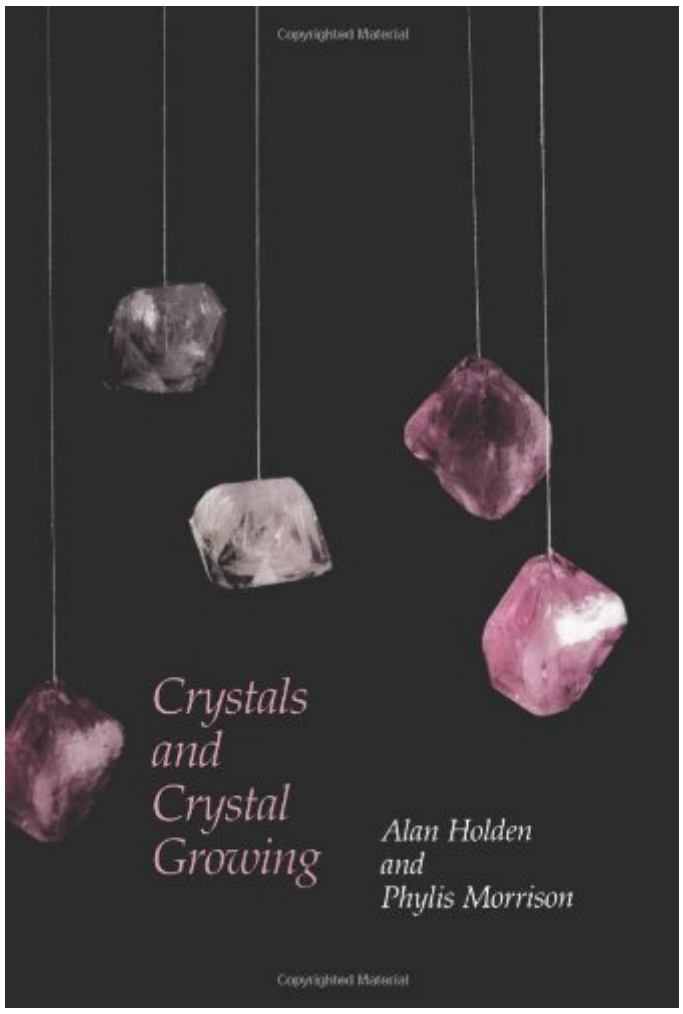

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Crystals and Crystal Growing-Alan Holden 1982 Experiments and problems to be done by the non-specialist to aid in his understanding of crystals

Crystals and Crystal Growing, By Alan Holden and Phylis Singer-Alan Holden 1960

Crystals and Crystal Growth-Wilfred Carter 2015-02-28 Hydrothermal crystal growth offers a complementary alternative to many of the classical techniques of crystal growth used to synthesise new materials and grow bulk crystals for specific applications. This specialised technique is often capable of growing crystals at temperatures well below their melting points and thus potentially offers routes to new phases or the growth of bulk crystals with less thermal strain. Borate crystals are widely used as nonlinear optical, laser and luminescent materials due to their diversified structures, and good chemical and physical properties. The growth of high-quality borate crystals is required for their applications. A fundamental problem for borate crystal growth is the high-temperature melt structures in the crystal growth systems. This book discusses several crystals and the crystal growth processes.

Crystal Growth Technology-K. Byrappa 2003-04-17 Crystals are the unacknowledged pillars of modern technology. The modern technological developments depend greatly on the availability of suitable single crystals, whether it is for lasers, semiconductors, magnetic devices, optical devices, superconductors, telecommunication, etc. In spite of great technological advancements in the recent years, we are still in the early stage with respect to the growth of several important crystals such as diamond, silicon carbide, PZT, gallium nitride, and so on. Unless the science of growing these crystals is understood precisely, it is impossible to grow them as large single crystals to be applied in modern industry. This book deals with almost all the modern crystal growth techniques that have been adopted, including appropriate case studies. Since there has been no other book published to cover the subject after the Handbook of Crystal Growth, Eds. DTJ Hurle, published during 1993-1995, this book will fill the existing gap for its readers. The book begins with "Growth Histories of Mineral Crystals" by the most senior expert in this field, Professor Ichiro Sunagawa. The next chapter reviews recent developments in the theory of crystal growth, which is equally important before moving on to actual techniques. After the first two fundamental chapters, the book covers other topics like the recent progress in quartz growth, diamond growth, silicon carbide single crystals, PZT crystals, nonlinear optical crystals, solid state laser crystals, gemstones, high melting oxides like lithium niobates, hydroxyapatite, GaAs by molecular beam epitaxy, superconducting crystals, morphology control, and more. For the first time, the crystal growth modeling has been discussed in detail with reference to PZT and SiC crystals.

