Micromechanics Of Defects In Solids

Defects in Liquid Crystals: Computer Simulations, Theory and Experiments *Micromechanics of defects in solids* **Micromechanics of Defects in Solids** *Theory of Defects in Solids* **Charged Semiconductor Defects Defects in Solids** *Gauge Theory and Defects in Solids* Defects and Defect Processes in Nonmetallic Solids *Spectroscopy of Defects in Organic Crystals* **Metastability of Defects in Compound Semiconductors Theory of Defects in Semiconductors Micromechanics of Defects in Solids Dopants and Defects in Semiconductors Methods for Calculation of the Electronic Structure of Defects in Insulators Characterisation and Control of Defects in Semiconductors** *Theories of Defects in Solids Detection of Defects in Glass* **Science and Technology of Defects in Silicon** Photographic Guide of Selected External Defect Indicators and Associated Internal Defects in White Oak **Quantitative Analysis of Defects in Composite Material by Means of Optical Lockin Thermography Photographic Guide to Selected External Defect Indicators and Associated Internal Defects in Yellow-poplar** Point and Extended Defects in Semiconductors Physics of Elasticity and Crystal Defects Recent Progress in the Mechanics of Defects **Principles and Applications of Chemical Defects Defects in SiO2 and Related Dielectrics: Science and Technology** Defects in Self-Catalysed III-V Nanowires **Defects in Microelectronic Materials and Devices** Beam Injection Assessment of Defects in Semiconductors *Defects and Disorder in Crystalline and Amorphous Solids* **Investigation of defects in weakly damaged GaAs** *Advanced Calculations for Defects in Materials* **Defects in Two-Dimensional Materials** Observations on the causes and early symptons of defects in the form of the spine, chest and shoulders, and on the means of correcting them *Defects and Transport in Oxides Prediction of Defects in Material Processing* **Metal Oxide Defects Investigation of Defects in Fe3Al-based Alloys by PAS Defects and Damage in Composite Materials and Structures** Point Defects in Semiconductors II

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Theories of Defects in Solids Jul 18 2021 This book surveys the theory of defects in solids, concentrating on the electronic structure of point defects in insulators and semiconductors. The relations between different approaches are described, and the predictions of the theory compared critically with experiment. The physicalassumptions and approximations are emphasized. Theory of Defects in Solids begins with the perfect solid, then reviews the main methods of calculating defect energy levels and wave functions. The calculation of observable defect properties is discussed, and finally, the theory is applied to a range of defects that are very different in nature.This book is intended for research workers and graduate students interested in solid-state physics.
Prediction of Defects in Material Processing Oct 28 2019
Defects in Solids May 28 2022 Provides a thorough understanding of the chemistry and

physics of defects, enabling the reader to manipulate them in the engineering of materials. Reinforces theoretical concepts by placing emphasis on real world processes and applications. Includes two kinds of end-of-chapter problems: multiple choice (to test knowledge of terms and principles) and more extensive exercises and calculations (to build skills and understanding). Supplementary material on crystallography and band structure are included in separate appendices.

Theory of Defects in Solids Jul 30 2022 This book surveys the theory of defects in solids, concentrating on the electronic structure of point defects in insulators and semiconductors. The relations between different approaches are described, and the predictions of the theory compared critically with experiment. The physical assumptions and approximations are emphasized. The book begins with the perfect solid, then reviews the main methods of calculating defect energy levels and wave functions. The calculation and observable defect properties is discussed, and finally, the theory is applied to a range of defects that are very different in nature. This book is intended for research workers and graduate students interested in solid-state physics. From reviews of the hardback: 'It is unique and of great value to all interested in the basic aspects of defects in solids.' Physics Today 'This is a particularly worthy book, one which has long been needed by the theoretician and experimentalist alike.' Nature

Metal Oxide Defects Sep 27 2019 Metal Oxide Defects: Fundamentals, Design, Development and Applications provides a broad perspective on the development of advanced experimental techniques to study defects and their chemical activity and catalytic reactivity in various metal oxides. This book highlights advances in characterization and analytical techniques to achieve better understanding of a wide range of defects, most importantly, state-of-the-art methodologies for controlling defects. The book provides readers with pathways to apply basic principles and interpret the behavior of metal oxides. After reviewing characterization and analytical techniques, the book focuses on the relationship of defects to the properties and performance of metal oxides. Finally, there is a review of the methods to control defects and the applications of defect engineering for the design of metal oxides for applications in optoelectronics, energy, sensing, and more. This book is a key reference for materials scientists and engineers, chemists, and physicists. Reviews advances in characterization and analytical techniques to understand the behavior of defects in metal oxide materials Introduces defect engineering applied to the design of metal oxide materials with desirable properties Discusses applications of defect engineering to enhance the performance of materials for a wide range of applications, with an emphasis on optoelectronics

