Reading free Charge transport in disordered solids with applications in electronics (PDF)

Disordered Solids Glassy Materials and Disordered Solids Physics of Structurally Disordered Solids Condensed Matter Disordered Solids Physics of Disordered Solids Low-temperature Thermal And Vibrational Properties Of Disordered Solids: A Half-century Of Universal "Anomalies" Of Glasses Disordered Materials Charge Transport in Disordered Solids with Applications in Electronics Electrons and Disorder in Solids Low-energy Excitations In Disordered Solids: A Story Of The 'Universal' Phenomena Of Structural Tunneling Disordered Materials Aspects of the Theory of Disordered Solids Theory of Disordered Solids Physics of Structurally Disordered Solids Aspects of the Theory of Disordered Solids Some aspects of the theory of disordered solids Dynamical Properties of Solids: Disordered solids, optical properties A First-Principles Study of Highly Anharmonic and Dynamically Disordered Solids Quantum and Semi-classical Percolation and Breakdown in Disordered Solids Defects and Disorder in Crystalline and Amorphous Solids Disordered Materials Order and Disorder in the World of Atoms Physics of Disordered Materials Some Problems in Electronic Properties of Disordered Solids Studies Relating to the Structures of Some Disordered Solids Physics and Chemistry of Earth Materials Diffusion in Disordered Solids and Undercooled Liquids Hydrogen in Disordered and Amorphous Solids Structural and Dynamic Properties of Disordered Solids Glassy Materials And Disordered Solids: An Introduction To Their Statistical Mechanics (Revised Edition) Metals, Superconductors, Magnetic Materials, Liquids Disordered Solids, Optical Properties Disordered Systems and New Materials Optical Properties of Disordered Solids Statistics of Linear Polymers in Disordered Media Hopping Transport in Solids Tunneling Systems in Amorphous and Crystalline Solids The Physics of Structurally Disordered Matter Low-Energy Excitations in Disordered Solids: the What and Where of Glassy States, If Not the Why (XL-Too Broad?) Electronic Structure of Disordered Alloys, Surfaces and Interfaces

Disordered Solids 2013-03-09 this book presents an account of the course disordered solids structures and processes held in erice italy from june 15 to 29 1987 this meeting was organized by the international school of atomic and molecular spectroscopy of the ettore majorana centre for scientific culture the objective of this course was to present the advances in physical modelling mathematical formalism and experimental techniques relevant to the interpretation of the structures of disordered solids and of the physical processes occurring therein traditional solid state physics treats solids as perfect crystals and takes great advantage of their symmetry by means of such mathematical formalisms as the reciprocal lattice the brillouin zone and the powerful tools of group theory even if in reality no solid is a perfect crystal this theoretical approach has been of great usefulness in describing solids deviations from perfect order have been treated as perturbations of the ideal model a new situation arises with truly disordered solids where any vestige of long range order has disappeared the basic problem is that of describing these systems and gaining a scientific understanding of their physical properties without the mathematical formalism of traditional solid state physics while some of the old approaches may occasionally remain valid e g chemical bonding approach for amorphous solids the old ways will not do disorder is not a perturbation with disorder something basically new may be expected to appear

Glassy Materials and Disordered Solids 2011 this book gives a pedagogical introduction to the physics of amorphous solids and related disordered condensed matter systems important concepts from statistical mechanics such as percolation random walks fractals and spin glasses are explained using these concepts the common aspects of these systems are emphasized and the current understanding of the glass transition and the structure of glasses are concisely reviewed this second edition includes new material on emerging topics in the field of disordered systems such as gels driven systems dynamical heterogeneities growing length scales etc as well as an update of the literature in this rapidly developing field

Physics of Structurally Disordered Solids 2013-06-29 structurally disordered solids are characterized by their lack of spatial order that is evidenced by the great variety of ordered solids the former class of materials is commonly termed amorphous or glassy the latter crystalline however both classes share many of the other physical properties of solids e g me chanical stability resistance to shear stress etc the traditional macroscopic distinction between the crystalline and the glassy states is that while the former has a fixed melting point the latter does not however with the availability and production of a large number of materials in both crystalline and amorphous states and their easy inter convertability simple de finitions are not possible or at best imprecise for the present purpose it is sufficient to say that in contrast to the crystalline state in which the posi tions of atoms are fixed into adefinite structure ex cept for small thermal vibrations the amorphous state of the same material displays varying degrees of de parture from this fixed structure the amorphous state almost always shows no long range order short range order up to several neighbors may often be retained although averaged considerably around their crystalline values it is generally believed that the amorphous state is a metastable one with respect to the crystal line ordered state and the conversion to the crystal line state may or may not be easy depending on the na ture of the material e g

Condensed Matter 1995 this book deals with different aspects of the structure and properties of disordered materials whenever the normal state of matter is affected by internal or external agencies and new states are developed it is generally observed that the new materials possess disordered structures however some characteristics such as the electronic and ionic remain similar to those of crystalline solids such isotropic materials are also termed disordered solids this book surveys the physics of materials like non transition transition metals and alloys in their solid and liquid phases liquid amorphous solids and materials with super structures like fullerene lattices etc the advancements in these materials which possess unusual physical properties provide exciting possibilities for technology and industry up to date investigations about theoretical and experimental techniques are presented here the reviews on different materials were prepared by renowned experts in the corresponding areas

