of Amorphous Semiconductors Kazuo Morigaki, 1999 This is a useful textbook for graduate students in the fields of solid state physics and chemistry as well as electronic engineering Presenting the fundamentals of amorphous semiconductors clearly it will be essential reading for young scientists intending to develop new preparation techniques for more ideal amorphous semiconductors e.g. a Si-H to fabricate stable and efficient solar cells and thin film transistors and new artificial amorphous materials such as multilayers for quantum devices A large portion is devoted to the latest developments of amorphous semiconductors including electronic properties of a Si-H nature of weak bonds and gap states in a Si-H mechanisms for light induced defect creation in a Si-H and chalcogenides quantum phenomena in multilayer fi

**Amorphous Semiconductors** Marc Herbert Brodsky, 1979

Amorphous Semiconductors David Adler, 1971 *Amorphous Semiconductors* Sándor Kugler, 2015 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

**Amorphous and Liquid Semiconductors** J. Tauc, 2012-12-06 Solid state physics after solving so successfully many fundamental problems in perfect or slightly imperfect crystals tried in recent years to attack problems associated with large disorder with the aim to understand the consequences of the lack of the long range order Semiconductors are much more changed by disorder than metals or insulators and appear to be the most suitable materials for fundamental work Considerable exploratory work on amorphous and liquid semiconductors was done by the Leningrad School since the early fifties In recent years much research in several countries was directed to deepen the understanding of the structural electronic optical vibrational magnetic and other proper ties of these materials and to possibly approach the present level of under standing of crystalline semiconductors This effort was stimulated not only by purely scientific interest but also by the possibility of new applications from which memory devices in the general sense are perhaps the most challenging The research met with serious difficulties which are absent in crystals

**Fundamentals of Amorphous Semiconductors** National Research Council (U.S.). Ad Hoc Committee on the Fundamentals of Amorphous Semiconductors, 1971

**Electronic and Structural Properties of Amorphous Semiconductors** P. G. Le Comber, J. Mort, 1973

**Physics of Semiconductor Devices** Dilip K Roy, 2004

*Fundamentals of Amorphous Semiconductors* National Research Council (U.S.). Ad Hoc Committee on the Fundamentals of Amorphous Semiconductors, National Research Council (U.S.). National Materials Advisory Board, 1972

*Fundamental Physics of Amorphous Semiconductors* F. Yonezawa, 2012-12-06 The Kyoto Summer Institute 1980 KSI 80 devoted to Fundamental Physics of Amorphous Semiconductors was held at Research Institute for Fundamental Physics RIFP Kyoto University from 8 11 September 1980 The KSI 80 was the successor of the preceding Institutes which were held in July 1978 on Particle Physics and Accelerator Projects and in September 1979 on Physics of Low Dimensional Systems The KSI 80 was attended by 200 participants of which 36 were from abroad Canada France Korea Poland U K U S A U S S R and the Federal Republic of Germany The KSI 80 was organized by RIFP and directed by the Amorphous Semicon ductor group in Japan A few years ago we started to organize an interna tional meeting on amorphous semiconductors as a satell ite meeting of the International Conference on Physics of Semiconductors held on September 1 5 1980 in Kyoto We later decided to hold the meeting in the form of the Kyoto Summer Institute The Kyoto Summer Institute is aimed to be something between a school and a conference Accordingly the object of the KSI 80 was to provide a series of invited lectures and informal seminars on fundamental physics of amorphous semiconductors No contributed paper was accepted but seminars were open

Amorphous Chalcogenide Semiconductors and Related Materials Keiji Tanaka, Koichi Shimakawa, 2011-05-24 Amorphous Chalcogenide Semiconductors

and Glasses describes developments in the science and technology of this class of materials. This book offers an up to date treatment of chalcogenide glasses and amorphous semiconductors from basic principles to applications while providing the reader with the necessary theoretical background to understanding the material properties technology of this class of materials. This book offers an up to date treatment of chalcogenide glasses and amorphous semiconductors from basic principles to applications while providing the reader with the necessary theoretical background to understanding the material properties. Chalcogenides form a special class of materials which have one or more of the elements from the chalcogen group Group VI in the Periodic Table S Se or Te as a constituent the chalcogen is mixed with other elements to form various new compounds and alloys. Chalcogenides are noncrystalline solids because their structure is amorphous or glassy. Such structures have totally different properties than crystalline solids. Chalcogenide glasses have a number of very interesting and useful properties which have been already exploited in the commercialization of new devices. **Optical**

**Constants of Crystalline and Amorphous Semiconductors** Sadao Adachi, 1999-08-31 Knowledge of the refractive indices and absorption coefficients of semiconductors is especially important in the design and analysis of optical and optoelectronic devices. The determination of the optical constants of semiconductors at energies beyond the fundamental absorption edge is also known to be a powerful way of studying the electronic energy band structures of the semiconductors. The purpose of this book is to give tabulated values and graphical information on the optical constants of the most popular semiconductors over the entire spectral range. This book presents data on the optical constants of crystalline and amorphous semiconductors. A complete set of the optical constants are presented in this book. They are the complex dielectric constant  $\epsilon = \epsilon' - i\epsilon''$  complex refractive index  $n = n' - ik$  absorption coefficient  $\alpha$  and normal incidence reflectivity  $R$ . The semiconductor materials considered in this book are the group IV elemental and binary III V IT VI IV VI binary semiconductors and their alloys. The reader will find the companion book *Optical Properties of Crystalline and Amorphous Semiconductors: Materials and Fundamental Principles* useful since it emphasizes the basic material properties and fundamental principles. *Functional Materials and Advanced Manufacturing* Chander Prakash, Sunpreet Singh, J. Paulo Davim, 2021-01-06 This three volume set addresses a new knowledge of functional materials their processing and their characterizations. Functional and Smart Materials covered the synthesis and fabrication route of functional and smart materials for universal applications such as material science mechanical engineering manufacturing metrology nanotechnology physics chemical biology chemistry civil engineering and food science. *Advanced Manufacturing and Processing Technology* covers the advanced manufacturing technologies includes coating deposition cladding nanotechnology surface finishing precision machining processing and emerging advanced manufacturing technologies for processing of materials for functional applications. *Characterization Testing Measurement and Metrology* covered the application of new and advanced characterization techniques to investigate and analysis the processed materials.

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### **Amorphous Semiconductors Introduction**

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