Beam Injection Assessment of Defects in Semiconductors Jun 04 2020

Detection of Defects in Glass Jun 16 2021 Glass defects which result into poor quality are a major reason of embarrassment for manufacturers. It is an extremely tedious process to manually inspect very large size glasses. The manual inspection process is slow, time-consuming and prone to human error.In this research work, the analyses and methodology employed to detect the defects in the glass sheets seek to address this need, using image processing technique because of its higher precision and speed to overcome many of these disadvantages and offer manufacturers an opportunity to significantly improve quality and reduce costs. The implementation of defect detection methodology has two main phases, namely the visibility test and segmentation phase. The visibility test enables the selection of an appropriate color space followed by the region-based active contour segmentation technique for final detection of the defect.The results show that the technique when applied to glass industry enables detection of any kind of major defects like surface defects, foreign materials, etc that can be present in the glass sheet providing good quality inspection with reasonable accuracy.

Defects in Self-Catalysed III-V Nanowires Aug 07 2020 This thesis presents an in-depth exploration of imperfections that can be found in self-catalysed III-V semiconductor nanowires. By utilising advanced electron microscopy techniques, the interface sharpness and defects at the atomic and macroscopic scale are

analysed. It is found that a surprising variety and quantity of defect structures can exist in nanowire systems, and that they can in fact host some never-before-seen defect configurations. To probe how these defects are formed, conditions during nanowire growth can be emulated inside the microscope using the latest generation of in-situ heating holder. This allowed the examination of defect formation, dynamics, and removal, revealing that many of the defects can in fact be eliminated. This information is critical for attaining perfect nanowire growth. The author presents annealing strategies to improve crystal quality, and therefore device performance.

Gauge Theory and Defects in Solids Apr 26 2022 This new series Mechanics and Physics of Discrete Systems aims to provide a coherent picture of the modern development of discrete physical systems. Each volume will offer an orderly perspective of disciplines such as molecular dynamics, crystal mechanics and/or physics, dislocation, etc. Emphasized in particular are the fundamentals of mechanics and physics that play an essential role in engineering applications. Volume 1, Gauge Theory and Defects in Solids, presents a detailed development of a rational theory of the dynamics of defects and damage in solids. Solutions to field equations are used to determine stresses, dislocation densities and currents that arise from histories of loading of boundaries of bodies. Analysed in detail is a gauge theory with a gauge group that is not semi-simple, and whose action occurs at the classical macroscopic level. Yang-Mills theory is applied where the state variables are elastic displacements in solids, determination of mechanical and electromagnetic observables by choice of gauge conditions is demonstrated, and practices of classical dislocation theory are derived from first principles.

Characterisation and Control of Defects in Semiconductors Aug 19 2021 This book provides an up-to-date review of the experimental and theoretical methods used for studying defects in semiconductors, this book focuses on recent developments driven by the requirements of new materials, including nitrides, oxide semiconductors and 2-D semiconductors.

Dopants and Defects in Semiconductors Oct 21 2021 This revised edition continues to provide the most complete coverage of the fundamental knowledge of semiconductors. In addition to inclusion of new chapter problems and worked examples, it delves into solid-state lighting (LEDs and laser diodes), and offers a solid foundation for experimental methods and the theory of defects in semiconduc

Recent Progress in the Mechanics of Defects Nov 09 2020 The International Symposium on Defect and Material Mechanics (ISDMM09) was the fourth international meeting of a series, following the workshops held at Kaiserslautern (2003), Symi (2005) and Aussois (2007), and was held in the alpine city of Trento, Italy, from July 6 to 9, 2009. The Symposium brought together researchers in the areas of the mechanics of defects, in a broad sense: cracks, dislocations, inclusions, precipitates, phase boundaries, and shape optimization. A select number of contributions based on the presentations given at the symposium are collected in this volume, which provides a reference source of the present state of development in the field of the mechanics of defects. Previously published in the International Journal of Fracture 166:1-2 (2010).