Disordered Solids 2014-01-15 this book edited by m a ramos and contributed by several reputed physicists in the field presents a timely review on low temperature thermal and vibrational properties of glasses and of disordered solids in general in 1971 the seminal work of zeller and pohl was published which triggered this relevant research field in condensed matter physics hence this book also commemorates about 50 years of that highlight with a comprehensive updated review in brief glasses firstly genuine amorphous solids but later on followed by different disordered crystals were found to universally exhibit low temperature properties specific heat thermal conductivity acoustic and dielectric attenuation etc unexpectedly very similar among them and very different from those of their crystalline counterparts these universal anomalies of glasses and other disordered solids remain very controversial topics in condensed matter physics they have been addressed exhaustively in this book through many updated experimental data a survey of most relevant models and theories as well as by computational simulations

Physics of Disordered Solids 1982 this self contained text introduces the physics of structurally disordered condensed systems at the level of advanced undergraduate and graduate students clearly presented and amply illustrated it provides stimulating and novel coverage of a difficult area in this second edition the treatment of the mode coupling theory of the glass transition has been enlarged and now connects to a new section on collective excitations in disordered systems

Low-temperature Thermal And Vibrational Properties Of Disordered Solids: A Half-century Of Universal "Anomalies" Of Glasses 2022-08-11 the field of charge conduction in disordered materials is a rapidly evolving area owing to current and potential applications of these materials in various electronic devices this text aims to cover conduction in disordered solids from fundamental physical principles and theories through practical material development with an emphasis on applications in all areas of electronic materials international group of contributors presents basic physical concepts developed in this field in recent years in a uniform manner brings up to date in a one stop source a key evolving area in the field of electronic materials

Disordered Materials 2013-06-29 this book has been written for those who study or professionally deal with solid state physics it contains modern concepts about the physics of electrons in solids it is written using a minimum of mathematics the emphasis is laid on various physical models aimed at stimulating creative thinking the book helps the reader choose the most efficient scheme of an experiment or the optimal algorithm of a calculation boltzmann and hopping types of conductivity are compared the qualitative theory of weak localization is presented and its links with the true localization and metal insulator transitions processes that determine the structure of impurity bands are revealed the concepts introduced in this book are applied to descriptions of granular metals and quasicrystals as well as the integer quantum hall effect emphasizing their universality

Charge Transport in Disordered Solids with Applications in Electronics 2006-08-14 the subject of low energy excitations has evolved since two level tunneling systems were first proposed 50 years ago initially they were used to explain the common anomalous properties of oxide glasses and polymers now the subject includes a wide range of other materials containing disorder amorphous semiconductors and metals doped mixed and quasi crystals surface adsorbates and topics such as dephasing of quantum states and interferometer noise a fairly simple empirical description using a remarkably small range of parameters serves well to describe the effect of these excitations but the structures causing these effects are known in only a few materials and the reasons for their similarity across disparate materials has only been qualitatively addressed this book provides a unified comprehensive description of tunneling systems in disordered solids suitable for graduate students researchers wishing an introduction to the field its focus is on the tunneling systems intrinsic to glassy solids it describes the experimental observations of glassy properties develops the basic empirical tunneling model and discusses the dynamics changes on cooling to temperatures where direct excitation interactions become important and on heating to where tunneling gives way to thermal activation finally it discusses how theories of glass formation can help us understand the ubiquity of these excitations the development of the basic tunneling model is the core of the book and is worked out in considerable detail to keep the total within bounds of our expertise and the readers patience many related experimental and theoretical developments are only sketched out here the text is heavily cited to allow readers to follow their specific interests in much more depth

Electrons and Disorder in Solids 2005-08-25 the teaching of solid state physics essentially concerns focusing on crystals and their properties we study crystals and their properties because of the simple and neat results obtained from the analysis of a spatially periodic system this is why the analysis can be made considering a small set of atoms that represent the whole system of many particles in contrast to the formal neat approach to crystals the study of struc turally disordered condensed systems is somewhat complicated and often leads to relatively imprecise results not to mention the experimental and computational effort involved as such almost all university textbooks in cluding the advanced course books only briefly touch on the physics of amor phous systems in any case both the fundamental aspect and the ever wider industrial applications have given structurally disordered matter a role that should not be overlooked the study of amorphous solids and their structure stability and properties is a vibrant research branch it is difficult to imagine how any physicist chemist or engineer who has to deal with materials could possibly ignore this class of systems the author of disordered matter an introduction uses this course book at the politecnico in milan italy collecting the material for the course proved no mean task leading him to have to prepare ad hoc didactic material the continual exchange between teacher and student has led to the current version of the book

Low-energy Excitations In Disordered Solids: A Story Of The 'Universal' Phenomena Of Structural Tunneling 2021-04-29 this book presents a consistent mathematical theory of the non electronic physical properties of disordered and amorphous solids starting from the atomic level dynamics and leading to experimentally verifiable descriptions of macroscopic properties such as elastic and viscoelastic moduli plasticity phonons and vibrational