The Art and Science of Growing Crystals-John Joseph Gilman 1963

Introduction to Crystal Growth-H.L. Bhat 2014-10-24 Introduction to Crystal Growth: Principles and Practice teaches readers about crystals and their origins. It offers a historical perspective of the subject and includes background information whenever possible. The first section of this introductory book takes readers through the historical development and motivation of the field of crystal growth. With more than 40 years of experience in the field, the author covers nucleation, two-dimensional layer growth mechanism, defects in crystals, and screw dislocation theory of crystal growth. He also explains some aspects of the important subject of phase diagrams. The second section focuses on the experimental techniques of crystal growth. For practicing crystal growers, the book provides nuts-and-bolts techniques and tips. It discusses the major techniques categorized by solid–solid, liquid–solid, and vapor–solid equilibria and describes characterization techniques essential to measuring the quality of grown crystals.

Crystals-Ichiro Sunagawa 2005-04-25 How do crystals nucleate and grow? Why and how do crystals form such a wide variety of morphologies, from polyhedral to dendritic and spherulitic forms? These are questions that have been posed since the seventeenth century, and are still of vital importance today both for modern technology, and to understand the Earth's interior and the formation of minerals by living organisms. In this book, Ichiro Sunagawa sets out clearly the atomic processes behind crystal growth, and describes case studies of complex systems from diamond, calcite and pyrite, to crystals formed through biomineralization, such as the aragonite of shells, and apatite of teeth. Essential reading for advanced graduates and researchers in mineralogy and materials science.

Crystal Growth Technology-Hans J. Scheel 2011-07-26 Semiconductors and dielectrics are two essential materials found in cell phones and computers, for example, and both are manufactured by growing crystals. Edited by the organizers of the International Workshop on Crystal Growth Technology, this ready reference is essential reading for materials scientists, chemists, physicists, computer hardware manufacturers, engineers, and those working in the chemical and semiconductor industries. They have assembled an international team of experts who present the current challenges, latest methods and new applications for producing these materials necessary for the electronics industry using bulk crystal growth technology. From the contents: * General aspects of crystal growth technology * Compound semiconductors * Halides and oxides * Crystal growth for sustaining energy * Crystal machining

Handbook of Crystal Growth-Tatau Nishinaga 1994

Space Age Crystals-Heinz J. Teige 1992

Crystals for Kids-Brenda DeHaan 2020-01-05 Do you like rocks and minerals? How many different ones can you name? "Crystals for Kids" has colorful photographs of 17 kinds of rocks and minerals (also called crystals). See how many you already know and learn what the others look like. The crystals are shown with their names and are also photographed in magical village scenes. Most of the stones are in their polished form. "Crystals for Kids" combines geology with imagination. It has almost no reading, just learning through the creative photographs with the rocks labeled. Look at the fun pictures and learn to identify more rocks and minerals.

Springer Handbook of Crystal Growth-Govindhan Dhanaraj 2010-10-20 Over the years, many successful attempts have been chapters in this part describe the well-known processes made to describe the art and science of crystal growth, such as Czochralski, Kyropoulos, Bridgman, and o- and many review articles, monographs, symposium v- ing zone, and focus speci cally on recent advances in umes, and handbooks have been published to present improving these methodologies such as application of comprehensive reviews of the advances made in this magnetic elds, orientation of the growth axis, intro- eld. These publications are testament to the grow- duction of a pedestal, and shaped growth. They also ing interest in both bulk and thin- lm crystals because cover a wide range of materials from silicon and III–V of their electronic, optical, mechanical, microstructural, compounds to oxides and uorides. and other properties, and their diverse scienti c and The third part, Part C of the book, focuses on - technological applications. Indeed, most modern ad- lution growth. The various aspects of hydrothermal vances in semiconductor and optical devices would growth are discussed in two chapters, while three other not have been possible without the development of chapters present an overview of the nonlinear and laser many elemental, binary, ternary, and other compound crystals, KTP and KDP. The knowledge on the effect of

crystals of varying properties and large sizes. The gravity on solution growth is presented through a c- literature devoted to basic understanding of growth parison of growth on Earth versus in a microgravity mechanisms, defect formation, and growth processes environment.