Observations on the causes and early symptons of defects in the form of the spine, chest and shoulders, and on the means of correcting them Dec 31 2019

Investigation of defects in weakly damaged GaAs Apr 02 2020

Point and Extended Defects in Semiconductors Jan 12 2021 The systematic study of defects in semiconductors began in the early fifties. FrQm that time on many questions about the defect structure and properties have been an swered, but many others are still a matter of investigation and discussion. Moreover, during these years new problems arose in connection with the identification and char acterization of defects, their role in determining transport and optical properties of semiconductor materials and devices, as well as from the technology of the ever in creasing scale of integration. This book presents to the reader a view into both basic concepts of defect physics and recent developments of high resolution experimental techniques. The book does not aim at an

exhaustive presentation of modern defect physics; rather it gathers a number of topics which represent the present-time research in this field. The volume collects the contributions to the Advanced Research Workshop "Point, Extended and Surface Defects in Semiconductors" held at the Ettore Majo rana Centre at Erice (Italy) from 2 to 7 November 1988, in the framework of the International School of Materials Science and Technology. The workshop has brought together scientists from thirteen countries. Most participants are currently working on defect problems in either silicon submicron technology or in quantum wells and superlattices, where point defects, dislocations, interfaces and surfaces are closely packed together.

Metastability of Defects in Compound Semiconductors Jan 24 2022

Defects and Defect Processes in Nonmetallic Solids Mar 26 2022 This extensive survey covers defects in nonmetals, emphasizing point defects and point-defect processes. It encompasses electronic, vibrational, and optical properties of defective solids, plus dislocations and grain boundaries. 1985 edition.

Spectroscopy of Defects in Organic Crystals Feb 22 2022 Spectroscopy of Defects in Organic Crystals presents a masterly summary of the widespread and voluminous literature on the subject, presenting theoretical and experimental investigations of electron and vibronic optical spectra of organic crystals. Electronic states of defects combine to form crystal near-to-band and band levels. These are discrete states in the vicinity of exciton bands, surface and dislocational excitons, etc. Some studies have expressed dissimilar or even conflicting opinions about the nature of observed phenomena. In the choice of the material, preference has been given to phenomena which have received a theoretical interpretation. Some attention is paid to observations which are not completely understood and also to effects predicted but not yet confirmed. The monograph will be useful for scientists as well as undergraduate and postgraduate students of solid state physics.

Defects in Liquid Crystals: Computer Simulations, Theory and Experiments Nov 02 2022 Proceedings of the NATO Advanced Research Workshop on Computer Simulations of Defects in Liquid Crystals Including their Relation to Theory and Experiment, held in Erice, Sicily, Italy, 19-23 September 2000

Defects and Transport in Oxides Nov 29 2019 DEFECTS AND TRANSPORT IN OXIDES is the proceedings of the eighth Battelle Colloquium in the Materials Sciences, held in Columbus and Salt Fork, Ohio, September 17-22, 1973. It took as its theme the relationship between defects and transport of both mass and charge in oxides. Applications of defect-controlled transport to a number of important processes in oxides also were covered. In selecting this topic, the Organizing Committee thought that 1973 was timely to bring together the leading theoretical and experimental researchers in the oxide transport field to review its status in a critical way, and to consider current major research directions and how research in the future might be guided into fruitful areas. The meeting was highlighted by the presentation of several papers which suggest that major advances in our understanding of transport in oxides appear to be imminent. These papers dealt with the results of new theoretical approaches whereby the energies and configurations of defects may be calculated, and with new experimental techniques for indirectly observing these defects, previously thought to be below the limits of experimental resolving power. Other papers, dealing with the application of defect chemistry to technological processes, served to demonstrate the successes and to point out yet unresolved problems associated with ix x PREFACE understanding the chemistry of imperfect crystals.

Defects in Microelectronic Materials and Devices Jul 06 2020 Uncover the Defects that Compromise Performance and Reliability As microelectronics features and devices become smaller and more complex, it is critical that engineers and technologists completely understand how components can be damaged during the increasingly complicated fabrication processes required to produce them. A comprehensive survey of defects that occur in silicon-based metal-oxide semiconductor field-effect transistor (MOSFET) technologies, this book also discusses flaws in linear bipolar technologies, silicon carbide-based devices, and gallium arsenide materials and devices. These