SPECTRA AND THERMAL PROPERTIES THIS THEORY BEGINS WITH THE ASSUMPTION OF THE UNDENIABLE EXISTENCE OF AN AMORPHOUS LATTICE WHICH ALLOWS ONE TO RELEGATE THE THEORETICAL UNCERTAINTIES ABOUT THE ULTIMATE NATURE OF THE GLASS TRANSITION TO A SUBSIDIARY ROLE AND THUS TAKE A MORE PRAGMATIC APPROACH TOWARDS THE MODELLING OF PHYSICAL PROPERTIES THE BOOK INTRODUCES THE READER NOT ONLY TO THE SUBTLE PHYSICAL CONCEPTS UNDERLYING THE DYNAMICS MECHANICS AND STATISTICAL PHYSICS OF GLASSES AND AMORPHOUS SOLIDS BUT ALSO TO THE ESSENTIAL MATHEMATICAL AND NUMERICAL METHODS THAT CANNOT BE READILY GLEANED FROM SPECIALIZED LITERATURE SINCE THEY ARE SPREAD OUT AMONG MANY OFTEN TECHNICALLY DEMANDING PAPERS THESE METHODS ARE PRESENTED IN THIS BOOK IN SUCH A WAY AS TO BE SUFFICIENTLY GENERAL ALLOWING FOR THE MATHEMATICAL OR NUMERICAL DESCRIPTION OF NOVEL PHYSICAL PHENOMENA OBSERVED IN MANY DIFFERENT TYPES OF AMORPHOUS SOLIDS INCLUDING SOFT AND GRANULAR SYSTEMS REGARDLESS OF THE ATOMISTIC DETAILS AND PARTICULAR CHEMISTRY OF THE MATERIAL THIS MONOGRAPH IS AIMED AT RESEARCHERS AND GRADUATE LEVEL STUDENTS IN PHYSICS MATERIALS SCIENCE PHYSICAL CHEMISTRY AND ENGINEERING WORKING IN THE AREAS OF AMORPHOUS MATERIALS SOFT MATTER AND GRANULAR SYSTEMS STATISTICAL PHYSICS CONTINUUM MECHANICS PLASTICITY AND SOLID MECHANICS IT IS ALSO PARTICULARLY WELL SUITED TO THOSE WORKING ON MOLECULAR DYNAMICS SIMULATIONS MOLECULAR COARSE GRAINED SIMULATIONS AS WELL AS AB INITIO ATOMISTIC AND DFT METHODS FOR SOLID STATE AND MATERIALS SCIENCE

