Deformation of Ceramic Materials II-Richard E. Tressler 2012-11-21
This volume "Deformation of Ceramic Materials II" constitutes the proceedings of an international symposium held at The Pennsylvania State University, University Park, PA on July 20, 21, and 22, 1983. It includes studies of semiconductors and minerals which are closely related to ceramic materials. The initial conference on this topic was held in 1974 at Penn State and the proceedings were published in the volume entitled "Deformation of Ceramic Materials." This conference emphasized the deformation behavior of crystals and polycrystalline line and polycrystalline ceramics with internationally recognized authorities as keynote lecturers on the major subtopics. Several papers dealing with cavity nucleation and creep crack growth represent a major new research thrust in ceramics since the first conference. This collection of papers represents the state-of-the-art of our understanding of the plastic deformation behavior of ceramics and the crystals of which they are composed. We are grateful for the suggestions of our International Advisory Committee in recommending experts in their respective countries to participate. We are particularly grateful that the organizers of the previous Dislocation-Point Defect Interaction Workshops agreed to participate in the Penn State Symposium as an alternative at the suggestion of Prof. A. H. Heuer. We acknowledge the financial support of the National Science Foundation for this conference.

Deformation of Ceramic Materials II-Richard E. Tressler 2012-12-06
This volume "Deformation of Ceramic Materials II" constitutes the proceedings of an international symposium held at The Pennsylvania State University, University Park, PA on July 20, 21, and 22, 1983. It includes studies of semiconductors and minerals which are closely related to ceramic materials. The initial conference on this topic was held in 1974 at Penn State and the proceedings were published in the volume entitled "Deformation of Ceramic Materials." This conference emphasized the deformation behavior of crystals and polycrystalline line and polycrystalline ceramics with internationally recognized authorities as keynote lecturers on the major subtopics. Several papers dealing with cavity nucleation and creep crack growth represent a major new research thrust in ceramics since the first conference. This collection of papers represents the state-of-the-art of our understanding of the plastic deformation behavior of ceramics and the crystals of which they are composed. We are grateful for the suggestions of our International Advisory Committee in recommending experts in their respective countries to participate. We are particularly grateful that the organizers of the previous Dislocation-Point Defect Interaction Workshops agreed to participate in the Penn State Symposium as an alternative at the suggestion of Prof. A. H. Heuer. We acknowledge the financial support of the National Science Foundation for this conference.

Deformation of Ceramic Materials II-Richard Carl Bradt 2000
Deformation of Ceramic Materials II-R. C. Bradt 2011-10-18
This volume constitutes the Proceedings of a Symposium on the Plastic Deformation of Ceramic Materials, held at The Pennsylvania State University, University Park, Pennsylvania, July 17, 18, and 19, 1974. The theme of this conference focused on single crystal and polycrystalline deformation processes in ceramic materials. The 31 contributed papers by 52 authors, present a current understanding of the theory and application of deformation processes to the study and utilization of ceramic materials. The program chairman gratefully acknowledges the financial assistance for the Symposium provided by the United States Atomic Energy Commission, The National Science Foundation, and The College of Earth and Mineral Sciences of The Pennsylvania State University. Special acknowledgment is extended to Drs. Louis C. Ianniello and Paul K. Predecki of the AEC and NSF, respectively. Of course, the proceedings would not have been possible without the excellent cooperation of the authors in preparing their manuscripts. Special appreciation is extended to the professional organization of the conference. In particular, Mrs. Patricia Ewing should be acknowledged for her excellent program organization and planning. Finally, we also wish to thank our secretaries for the patience and help in bringing these Proceedings to press.

Deformation of Ceramic Materials II-Richard E. Tressler 1984-08-31
This volume "Deformation of Ceramic Materials II" constitutes the proceedings of an international symposium held at The Pennsylvania State University, University Park, PA on July 20, 21, and 19, 1983. It includes studies of semiconductors and minerals which are closely related to ceramic materials. The initial conference on this topic was held in 1974 at Penn State and the proceedings were published in the volume entitled "Deformation of Ceramic Materials." This conference emphasized the deformation behavior of crystals and polycrystalline line and polycrystalline ceramics with internationally recognized authorities as keynote lecturers on the major subtopics. Several papers dealing with cavity nucleation and creep crack growth represent a major new research thrust in ceramics since the first conference. This collection of papers represents the state-of-the-art of our understanding of the plastic deformation behavior of ceramics and the crystals of which they are composed. We are grateful for the suggestions of our International Advisory Committee in recommending experts in their respective countries to participate. We are particularly grateful that the organizers of the previous Dislocation-Point Defect Interaction Workshops agreed to participate in the Penn State Symposium as an alternative at the suggestion of Prof. A. H. Heuer. We acknowledge the financial support of the National Science Foundation for this conference.