defects can profoundly affect the yield, performance, long-term reliability, and radiation response of microelectronic devices and integrated circuits (ICs). Organizing the material to build understanding of the problems and provide a quick reference for scientists, engineers and technologists, this text reviews yield- and performance-limiting defects and impurities in the device silicon layer, in the gate insulator, and/or at the critical Si/SiO2 interface. It then examines defects that impact production yield and long-term reliability, including: Vacancies, interstitials, and impurities (especially hydrogen) Negative bias temperature instabilities Defects in ultrathin oxides (SiO2 and silicon oxynitride) Take A Proactive Approach The authors condense decades of experience and perspectives of noted experimentalists and theorists to characterize defect properties and their impact on microelectronic devices. They identify the defects, offering solutions to avoid them and methods to detect them. These include the use of 3-D imaging, as well as electrical, analytical, computational, spectroscopic, and state-of-the-art microscopic methods. This book is a valuable look at challenges to come from emerging

Quantitative Analysis of Defects in Composite Material by Means of Optical Lockin Thermography Mar 14 2021 In the aerospace industry, carbon-ber reinforced plastic (CFRP) materials are becoming increasingly popular. Due to mechanical fracture and hence safety related issues, CFRP components must be inspected for defects with non-destructive methods. This thesis focuses on non-destructive testing of CFRP materials with optical lockin thermography. The eld of quantitative analysis of thermographic measurements is enhanced. The data of geometrical parameters e.g. depth, size and shape of defects in structures of globally homogeneous and anisotropic CFRP materials is required for fracture mechanics. To evaluate defects in a quantitative way, image processing algorithms are applied to thermographic phase images in order to get panoramic views of extended aircraft parts and to compare measurements before and after a fatigue load in order to determine potential defect growth. Images of lockin and ultrasound excited thermography are combined with data-fusion techniques to get improved information on defects such as impacts. The image formation process can be modeled through a point-spread function, which depends on the depth of the defect and the modulation frequency. A function is computed by using Green's functions and is adapted to anisotropic materials. The quantities depth, size and shape of a defect are determined through inverse numerical lters. Measurements are compared to numerical simulations and a reconstruction algorithm of planar subsurface defects is validated.

Methods for Calculation of the Electronic Structure of Defects in Insulators Sep 19 2021

Micromechanics of defects in solids Oct 01 2022 This book sterns from a course on Micromechanics that I started about fifteen years ago at Northwestern University. At that time, micro mechanics was a rather unfamiliar subject. Although I repeated the course every year, I was ne ver convinced that my notes have quite developed into a final manuscript because new topics emerged con stantly requiring revisions, and additions. I finally came to realize that if this is continued, then I will never complete the book to my total satisfaction. Meanwhile, T. Mori and I had coauthored a book in Micromechanics, published by Baifu-kan, Tokyo, in Japanese, entitled 1975. It received an extremely favorable response from students and researchers in Japan. This encouraged me to go ahead and publish my course notes in their latest version, as this book, which contains further development of the subject and is more comprehensive than the one published in Japanese. Micromechanics encompasses mechanics related to microstructures of materials. The method employed is a continuum theory of elasticity yet its applications cover a broad area relating to the mechanical behavior of materials: plasticity, fracture and fatigue, constitutive equa tions, composite materials, polycrystals, etc. These subjects are treated in this book by means of a powerful and unified method which is called the 'eigenstrain method. ' In particular, problems relating to inclusions and dislocations are most effectively analyzed by this method, and therefore, special emphasis is placed on these topics.

Principles and Applications of Chemical Defects Oct 09 2020 This book provides some insight into chemical defects in crystalline solids, focusing on the relationship between basic principles and device applications. It is concerned with the chemical, optical and electronic consequences of the presence of defects in crystals.

Micromechanics of Defects in Solids Nov 21 2021 This volume presents recent developments in the theory of defects and the mechanics of material forces. The book constitutes a selection of the contributions presented at the International Symposium on Defect and Material Mechanics (ISDMM2011), held inSeville,Spain, June 2011. The ISDMM series of symposia provides a rare and much needed forum for bringing together a diverse group of researchers from various areas ranging from theoretical, experimental and computational modeling of the mechanics of materials. The present volume constitutes a valuable snapshot of the field of the mechanics of materials and their defects, and a window to its many accomplishments, challenges and opportunities, and open questions. The volume is intended to motivate the young research community interested in the field. Reprinted from International Journal of Fracture, Vol. 174:1 (2012)

Photographic Guide to Selected External Defect Indicators and Associated Internal Defects in Yellow-poplar Feb 10 2021 S2To properly classify or grade logs or trees, one must be able to correctly identify indicators and assess the effect of the underlying defect on possible end products. This guide assists the individual in identifying the surface defect indicator and shows the progressive stages of the defect throughout its development for yellow poplar. Twelve types of external defect indicators and associated defects that are particularly difficult to evaluate are illustrated and described.S3.