Disordered Materials 2003 THIS THESIS IS A FIRST PRINCIPLES THEORETICAL INVESTIGATION OF SOLID MATERIALS WITH HIGH DEGREES OF ANHARMONICITY THESE ARE SYSTEMS WHERE THE DYNAMICS OF THE CONSTITUENT ATOMS IS TOO COMPLEX TO BE WELL DESCRIBED BY A SET OF UNCOUPLED HARMONIC OSCILLATORS WHILE THEORETICAL STUDIES OF SUCH SYSTEMS POSE A SIGNIFICANT CHALLENGE THEY ARE UNDER INCREASING DEMAND DUE TO THE PREVALENCE OF THESE SYTEMS IN NEXT GENERATION TECHNOLOGICAL APPLICATIONS INDEED VERY ANHARMONIC SYSTEMS ARE UBIQUITOUS IN ENVISIONED MATERIALS FOR FUTURE SOLID STATE BATTERIES AND FUEL CELLS THERMOELECTRICS AND OPTOELECTRONICS IN SOME OF THESE CASES THE ANHARMONICITY IS A SIDE EFFECT THAT SIMPLY HAS TO BE DEALT WITH IN ORDER TO ACCURATELY MODEL CERTAIN PROPERTIES WHILE IN OTHER CASES THE ANHARMONICITY IS THE ORIGIN OF THE HIGH PERFORMANCE OF THE MATERIAL THERE ARE TWO MAIN PARTS TO THE THESIS THE FIRST IS ON MATERIALS WITH PEROVSKITE RELATED STRUCTURES THIS IS A VERY LARGE CLASS OF MATERIALS MEMBERS OF WHICH ARE TYPICALLY HIGHLY ANHARMONIC NOT LEAST IN RELATION TO A SERIES OF COMPLEX PHASE TRANSFORMATIONS BETWEEN DIFFERENT STRUCTURAL MODIFICATIONS IN THE THESIS I HAVE STUDIED A SPECIFIC CLASS OF SUCH PHASE TRANSFORMATIONS THAT RELATE TO TILTING OF THE FRAMEWORK OF OCTAHEDRA THAT MAKE UP THE STRUCTURE THE OXIDE CAMNO3 AND A SET OF INORGANIC HALIDE PEROVSKITES WERE TAKEN AS MODEL SYSTEMS THE RESULTS SHED SOME LIGHT ON THE EXPERIMENTALLY OBSERVED DIFFERENCES BETWEEN THE LOCAL AND AVERAGE ATOMIC STRUCTURE IN THESE SYSTEMS I HAVE FURTHER STUDIED CS2AGBIBR6 A MEMBER OF THE SO CALLED LEAD FREE HALIDE DOUBLE PEROVSKITES I RATIONALIZED ITS TEMPERATURE INDUCED PHASE TRANSFORMATION AND FOUND HIGH DEGREES OF ANHARMONICITY AND ULTRA LOW THERMAL CONDUCTIVITY FINALLY I STUDIED THE INFLUENCE OF NUCLEAR QUANTUM EFFECTS WHICH ARE OFTEN IGNORED IN COMPUTATIONAL MODELLING ON THE STRUCTURE AND BONDING IN THE HYBRID ORGANIC INORGANIC LEAD HALIDE PEROVSKITE CH3NH3PBI3 THE SECOND PART OF THE THESIS DEALS WITH THEORETICAL STUDIES OF THE PHASE STABILITY OF DYNAMICALLY DISORDERED SOLIDS THESE ARE SOLIDS WHICH HAVE SOME SORT OF TIME AVERAGED LONG RANGE ORDER CHARACTERISTIC OF A CRYSTALLINE SOLID BUT WHERE THE ANHARMONICITY IS SO STRONG THAT THE BASIC CONCEPT OF AN EQUILIBRIUM ATOMIC POSITION CANNOT BE STATICALLY ASSIGNED TO ALL ATOMS EXAMPLES INCLUDE CERTAIN SOLIDS WITH VERY FAST IONIC CONDUCTION SO CALLED SUPERIONICS AND SOLIDS WITH ROTATING MOLECULAR UNITS THIS ABSENCE OF EQUILIBRIUM ATOMIC POSITIONS MAKES MANY STANDARD COMPUTATIONAL TECHNIQUES TO EVALUATE PHASE STABILITY INAPPLICABLE I OUTLINE A METHOD TO DEAL WITH THIS ISSUE WHICH IS BASED ON A STRESS STRAIN THERMODYNAMIC INTEGRATION ON A DEFORMATION PATH FROM AN ORDERED VARIANT TO THE DYNAMICALLY DISORDERED PHASE ITSELF I APPLY THE METHOD TO STUDY THE PHASE STABILITY OF THE HIGH TEMPERATURE PHASE OF BI2O3 WHICH IS THE FASTEST KNOW SOLID OXIDE ION CONDUCTOR AND TO LI2C2 WHOSE HIGH TEMPERATURE CUBIC PHASE CONTAINS ROTATING C2 DIMERS THE THESIS EXEMPLIFIES THE NEED TO GO BEYOND MANY OF THE STANDARD APPROXIMATIONS USED IN FIRST PRINCIPLES COMPUTATIONAL MATERIALS SCIENCE IF ACCURATE THEORETICAL PREDICTIONS ARE TO BE MADE THIS IS TRUE IN PARTICULAR FOR MANY EMERGING MATERIAL CLASSES IN THE FIELD OF ENERGY MATERIALS I DEN KONVENTIONELLA TEORETISKA MODELLEN F R ETT KRISTALLINT FAST MATERIAL ANTAGS VARJE ATOM KUNNA TILLORDNAS EN J MVIKTSPOSITION R RELSEN AV ATOMERNA RUNT DESSA J MVIKTSPOSITIONER ANTAGS SEDAN OFTA VARA HARMONISKT D V S HYFSAT KUNNA BESKRIVS I TERMER AV EN SAMLING KVANTMEKANISKA FJ DRAR DENNA AVHANDLING BEHANDLAR TEORI OCH BER KNINGSSTUDIER AV MATERIAL D R ETT ELLER B DA AV DESSA ANTAGANDEN INTE R GILTIGA S KALLADE ANHARMONISKA MATERIAL EN NOGRANN TEORETISK BEHANDLING AV S DANA MATERIAL R OFTA ORDENTLIGT UTMANANDE I TAKT MED EN SNABB TEKNOLOGISKA UTVECKLING ST LLS ALLT MER SPECIFIKA OCH STR NGA KRAV P DE MATERIAL SOM BEH VS F R DIVERSE APPLIKATIONER INOM FLERTALET OMR DEN DYKER D DENNA TYP AV KOMPLEXA OCH ANHARMONISKA MATERIAL UPP SOM POTENTIELLA KANDIDATER TILL EXEMPEL SOM FASTELEKTROLYTER F R BATTERIER OCH BR NSLECELLER ELLER SOM SOLCELLSMATERIAL INOM VISSA APPLIKATIONER R DENNA ANHARMONICITET EN BIEFFEKT SOM MAN HELT ENKELT M STE TA H NSYN TILL F R ATT KUNNA G RA NOGGRANNA TEORETISKA F RUTS GELSER OM DIVERSE MATERIALEGENSKAPER I ANDRA FALL R ANHARMONICITETEN SJ LVA URSPRUNGET F R MATERIALETS GODA EGENSKAPER I DEN F RSTA DELEN AV AVHANDLINGEN BEHANDLAR JAG MATERIAL SOM HAR