The Growth of Single Crystals-R. A. Laudise 1970

Growth of Crystals-E.I. Givargizov 2002-07-31 Growth of Crystals, Volume 21 presents a survey, with detailed analysis, of the scientific and technological approaches, and results obtained, by leading Russian crystal growth specialists from the late 1990's to date. The volume contains 16 reviewed chapters on various aspects of crystal and crystalline film growth from various phases (vapour, solution, liquid and solid). Both fundamental aspects, e.g. growth kinetics and mechanisms, and applied aspects, e.g. preparation of technically important materials in single-crystalline forms, are covered. A large portion of the volume is devoted to film growth, including film growth from eutectic melt, from amorphous solid state, kinetics of lateral epitaxy and film growth on specially structured substrates. An important chapter in this section covers heteroepitaxy of non-isovalent A3B5 semiconductor compounds, which have important applications in the field of photonics. The volume also includes a detailed analysis of the structural aspects of a broad range of laser crystals, information that is invaluable for successfully growing perfect, laser-effective, single crystals.

Trends in Crystal Growth Research-George V. Karas 2005 Experimental and theoretical aspects of crystal growth and its applications, e.g. in devices, are within the scope of these new books. Experimental and theoretical contributions are included in the following fields: theory of nucleation and growth, molecular kinetics and transport phenomena, crystallisation in viscous media such as polymers and glasses; crystal growth of metals, minerals, semiconductors, superconductors, magnetics, inorganic, organic and biological substances in bulk or as thin films; molecular beam epitaxy, chemical vapour deposition, growth of III-V and II-VI and other semiconductors; characterisation of single crystals by physical and chemical methods; apparatus, instrumentation and techniques for crystal growth, and purification methods; and multilayer heterostructures and their characterisation with an emphasis on crystal growth and epitaxial aspects of electronic materials.

Crystal Growth - From Fundamentals to Technology-Georg Müller 2004-07-07 The book contains 5 chapters with 19 contributions form internationally well acknowledged experts in various fields of crystal growth. The topics are ranging from fundamentals (thermodynamic of epitaxy growth, kinetics, morphology, modeling) to new crystal materials (carbon nanocrystals and nanotubes, biological crystals), to technology (Silicon Czochralski growth, oxide growth, III-IV epitaxy) and characterization (point defects, X-ray imaging, in-situ STM). It covers the treatment of bulk growth as well as epitaxy by anorganic and organic materials.

Crystal Growth in Gels-Heinz K. Henisch 1996-01-01 First book ever printed on growing crystals in a gel medium provides thorough descriptions of the procedure, its history and future potential. "Concise and readable."—Science. 42 illus. 1970 edition.

Nucleation and Crystal Growth-Keshra Sangwal 2018-10-16 A unique text presenting practical information on the topic of nucleation and crystal growth processes from metastable solutions and melts Nucleation and Crystal Growth is a groundbreaking text thatoffers an overview and description of the processes and phenomena associated with metastability of solutions and melts. The author—a noted expert in the field—puts the emphasis on low-temperature solutions that are typically involved in crystallization in a wide range of industries. The text begins with a review of the basic knowledge of solutions and the fundamentals of crystallization processes. The author then explores topics related to the metastable state of solutions and melts from the standpoint of three-dimensional nucleation and crystal growth. Nucleation and Crystal Growth is the first text that contains a unified description and discussion of the many processes and phenomena occurring in the metastable zone of solutions and melts from the consideration of basic concepts of structure of crystallization. This important text: Outlines an interdisciplinary approach to the topic and offers an essential guide for crystal growth practitioners in materials science, physics, and chemical engineering Contains a comprehensive content that details the crystallization processes starting from the initial solutions and melts, all the way through nucleation, to the final crystal products Presents a unique focus and is the first book on understanding, and exploiting, metastability of solutions and melts in crystallization processes Written for specialists and researchers in the fields of materials science, condensed matter physics, and chemical engineering. Nucleation and Crystal Growth is a practical resource filled with hands-on knowledge of nucleation and crystal growth processes from metastable solutions and melts.

Grow Your Own Crystals-David Packard 2001-05-01 Kids can learn science and eat it, too! Grow Your Own Crystals, now packaged in a striking gift box, invites kids to learn how crystals are formed, then experiment by growing their own sugar crystals that they can eat just like candy. This great kit includes full-color instruction book, wooden sticks, food-coloring tablets, and a plastic disk. All young scientists need to supply are a glass, water, and sugar.