Science and Technology of Defects in Silicon May 16 2021 This volume reviews recent developments in the materials science of silicon. The topics discussed range from the fundamental characterization of the physical properties to the assessment of materials for device applications, and include: crystal growth; process-induced defects; topography; hydrogenation of silicon; impurities; and complexes and interactions between impurities. In view of its key position within the conference scope, several papers examine process induced defects: defects due to ion implantation, silicidation and dry etching, with emphasis being placed on the device aspects. Special attention is also paid to recent developments in characterization techniques on epitaxially grown silicon, and silicon-on-insulators.

Advanced Calculations for Defects in Materials Mar 02 2020 This book investigates the possible ways of improvement by applying more sophisticated electronic structure methods as well as corrections and alternatives to the supercell model. In particular, the merits of hybrid and screened functionals, as well as of the +U methods are assessed in comparison to various perturbative and Quantum Monte Carlo many body theories. The inclusion of excitonic effects is also discussed by way of solving the Bethe-Salpeter equation or by using time-dependent DFT, based on GW or hybrid functional calculations. Particular attention is paid to overcome the side effects connected to finite size modeling. The editors are well known authorities in this field, and very knowledgeable of past developments as well as current advances. In turn, they have selected respected scientists as chapter authors to provide an expert view of the latest advances. The result is a clear overview of the connections and boundaries between these methods, as well as the broad criteria determining the choice between them for a given problem. Readers will find various correction schemes for the supercell model, a description of alternatives by applying embedding techniques, as well as algorithmic improvements allowing the treatment of an ever larger number of atoms at a high level of sophistication.

Defects in Two-Dimensional Materials Jan 30 2020 Defects in Two-Dimensional Materials addresses the fundamental physics and chemistry of defects in 2D materials and their effects on physical, electrical and optical properties. The book explores 2D materials such as graphene, hexagonal boron nitride (h-BN) and transition metal dichalcogenides (TMD). This knowledge will enable scientists and engineers to tune 2D materials properties to meet specific

application requirements. The book reviews the techniques to characterize 2D material defects and compares the defects present in the various 2D materials (e.g. graphene, h-BN, TMDs, phosphorene, silicene, etc.). As two-dimensional materials research and development is a fast-growing field that could lead to many industrial applications, the primary objective of this book is to review, discuss and present opportunities in controlling defects in these materials to improve device performance in general or use the defects in a controlled way for novel applications. Presents the theory, physics and chemistry of 2D materials Catalogues defects of 2D materials and their impacts on materials properties and performance Reviews methods to characterize, control and engineer defects in 2D materials

Defects in SiO2 and Related Dielectrics: Science and Technology Sep 07 2020 Silicon dioxide plays a central role in most contemporary electronic and photonic technologies, from fiber optics for communications and medical applications to metal-oxide-semiconductor devices. Many of these applications directly involve point defects, which can either be introduced during the manufacturing process or by exposure to ionizing radiation. They can also be deliberately created to exploit new technologies. This book provides a general description of the influence that point defects have on the global properties of the bulk material and their spectroscopic characterization through ESR and optical spectroscopy.

Photographic Guide of Selected External Defect Indicators and Associated Internal Defects in White Oak Apr 14 2021 S2To properly classify or grade logs and trees, one must be able to correctly identify defect indicators and assess the effect of the underlying defect on possible end products. This guide assists the individual in identifying the surface defect indicator and also shows the progressive stages of the defect throughout its development for white oak. It illustrates and describes nine types of external defect indicators and associated defects that are particularly difficult to evaluate. S3.

Defects and Disorder in Crystalline and Amorphous Solids May 04 2020 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 Elasticity and Crystal Defects Dec 11 2020 Although linear elasticity of defects in solids is well established, this textbook introduces the subject in a novel way by comparing key concepts at the atomic scale and at the usual continuum scale, and it explores the relationships between these treatments. There are exercises to work through, with solutions for instructors from the OUP website.