Plastic Deformation of Ceramics-R.C. Bradt 2013-11-11
This proceedings volume, "Plastic Deformation of Ceramics," constitutes the papers of an international symposium held at Snowbird, Utah from August 7-12, 1994. It was attended by nearly 100 scientists and engineers from more than a dozen countries representing academia, national laboratories, and industry. Two previous conferences on this topic were held at The Pennsylvania State University in 1974 and 1983. Therefore, the last major international conference focusing on the deformation of ceramic materials was held more than a decade ago. Since the early 1980s, ceramic materials have progressed through an evolutionary period of development and advancement. They are now under consideration for applications in engineering structures. The contents of the previous conferences indicate that considerable effort was directed towards a basic understanding of deformation processes in covalently bonded or simple oxide ceramics. However, now, more than a decade later, the focus has completely shifted. In particular, the drive for more efficient heat engines has resulted in the development of silicon-based ceramics and composite ceramics. The discovery of high-temperature cupric oxide-based superconductors has created a plethora of interesting perovskite-like structured ceramics. Additionally, nanophase ceramics, ceramic thin films, and various forms of toughened ceramics have potential applications and, hence, their deformation has been investigated. Finally, new and exciting areas of research have attracted interest since 1983, including fatigue, nanoindentation techniques, and superplasticity.

Deformation of Ceramic Materials-R. C. Bradt 2012-12-06
This volume constitutes the Proceedings of a Symposium on the Plastic Deformation of Ceramic Materials, held at The Pennsylvania State University, University Park, Pennsylvania, July 17, 18, and 19, 1974. The theme of this conference focused on single crystal and polycrystalline deformation processes in ceramic materials. The 31 contributed papers by 52 authors, present a current understanding of the theory and application of deformation processes to the study and utilization of ceramic materials. The program chairman gratefully acknowledges the financial assistance for the Symposium provided by the United States Atomic Energy Commission, The National Science Foundation, and The College of Earth and Mineral Sciences of The Pennsylvania State University. Special acknowledgment is...
Deformation of Ceramic Materials—I

Mechanical Properties of Ceramics

Developments in Strategic Ceramic Materials

Deformation of Ceramic Materials

Deformation Processes in Minerals, Ceramics and Rocks

Ceramic Materials: Science and Engineering

Atomistic Simulation of Strength and Deformation of Ceramic Materials

Handbook of Ceramics Grinding and Polishing

Understanding the Deformation of Ceramic Materials at High Strain Rates
Deformation and Fracture Mechanics of Engineering Materials—Richard W. Hertzberg 1996 This edition comprehensively updates the field of fracture mechanics by including details of the latest research programmes. It contains new material on non-metals, design issues and statistical aspects. The application of fracture mechanics to different types of materials is stressed.

Physical Aspects of Fracture—Elisabeth Bouchaud 2012-12-06 The main scope of this Cargese NATO Advanced Study Institute (June 5-17 2000) was to bring together a number of international experts, covering a large spectrum of the various Physical Aspects of Fracture. As a matter of fact, lecturers as well as participants were coming from various scientific communities: mechanics, physics, materials science, with the common objective of progressing towards a multi-scale description of fracture. This volume includes papers on most materials of practical interest: from concrete to ceramics through metallic alloys, glasses, polymers and composite materials. The classical fields of damage and fracture mechanics are addressed (critical and sub-critical quasi-static crack propagation, stress corrosion, fatigue, fatigue-corrosion . . . . as well as dynamic fracture). Brittle and ductile fractures are considered and a balance has been carefully kept between experiments, simulations and theoretical models, and between the contributions of the various communities. New topics in damage and fracture mechanics - the effect of disorder and statistical aspects, dynamic fracture, friction and fracture of interfaces - were also explored. This large overview on the Physical Aspects of Fracture shows that the old barriers built between the different scales will soon "fracture". It is no more unrealistic to imagine that a crack initiated through a molecular dynamics description could be propagated at the grain level thanks to dislocation dynamics included in a crystal plasticity model, itself implemented in a finite element code. Linking what happens at the atomic scale to fracture of structures as large as a dam is the new emerging challenge.

Dislocation Dynamics During Plastic Deformation—Ulrich Messerschmidt 2010-04-19 Along with numerous illustrative examples, this text provides an overview of the dynamic behavior of dislocations and its relation to plastic deformation. It introduces the general properties of dislocations and treats the dislocation dynamics in some detail.