ELLER [?] R N[?] RA RELATERADE TILL DEN S[?] KALLADE PEROVSKITSTRUKTUREN DETTA [?] R EN V[?] LDIGT STOR KLASS AV MATERIAL OCH STRUKTUREN DYKER D[?] RF[?] R UPP INOM EN M[?] NGD OLIKA TILL[?] MPNINGAR INTE MINST I LOVANDE SOLCELLSMATERIAL DESSA MATERIAL [?] R OFTA MYCKET ANHARMONISKA VILKET TAR SIG UTTRYCK BLAND ANNAT I EN RAD KOMPLEXA FASTRANSFORMATIONER MELLAN OLIKA TYPER AV PEROVSKITMODIFIKATIONER I PEROVSKITOXIDEN CAMNO3 SAMT I EN SAMLING HALOGENPEROVSKITER HAR JAG HAR STUDERAT EN SPECIFIK TYP AV FASTRANSFORMATIONER SOM TILLKOMMER P[?] GRUND AV ROTATIONER AV DE OKTAEDRAR SOM UTG[?] R EN DEL AV STRUKTUREN JAG HAR FORTSATT STUDERAT DEN V[?] LDIGT KRAFTIGA ANHARMONICITETEN I DEN S[?] KALLADE BLYFRIA HALOGENDUBBELPEROVSKITEN CS2AGBIBR6 OCH SLUTLIGEN HAR JAG STUDERAT HUR EN KVANTMEKANISK BEHANDLING AV ATOMK[?] RNORNA N[?] GOT SOM OFTAST INTE G[?] RS P[?] VERKAR MATERIALEGENSKAPER I CH3NH3PBI3 EN S[?] KALLAD HYBRID ORGANISK INORGANISK BLY HALOGENPEROVSKIT SOM [?] R ETT EXTREMT LOVANDE SOLCELLSMATERIAL I DEN ANDRA DELEN AV AVHANDLINGEN STUDERAR JAG DYNAMISKT OORDNADE FASTA MATERIAL I DESSA MATERIAL [?] R ATOMERNAS R[?] RELSE F[?] R KOMPLEX F[?] R ATT VARJE ATOM SKA KUNNA TILLDELLAS EN STATISK J[?] MVIKTSPOSITION MATERIAL I DENNA KLASS [?] R TILL EXEMPEL LOVANDE SOM FASTELEKTROLYTER I BR[?] NSLECELLER OCH BATTERIER MER SPECIFIKT STUDERAR JAG EN TYP AV FAS[?] VERG[?] NG FR[?] N EN ORDNAD FAS TILL EN FAS MED DYNAMISK OORDNING SOM OFTA SKER N[?] R DESSA MATERIAL V[?] RMS UPP JAG INTRODUCERAR EN BER[?] KNINGSMETOD F[?] R ATT UTV[?] RDERA DERAS FASSTABILITET METODEN [?] R BASERAD P[?] EN S[?] KALLAD TERMODYNAMISK INTEGRATION UTF[?] RD MELLAN EN ORDNAD VARIANT OCH DEN DYNAMISKT OORDNADE FASEN SJ[?] LV METODEN G[?] R DET M[?] JLIGT ATT BER[?] KNA FASTRANSFORMATIONSTEMPERATURER I DENNA TYP AV MATERIAL JAG APPLICERAR METODEN P[?] BI2O3 SOM I SIN FAS [?] R DET FASTA MATERIAL MED H[?] GST K[?] ND SYREJONLEDNINGSF[?] RM[?] GA SAMT P[?] LI2C2 VARS KUBISKA FAS INNEH[?] LLER ROTERANDE C2 MOLEKYLER RESULTATEN ST[?] MMER BRA [?] VERENS MED K[?] NDA EXPERIMENTELLA M[?] TNINGAR

Aspects of the Theory of Disordered Solids 1978 THIS LECTURE NOTES IN PHYSICS VOLUME MAINLY FOCUSES ON THE SEMI CLASSICAL AND QU TUM ASPECTS OF PERCOLATION AND BREAKDOWN IN DISORDERED COMPOSITE OR GRANULAR S TEMS THE MAIN REASON FOR THIS UNDERTAKING HAS BEEN THE FACT THAT OF LATE THERE HAVE BEEN A LOT OF THEORETICAL WORK ON QUANTUM PERCOLATION BUT THERE IS NOT EVEN A SINGLE PUBLISHED REVIEW ON THE TOPIC AND OF COURSE NO BOOK ALSO THERE ARE MANY THEORETICAL AND EXPERIMENTAL STUDIES ON THE NONLINEAR CURRENT VOLTAGE CHARACTERISTICS BOTH AWAY FROM AS WELL AS ONE APPROACHES AN ELECTRICAL BREAKDOWN IN COMPOSITE MATERIALS SOME OF THE RESULTS ARE QUITE INTRIGUING AND MAY BROADLY BE EXPLAINED UTILISING A SEMI CLASSICAL IF NOT FULLY QUANTUM MECHANICAL TUNNELLING BETWEEN CRON OR NANO SIZED METALLIC ISLANDS DISPERSED SEPARATED BY THIN INSULATING LAYERS OR IN OTHER WORDS BETWEEN THE DANGLING ENDS OF SMALL PERCOLATION CLUSTERS THERE HAVE ALSO BEEN SEVERAL THEORETICAL STUDIES OF ZENER BREAKDOWN IN MOTT OR ANDERSON IN LATORS AGAIN THERE IS NO REVIEW AVAILABLE CONNECTING THEM IN ANY COHERENT FASHION A COMPENDIUM VOLUME CONNECTING THESE EXPERIMENTAL AND THEORETICAL STUDIES SHOULD BE UNIQUE AND VERY TIMELY AND HENCE THIS VOLUME THE BOOK IS ORGANISED AS FOLLOWS FOR COMPLETENESS WE HAVE STARTED WITH A SHORT AND CONCISE INTRODUCTION ON CLASSICAL PERCOLATION IN THE RST CHAPTER D STAUFFER REVIEWS THE SCALING THEORY OF CLASSICAL PERCOLATION EMPHASIZING BIASED DIFFUSION WITHOUT ANY QUANTUM EFFECTS THE NEXT CHAPTER BY A K