Crystal Growth for Beginners-Ivan V. Markov 2003 This is the first-ever textbook on the fundamentals of nucleation, crystal growth and epitaxy. It has been written from a unified point of view and is thus a non-eclectic presentation of this interdisciplinary topic in materials science. The reader is required to possess some basic knowledge of mathematics and physics. All formulae and equations are accompanied by examples that are of technological importance. The book presents not only the fundamentals but also the state of the art in the subject. The second revised edition includes two separate chapters dealing with the effect of the Enrich-Schwoebel barrier for down-step diffusion, as well as the effect of surface active species, on the morphology of the growing surfaces. In addition, many other chapters are updated accordingly. Thus, it serves as a valuable reference book for both graduate students and researchers in materials science.

Handbook of Industrial Crystallization-Allan Myerson 2002-01-08 Crystallization is an important separation and purification process used in industries ranging from bulk commodity chemicals to specialty chemicals and pharmaceuticals. In recent years, a number of environmental applications have also come to rely on crystallization in waste treatment and recycling processes. The authors provide an introduction to the field of newcomers and a reference to those involved in the various aspects of industrial crystallization. It is a complete volume covering all aspects of industrial crystallization, including material related to both fundamentals and applications. This new edition presents detailed material on crystallization of biomolecules, precipitation, impurity-crystal interactions, solubility, and design. Provides an ideal introduction for industrial crystallization newcomers Serves as a worthwhile reference to anyone involved in the field Covers all aspects of industrial crystallization in a single, complete volume

Grow Your Own Crystal Narwhal-Klutz 2019-08 This "unicorn of the sea" will shimmer with a crystal spout, horn, and tail. Create a sparkly, crystal-covered friend. Choose from a unicorn, narwhal, dragon, fox, or collect them all! Bend and insert colourful pipe cleaners into your animal to form dazzling details like the unicorn's horn or the dragon's wings. Soak the figurine in our specially formulated crystal solution, and watch the crystals magically grow. Along the way, learn the science behind the magic in the included 20-page book. Comes with: Crystal powder, colourful pipe cleaners, and a custom-molded, plastic animal base

Beginner’s Guide to Flux Crystal Growth-Makoto Tachibana 2017-10-26 This book introduces the principles and techniques of crystal growth by the flux method, which is arguably the most useful way to obtain millimeter- to centimeter-sized single crystals for physical research. As it is possible to find an appropriate solvent (“flux”) for nearly all inorganic materials, the flux method can be applied to the growth of many crystals ranging from transition metal oxides to intermetallic compounds. Both important principles and experimental procedures are described in a clear and accessible manner. Practical advice on various aspects of the experiment, which is not readily available in the literature, will assist the beginning graduate students in setting up the lab and conducting successful crystal growth. The mechanisms of crystal growth at an elementary level are also provided to better understand the techniques and to help in assessing the quality of the crystals. The book also contains many photographs of beautiful crystals with important physical properties of current interest, such as high-temperature superconductors, strongly correlated electronic systems, topological insulators, relaxor ferroelectrics, low-dimensional quantum magnets, non-linear optical materials, and multiferroics.

Crystals and Crystal Gardens You Can Grow-Jean Stangl 1990 Provides

scientific explanations for the formation of crystals, tips for growing them, and instructions for experiments.

Handbook of Crystal Growth-Tom Kuech 2014-11-02 Volume IIIA Basic Techniques Handbook of Crystal Growth, 2nd Edition Volume IIIA (Basic Techniques), edited by chemical and biological engineering expert Thomas F. Kuech, presents the underpinning science and technology associated with epitaxial growth as well as highlighting many of the chief and burgeoning areas for epitaxial growth. Volume IIIA focuses on major growth techniques which are used both in the scientific investigation of crystal growth processes and commercial development of advanced epitaxial structures. Techniques based on vacuum deposition, vapor phase epitaxy, and liquid and solid phase epitaxy are presented along with new techniques for the development of three-dimensional nano-and micro-structures. Volume IIIB Materials, Processes, and Technology Handbook of Crystal Growth, 2nd Edition Volume IIIB (Materials, Processes, and Technology), edited by chemical and biological engineering expert Thomas F. Kuech, describes both specific techniques for epitaxial growth as well as an array of materials-specific growth processes. The volume begins by presenting variations on epitaxial growth process where the kinetic processes are used to develop new types of materials at low temperatures. Optical and physical characterizations of epitaxial films are discussed for both in situ and exit to characterization of epitaxial materials. The remainder of the volume presents both the epitaxial growth processes associated with key technology materials as well as unique structures such as monolayer and two dimensional materials. Volume IIIA Basic Techniques Provides an introduction to the chief epitaxial growth processes and the underpinning scientific concepts used to understand and develop new processes. Presents new techniques and technologies for the development of three-dimensional structures such as quantum dots, nano-wires, rods and patterned growth Introduces and utilizes basic concepts of thermodynamics, transport, and a wide cross-section of kinetic processes which form the atomic level text of growth process Volume IIIB Materials, Processes, and Technology Describes atomic level epitaxial deposition and other low temperature growth techniques Presents both the development of thermal and lattice mismatched streams as the techniques used to characterize the structural properties of these materials Presents in-depth discussion of the epitaxial growth techniques associated with silicone silicone-based materials, compound semiconductors, semiconducting nitrides, and refractory materials