Ceramic Materials—Philippe Boch 2010-01-05

13th Annual Conference on Composites and Advanced Ceramic Materials, Part 2 of 2—John B. Wachtman 2009-09-28 This volume is part of the Ceramic Engineering and Science Proceeding (CESP) series. This series contains a collection of papers dealing with issues in both traditional ceramics (i.e., glass, whitewares, refractories, and porcelain enamel) and advanced ceramics. Topics covered in the area of advanced ceramic include bioceramics, nanomaterials, composites, solid oxide fuel cells, mechanical properties and structural design, advanced ceramic coatings, ceramic armor, porous ceramics, and more.

Fracture Mechanics of Ceramics—R.C. Bradt 2013-03-07 These volumes, 9 and 10, of Fracture Mechanics of Ceramics constitute the proceedings of an international symposium on the fracture mechanics of ceramic materials held at the Japan Fine Ceramics Center, Nagoya, Japan on July 15, 16, 17, 1995. These proceedings constitute the fifth pair proceeding series of conferences. Volumes 1 and 2 were from the 1973 symposium, volumes 3 and 4 from a 1977 symposium, and volumes 5 and 6 from a 1981 symposium all of which were held at The Pennsylvania State University. Volumes 7 and 8 are from the 1985 symposium which was held at the Virginia Polytechnic Institute and State University. The theme of this conference, as for the previous four, focused on the mechanical behavior of ceramic materials in terms of the characteristics of cracks, particularly the roles which they assume in the fracture processes and mechanisms. The 82 contributed papers by over 150 authors and co-authors represent the current state of that field. They address many of the theoretical and practical problems of interest to those scientists and engineers concerned with brittle fracture.

Fracography of Advanced Ceramics II—J. Dusza 2005-07-15 The aim of this book is to make an important contribution to the development of new functional and structural ceramic materials which exhibit enhanced performances and have improved lifetimes and reliability, by fostering a better understanding of the mechanisms of their deterioration and failure under various stress conditions and at various operating temperatures. Volume is indexed by Thomson Reuters CPCI-S (WoS). The publication covers the topics of basic failure phenomena; indentation fracture; fracture and fractography of structural, electro- and bio-ceramics; fracture of reinforced composites; fracture of porous and laminated ceramics; defect-strength and microstructure - fracture toughness relationships; damage mechanisms in nanoceramics; Fracture and fractography of multilayered ceramics and coatings; machining cracks and edge-chipping; and the fracture and fractography of composites and nanocomposites.

Applied Mechanics Reviews—1977

The Physics and Chemistry of Carbides, Nitrides and Borides—R. Freer 2012-12-06 Carbides, nitrides and borides are families of related refractory materials. Traditionally they have been employed in applications associated with engineering ceramics where either high temperature stability or stability is of primary importance. In recent years there has been a growing awareness of the interesting electrical, thermal and optical properties exhibited by these materials, and the fact that many can be prepared as monolithic ceramics, single crystals and thin films. In practical terms carbides, nitrides and borides offer the prospect of a new generation of semiconductor materials, for example, which can function at very high temperatures in severe environmental conditions. However, as yet, we have only a limited understanding of the detailed physics and chemistry of the materials and how the various manufacturing techniques influence the properties. Under the auspices of the NATO Science Committee an Advanced Research Workshop (ARW) was held on the Physics and Chemistry of Carbides, Nitrides and Borides (University of Manchester, 18-22 September, 1989) in order to assess progress to date and identify the most promising themes and materials for future research. An international group of 38 scientists considered developments in 5 main areas: The preparation of powders, monolithic ceramics, single crystals and thin films; Phase transformations, microstructure, defect structure and mass transport; Materials stability; Theoretical studies; Electrical, thermal and optical properties of bulk materials and thin films.

International Aerospace Abstracts - 1997

14th Annual Conference on Composites and Advanced Ceramic Materials, Part 1 of 2: John B. Wachtman 2009-09-28 This volume is part of the Ceramic Engineering and Science Proceeding (CESP) series. This series contains a collection of papers dealing with issues in both traditional ceramics and advanced ceramics. Topics covered in the area of advanced ceramic include bioceramics, nanomaterials, composites, solid oxide fuel cells, mechanical properties and structural design, advanced ceramic coatings, ceramic armor, porous ceramics, and more.