Theory of Disordered Solids 2023-06-30 THE STUDY OF DEFECTS AND DISORDER IN SOLIDS REMAINS A CENTRAL TOPIC IN SOLID STATE SCIENCE DEVELOPMENTS IN THE FIELD CONTINUE TO BE PROMOTED BY NEW EXPERIMENTAL AND THEORETICAL TECHNIQUES WHILE FURTHER IMPETUS FOR THE STUDY OF DISORDER IN SOLIDS IS PROVIDED BY THE GROWING RANGE OF APPLICATIONS OF SOLID STATE MATERIALS IN WHICH DISORDER AT THE ATOMIC LEVEL PLAYS A CRUCIAL ROLE IN THIS BOOK WE ATTEMPT TO PRESENT A SURVEY OF FUNDAMENTAL AND APPLIED ASPECTS OF THE FIELD WE CONSIDER THE BASIC ASPECTS OF DEFECTIVE CRYSTALLINE AND AMORPHOUS SOLIDS WE DISCUSS RECENT STUDIES OF STRUCTURAL ELECTRONIC TRANSPORT THERMODYNAMIC AND SPECTROSCOPIC PROPERTIES OF SUCH MATERIALS EXPERIMENTAL AND THEORETICAL METHODOLOGIES ARE REVIEWED AND DETAILED CONSIDERATION IS GIVEN TO MATERIALS SUCH AS FAST ION CONDUCTORS AND AMORPHOUS SEMICONDUCTORS THAT ARE OF IMPORTANCE IN AN APPLIED CONTEXT ANY SURVEY OF THIS LARGE FIELD IS NECESSARILY SELECTIVE WE HAVE CHOSEN TO EMPHASISE INSULATING ESPECIALLY OXIDIC AND SEMI CONDUCTING MATERIALS BUT MANY OF THE APPROACHES AND TECHNIQUES WE DESCRIBE APPLY GENERALLY ACROSS THE ENTIRE FIELD OF SOLID STATE SCIENCE THIS VOLUME IS BASED ON A NATO ASI HELD AT THE RESIDENCIA SANTA TERESA DE JESUS MADRID IN SEPTEMBER 1991 THE EDITOR IS GRATEFUL TO THE NATO SCIENTIFIC AFFAIRS DIVISION FOR THEIR SPONSORSHIP OF THIS SCHOOL THANKS ARE ALSO DUE TO ALL WHO PARTICIPATED IN AND LECTURED AT THE SCHOOL BUT ESPECIALLY TO THE ORGANISING COMMITTEE OF A V CHADWICK G N GREAVES M GRIGORKIEWICZ J H HARDING AND S KALBITZER C R A

Physics of Structurally Disordered Solids 2014-09-01 LANDMARK CONTRIBUTIONS TO SCIENCE AND MECHANISMS FOR THE ORIGIN OF THE PHENOMENA AND TECHNOLOGY ARE RARELY RECOGNIZED AT THE TIME OF REACHED IMPORTANT CONCLUSIONS ABOUT THE PHYSICAL PUBLICATION FEW PEOPLE EVEN IN TECHNICAL AREAS NATURE OF THE MATERIALS AT EQUILIBRIUM AND THEIR RECOGNI ZED THE IMPORTANCE OF DEVELOPMENTS SUCH AS ELECTRONIC NONEQUILIBRIUM PROPERTIES MANY OF THESE THE TRANSISTOR THE LASER OR ELECTROPHOTOGRAPHY IDEAS WERE CONDENSED INTO A PUBLICATION FOR PHYSICAL UNTIL WELL AFTER THEIR SUCCESSFUL DEMONSTRATION REVIEW LETTERS PAPER 1 IN THIS COLLECTION THIS SO CALLED EXPERTS IN FACT TEND TO RESIST NEW PAPER IMMEDIATELY ATTRACTED ATTENTION TO THE FIELD INVENTIONS A NATURAL INSTINCT BASED

on a combina and directly lead to the initiation of large research tion of fear of obsolescent expertise and jealousy efforts at both industrial laboratories and univer arising from lack of active participation in the ties throughout the world inevitably there was discovery the usual amount of controversy with many experts denigration of new ideas is a relatively simultaneously taking positions 2 and 3 above safe modus operandi since the vast majority it has now been well over 20 years since eventually are abandoned well short of commerciality the original publication date and an objective view however a successful device can be identified by can be taken in hindsight