Charged Semiconductor Defects Jun 28 2022 Defects in semiconductors have been studied for many years, in many cases with a view toward controlling their behaviour through various forms of “defect engineering”. For example, in the bulk, charging significantly affects the total concentration of defects that are available to mediate phenomena such as solid-state diffusion. Surface defects play an important role in

mediating surface mass transport during high temperature processing steps such as epitaxial film deposition, diffusional smoothing in reflow, and nanostructure formation in memory device fabrication. “Charged Defects in Semiconductors” details the current state of knowledge regarding the properties of the ionized defects that can affect the behaviour of advanced transistors, photo-active devices, catalysts, and sensors. Features: group IV, III-V, and oxide semiconductors; intrinsic and extrinsic defects; and, point defects, as well as defect pairs, complexes and clusters.

Point Defects in Semiconductors II Jun 24 2019 In introductory solid-state physics texts we are introduced to the concept of a perfect crystalline solid with every atom in its proper place. This is a convenient first step in developing the concept of electronic band struc ture, and from it deducing the general electronic and optical properties of crystalline solids. However, for the student who does not proceed further, such an idealization can be grossly misleading. A perfect crystal does not exist. There are always defects. It was recognized very early in the study of solids that these defects often have a profound effect on the real physical properties of a solid. As a result, a major part of scientific research in solid-state physics has,' from the early studies of "color centers" in alkali halides to the present vigorous investigations of deep levels in semiconductors, been devoted to the study of defects. We now know that in actual fact, most of the interest ing and important properties of solids-electrical, optical, mechanical- are determined not so much by the properties of the perfect crystal as by its im perfections.

Theory of Defects in Semiconductors Dec 23 2021 Semiconductor science and technology is the art of defect engineering. The theoretical modeling of defects has improved dramatically over the past decade. These tools are now applied to a wide range of materials issues: quantum dots, buckyballs, spintronics, interfaces, amorphous systems, and many others. This volume presents a coherent and detailed description of the field, and brings together leaders in theoretical research. Today's state-of-the-art, as well as tomorrow’s tools, are discussed: the supercell-pseudopotential method, the GW formalism,Quantum Monte Carlo, learn-on-the-fly molecular dynamics, finite-temperature treatments, etc. A wealth of applications are included, from point defects to wafer bonding or the propagation of dislocation.

Micromechanics of Defects in Solids Aug 31 2022 This book stems from a course on Micromechanics that I started about fifteen years ago at Northwestern University. At that time, micromechanics was a rather unfamiliar subject. Although I repeated the course every year, I was never convinced that my notes have quite developed into a final manuscript because new topics emerged constantly requiring revisions, and additions. I finally came to realize that if this is continued, then I will never complete the book to my total satisfaction. Meanwhile, T. Mori and I had coauthored a book in Japanese, entitled Micromechanics, published by Baifu-kan, Tokyo, in 1975. It received an extremely favorable response from students and re searchers in Japan. This encouraged me to go ahead and publish my course notes in their latest version, as this book, which contains further development of the subject and is more comprehensive than the one published in Japanese. Micromechanics encompasses mechanics related to microstructures of materials. The method employed is a continuum theory of elasticity yet its applications cover a broad area relating to the mechanical behavior of materi als: plasticity, fracture and fatigue, constitutive equations, composite materi als, polycrystals, etc. These subjects are treated in this book by means of a powerful and unified method which is called the 'eigenstrain method. ' In particular, problems relating to inclusions and dislocations are most effectively analyzed by this method, and therefore, special emphasis is placed on these topics.

Investigation of Defects in Fe3Al-based Alloys by PAS Aug 26 2019

Defects and Damage in Composite Materials and Structures Jul 26 2019 The advantages of composite materials include a high specific strength and stiffness, formability, and a comparative resistance to fatigue cracking and corrosion. However, not forsaking these advantages, composite materials are prone to a wide range of defects and damage that can significantly reduce the residual strength and stiffness of a structure or result in unfavorable

load paths. Emphasizing defect identification and restitution, Defects and Damage in Composite Materials and Structures explains how defects and damage in composite materials and structures impact composite component performance. Providing ready access to an extensive, descriptive list of defects and damage types, this must-have reference: Examines defect criticality in composite structures Recommends repair actions to restore structural integrity Discusses failure modes and mechanisms of composites due to defects Reviews NDI processes for finding and identifying defects in composite materials Relating defect detection methods to defect type, the author merges his experience in the field of in-service activities for composite airframe maintenance and repair with indispensable reports and articles on defects and damage in advanced composite materials from the last 50 years.