Dynamic Response of Advanced Ceramics - Ghato Subhash 2021-05-04 Dynamic Response of Advanced Ceramics Discover fundamental concepts and recent advances in experimental, analytical, and computational research into the dynamic behavior of ceramics. In Dynamic Response of Advanced Ceramics, an accomplished team of internationally renowned researchers deliver a comprehensive exploration of foundational and advanced concepts in experimental, analytical, and computational aspects of the dynamic behavior of advanced structural ceramics and transparent materials. The book discusses new techniques used for determination of dynamic hardness and dynamic fracture toughness, as well as edge-on-impact experiments for imaging evolving damage patterns at high impact velocities. The authors also include descriptions of the dynamic deformation behavior of ceramics, including dynamic deformation behavior of ceramics, and the dynamic behavior of advanced structural ceramics and transparent materials, like chemically strengthened glass and glass ceramics. The developments discussed within the book have applications in everything from high-speed machining to cutting, grinding, and blast protection. Readers will also benefit from a presentation of emerging trends and directions in research on this subject as well as current challenges in experimental and computational domains, including an introduction to the history of ceramic materials and their dynamic behavior, including examples of material response to high-strain-rate loading. An exploration of high-strain-rate experimental techniques, like 1D elastic stress-wave propagation techniques, shock waves, and impact testing. Discussions of the static and dynamic responses of ceramics and the shock response of brittle solids. An overview of deformation mechanisms during projectile impact on a confined ceramic, including damage evolution during the nonpenetration and penetration phases. Perfect for researchers, scientists, and engineers working on ballistic impact and shock response of brittle materials. Dynamic Response of Advanced Ceramics will also earn a place in the libraries of industry personnel studying impact-resistant solutions for a variety of applications.

Creep of Crystals - Jean-Paul Poirier 1985-02-28 This textbook describes the physics of the elastic deformation of solids at high temperatures. It is directed at geologists or geophysicists interested in the high-temperature behaviour of crystals who wish to become acquainted with the methods of materials science in so far as they are useful to earth scientists. It explains the most important models and recent experimental results without losing the reader in the primary literature of materials science. In turn, the book deals with the essential solid-state physics, thermodynamics and hydrostatics of creep; creep models and their applications in the geological sciences; diffusion creep; superplastic deformation and deformation enhanced by phase transformations. Five concluding chapters give experimental results for metals, ceramics and minerals. There are extensive bibliographies to aid further study.

Mechanical Behaviour of Engineering Materials - Joachim Roehler 2007-10-16 How do engineering materials deform when bearing mechanical loads? To answer this crucial question, the book bridges the gap between continuum mechanics and materials science. The different kinds of material deformation are explained in detail. The book also discusses the physical processes occurring during the deformation of all classes of engineering materials and shows how these materials can be strengthened to meet the design requirements. It provides the knowledge needed in selecting the appropriate engineering material for a certain design problem. This book is both a valuable textbook and a useful reference for graduate students and practising engineers.

Advances in Ceramic Materials - Ping Xiao 2008-10-21 Volume is indexed and reviewed by Thomson Reuters BCI (WoS). This topical book, containing as it does state-of-the-art reviews, neatly encompasses the current status of research into ceramic materials.

Mechanical Properties of Ceramics - Joshua Pelleg 2014-04-22 This book discusses the mechanical properties of ceramics and aims to provide both a solid background for undergraduate students, as well as serving as a text to bring practicing engineers up to date with the latest developments in this topic so they can use and apply these to their actual engineering work. Generally, ceramics are made by moisturizing a mixture of clays, casting it into desired shapes and then firing it to a high temperature, a process known as 'vitrification'. The relatively late development of metallurgy was contingent on the availability of ceramics and the know-how to mold them into the appropriate forms. Because of the characteristics of ceramics, they offer great advantages over metals in specific applications in which hardness, wear resistance and chemical stability at high temperatures are essential. Clearly, modern ceramics manufacturing has come a long way from the early clay-processing fabrication method, and the last two decades have seen the development of sophisticated techniques to produce a large variety of ceramic material. The chapters of this volume are ordered to help students with their laboratory experiments and guide their observations in parallel with lectures based on the current text. Thus, the first chapter is devoted to mechanical testing. A chapter of ductile and superplastic ceramic is added to emphasize their role in modern ceramics (chapter 2). These are followed by the theoretical basis of the subject. Various aspects of the mechanical properties are discussed in the following chapters, among them, strengthening mechanisms, time dependent and cyclic deformation of ceramics. Many practical illustrations are provided representing various observations encountered in actual ceramic-structures of particularly technical significance. A comprehensive list of references at the end of each chapter is included in this textbook to provide a broad basis for further studying the subject. The work also contains a unique chapter on a topic not discussed in other textbooks on ceramics concerning nanosized ceramics. This work will also be useful as a reference for materials scientists, not only to those who specialize in ceramics.

Ceramic Materials - Wilfried Wunderlich 2010-09-28 This is the first book of a series of forthcoming publications on this field by this publisher. The reader can enjoy both a classical printed version on demand for a small charge, as well as the online version free for download. Your citation decides about the acceptance, distribution, and impact of this piece of knowledge. Please enjoy reading and may this book help promote the progress in ceramic development for better life on earth.