Aspects of the Theory of Disordered Solids 1978 our main aim is to examine whether the atoms and molecules constituting the world around us are distributed in space in a random and disordered fashion like pebbles on the beach or in an ordered pattern like the cells of a honeycomb however it is often impossible to make such a clear cut distinction and it is better not to use order and disorder as absolute terms but to speak instead of a degree of order and a degree of disorder these concepts are fairly new in science up to about 20 30 years ago it was still believed and in fact this belief can still be en countered today that certain states of matter such as gases liquids and amorphous solids were characterized by a totally disordered distribution of the constituent particles whilst crys tals by contrast exhibited perfectly ordered lattices according to the present view on the other hand order and disorder often coexist inseparably from each other though there are admittedly many cases in which order or disorder does describe quite accurately tbe actual state of affairs symptoms of disorder have recently been found in seemingly perfectly regular molecular structures and symptoms of order in seemingly perfectly chaotic aggregations of particles these dis coveries led to the formulation of new and important laws cor relating the structure of substances with their properties and to tilt explanation of many phenomena in terms of changes in the degree of order

Some aspects of the theory of disordered solids 1981 this volume and its two companion volumes entitled tetrahedrally bonded amorphous semiconductors and localization and metal insulator transitions are our way of paying special tribute to sir nevill mott and to express our heartfelt wishes to him on the occasion of his eightieth birthday sir nevill has set the highest standards as a physicist teacher and scientific leader our feelings for him include not only the respect and admiration due a great scientist but also a deep affection for a great human being who possesses a rare combination of outstanding personal qualities we thank him for enriching our lives and we shall forever carry cherished memories of this noble man scientists best express their thanks by contributing their thoughts and observations to a festschrift this one honoring sir nevill fills three volumes with literally hundreds of authors meeting a strict deadline the fact that contributions poured in from all parts of the world attests to the international cohesion of our scientific community it is a tribute to sir nevill s stand for peace and understanding transcending national borders the editors wish to express their gratitude to ghazaleh koefod for her diligence and expertise in deciphering and typing many of the papers as well as helping in numerous other ways the blame for the errors that remain belongs to the editors

Dynamical Properties of Solids: Disordered solids, optical properties 1974 with an approach that stresses the fundamental solid state behaviour of minerals this 1995 text surveys the physics and chemistry of earth materials

A First-Principles Study of Highly Anharmonic and Dynamically Disordered Solids 2020-05-06 this is the second volume in the nato asi series dealing with the topic of hydrogen in solids the first v b76 metal hydrides appeared five years ago and focussed primarily on crystalline phases of hydrided metallic systems in the intervening period the amorphous solid state has become an area of intense research activity encompassing both metallic and non metallic e g semiconducting systems at the same time the problem of storage of hydrogen which motivated the first asi continues to be important in the case of metallic systems there were early indications that metallic glasses and disordered alloys may be more corrosion resistant less susceptible to embrittlement by hydrogen and have a higher hydrogen mobility than ordered metals or intermetallics all of these properties are desirable for hydrogen storage subsequent research has shown that thermodynamic instability is a severe problem in many amorphous metal hydrides the present asi has provided an appropriate forum to focus on these issues

Quantum and Semi-classical Percolation and Breakdown in Disordered Solids 2009-04-20 this book gives a pedagogical introduction to the physics of amorphous solids and related disordered condensed matter systems important concepts from statistical mechanics such as percolation random walks fractals and spin glasses are explained using these concepts the common aspects of these systems are emphasized and the current understanding of the glass transition and the structure of glasses are concisely reviewed this second edition includes new material on emerging topics in the field of disordered systems such as gels driven systems dynamical heterogeneities growing length scales etc as well as an update of the literature in this rapidly developing field

Defects and Disorder in Crystalline and Amorphous Solids 2012-11-02 dynamical properties of solids volume 4 disordered solids optical properties focuses on the lattice dynamical properties of noncrystalline and disordered solids and optical properties of crystalline solids the selection first elaborates on the vibrational properties of amorphous solids and computer experiments and disordered solids topics include thermal and electrical transport density of states numerical methods localization low frequency modes and theoretical background the text then takes a look at the morphic effects in lattice dynamics including normal coordinate formalism electric field induced infrared absorption and raman scattering stress induced changes in the phonon frequencies and the effect of time reversal on the symmetry of the long wavelength optical the manuscript examines the absorption of infrared radiation by multiphonon processes in solids as well as theoretical studies of infrared absorption in the multiphonon region and experimental studies of infrared absorption at frequencies above the characteristic lattice vibration frequencies the selection is a dependable source of data for researchers interested in the optical properties of crystalline solids and lattice dynamical properties of noncrystalline and disordered solids

Disordered Materials 2012-12-06 with the mapping of the partition function graphs of the n vector magnetic model in the n to 0 limit as the self avoiding walks the conformational statistics of linear polymers was clearly understood in early seventies various models of disordered solids percolation model in particular were also established by late seventies subsequently investigations on the statistics of linear polymers or of self avoiding walks in say porous medium or disordered lattices were started in early eighties inspite of the brilliant ideas forwarded and extensive studies made for the next two decades the problem is not yet completely solved in its generality this intriguing and important problem has remained since a topic of vigorous and active research this book intends to offer the readers a first hand and extensive review of the various aspects of the problem written by the experts in the respective fields we hope the contents of the book will provide a valuable guide for researchers in statistical physics of polymers and will surely induce further research and advances towards a complete understanding of the problem first book on statistics of polymers in random media contents straight away from research labs chapters written by foremost experts in the respective fields theories experiments and computer simulations extensively discussed includes latest developments in understanding related important topics like dna unzipping travelling salesman problem etc comprehensive index for quick search for keywords

Order and Disorder in the World of Atoms 2012-12-06 the hopping process which differs substantially from conventional transport processes in crystals is the central process in the transport phenomena discussed in this book throughout the book the term hopping is defined as the inelastic tunneling transfer of an electron between two localized electronic states centered at different locations such processes do not occur in conventional electronic transport in solids since localized states are not compatible with the translational symmetry of crystals the rapid growth of interest in hopping transport has followed in the footsteps of the development of physics of disordered systems during the last three decades the intense interest in disordered solids can be attributed to the technological potential of the new noncrystalline materials as well as to new fundamental problems discovered in solid state physics when a crystal is no longer translationally symmetric in the last decade hopping systems such as organic polymers biological materials many oxide glasses mesoscopic systems and the new high temperature superconducting materials in their normal state have attracted much interest new phenomena investigated recently include interference and coherent scattering in variable range hopping conduction mesoscopic effects relaxation processes and thermo electric power and thermal conductivity caused by hopping transport this volume presents the reader with a thorough overview of these recent developments written by leading experts in the various fields

Physics of Disordered Materials 2012-12-06 this comprehensive book provides a full description of experimental and theoretical details and the latest theories the expert contributions point out the direction research is currently taking the expectations and implications serving as useful introductory surveys

Some Problems in Electronic Properties of Disordered Solids 1982 intended for managers engineers in powder technology metal finishing other industries using electrostatic processes those concerned with industrial safety flammable environments etc those in the electronics industry where electrostatic damage is a problem graduates researchers studying electrostatics undergraduates on courses in the subject will also find it an invaluable reference source

Studies Relating to the Structures of Some Disordered Solids 1981 the subject of low energy excitations has evolved since two level tunneling systems were first proposed 50 years ago initially they were used to explain the common anomalous properties of oxide glasses and polymers now the subject includes a wide range of other materials containing disorder amorphous semiconductors and metals doped mixed and quasi crystals surface adsorbates

and topics such as dephasing of quantum states and interferometer noise a fairly simple empirical description using a remarkably small range of parameters serves well to describe the effect of these excitations but the structures causing these effects are known in only a few materials and the reasons for their similarity across disparate materials has only been qualitatively addressed this book provides a unified comprehensive description of tunneling systems in disordered solids suitable for graduate students researchers wishing an introduction to the field its focus is on the tunneling systems intrinsic to glassy solids it describes the experimental observations of glassy properties develops the basic empirical tunneling model and discusses the dynamics changes on cooling to temperatures where direct excitation interactions become important and on heating to where tunneling gives way to thermal activation finally it discusses how theories of glass formation can help us understand the ubiquity of these excitations the development of the basic tunneling model is the core of the book and is worked out in considerable detail to keep the total within bounds of our expertise and the readers patience many related experimental and theoretical developments are only sketched out here the text is heavily cited to allow readers to follow their specific interests in much more depth

Physics and Chemistry of Earth Materials 1994-11-25 at present there is an increasing interest in the prediction of properties of classical and new materials such as substitutional alloys their surfaces and metallic or semiconductor multilayers a detailed understanding based on a thus of the utmost importance for fu microscopic parameter free approach is ture developments in solid state physics and materials science the interrela tion between electronic and structural properties at surfaces plays a key role for a microscopic understanding of phenomena as diverse as catalysis corrosion chemisorption and crystal growth remarkable progress has been made in the past 10 15 years in the understand ing of behavior of ideal crystals and their surfaces by relating their properties to the underlying electronic structure as determined from the first principles similar studies of complex systems like imperfect surfaces interfaces and mul tilayered structures seem to be accessible by now conventional band structure methods however are of limited use because they require an excessive number of atoms per elementary cell and are not able to account fully for e g substitu tional disorder and the true semiinfinite geometry of surfaces such problems can be solved more appropriately by green function techniques and multiple scattering formalism

Diffusion in Disordered Solids and Undercooled Liquids 2001

Hydrogen in Disordered and Amorphous Solids 2013-12-19

Structural and Dynamic Properties of Disordered Solids 1997

Glassy Materials And Disordered Solids: An Introduction To Their Statistical Mechanics (Revised Edition) 2011-01-31

Metals, Superconductors, Magnetic Materials, Liquids Disordered Solids, Optical Properties 2012-12-02

Disordered Systems and New Materials 1989

Optical Properties of Disordered Solids 1992

Statistics of Linear Polymers in Disordered Media 2005-06-09

Hopping Transport in Solids 1991-07-26

Tunneling Systems in Amorphous and Crystalline Solids 2013-03-09

The Physics of Structurally Disordered Matter 1987

Low-Energy Excitations in Disordered Solids: the What and Where of Glassy States, If Not the Why (XL-Too Broad?) 2021-04-21

Electronic Structure of Disordered Alloys, Surfaces and Interfaces 2013-11-27

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