Physics of Crystal Growth-Alberto Pimpinelli 2010-05-07 This text discusses the physical principles of how and why crystals grow. It introduces the fundamental properties of crystal surfaces at equilibrium, and describes simple models and basic concepts of crystal growth including diffusion, thermal smoothing of a surface, and applications to semiconductors. It also covers more complex topics such as kinetic roughness, growth instabilities, and elastic effects, as well as the crucial contributions of crystal growth in electronics during this century. The book focuses on growth using molecular beam epitaxy. Throughout, the emphasis is on the role played by modern statistical physics. Informative appendices, interesting exercises and an extensive bibliography reinforce the text.

Introduction to Crystal Growth and Characterization-Klaus-Werner Benz 2014-07-28 This new textbook provides for the first time a comprehensive treatment of the basics of contemporary crystallography and crystal growth in a single volume. The reader will be familiarized with the concepts for the description of morphological and structural symmetry of crystals. The architecture of crystal structures of selected inorganic and molecular crystals is illustrated. The main crystallographic databases as data sources of crystal structures are described. Nucleation processes, their kinetics and main growth mechanism will be introduced in fundamentals of crystal growth. Some phase diagrams in the solid and liquid phases in correlation with the segregation of dopants are treated on a macro- and microscale. Fluid dynamic aspects with different types of convection in melts and solutions are discussed. Various growth techniques for semiconducting materials in connection with the use of external field (magnetic fields and microgravity) are described. Crystal characterization as the overall assessment of the grown crystal is treated in detail with respect to - crystal defects - crystal quality - field of application Introduction to Crystal Growth and Characterization is an ideal textbook written in a form readily accessible to undergraduate and graduate students of crystallography, physics, chemistry, materials science and engineering. It is also a valuable resource for all scientists concerned with crystal growth and materials engineering.

KDP - Family Single Crystals-L.N Rashkovich 1991-01-01 The KDP family of single crystals is composed of compounds of alkali metals with light or heavy (hydro, deutero) water and oxides of phosphate or arsenate, including ammonium, potassium, rubidium and caesium dihydro- and dideutero-phosphates, and similar arsenates. While not occurring in nature, their production exceeds that of any other water-soluble crystals and the demand for bigger and more optically pure crystals is ever increasing. KDP-Family Single Crystals is a comprehensive investigation of the crystallization mechanism for these systems. The first part of the book collects the majority of the available data on the physico-chemical analysis of these systems. This is complemented by a review of contemporary concepts related to the crystal growth dislocation mechanism under the influence of impurities, changing supersaturation, and temperature. This is not only relevant to the growth of KDP single crystals but to the majority of crystals grown from low- and high-temperature solutions. Finally, attention is given to the important problem of speeding up the production processes for the growth of these crystals while maintaining the quality of the crystals. The in-depth coverage that KDP-Family Single Crystals provides to the art of crystal growth techniques makes it an essential reference work for all those working in the field of crystal growth and to those using KDP-family crystals in quantum electronics devices.

Single Crystals of Electronic Materials-Roberto Fornari 2018-09-18 Single Crystals of Electronic Materials: Growth and Properties is a complete overview of the state-of-the-art growth of bulk semiconductors. It is not only a valuable update on the body of information on crystal growth of well-established electronic materials, such as silicon, III-V, II-VI and IV-VI semiconductors, but also includes chapters on novel semiconductors, such as wide bandgap oxides like ZnO, Ga2, O3, In2, O3, Al2, O3, nitrides (AIN and GaN), and diamond. Each chapter focuses on a specific material, providing a comprehensive overview that includes applications and requirements, thermodynamic properties, schematics of growth methods, and more. Presents the latest research and most comprehensive overview of both standard and novel semiconductors Provides a systematic examination of important electronic materials, including their applications, growth methods, properties, technologies and defect and doping issues Takes a close look at emerging materials, including wide bandgap oxides, nitrides and diamond

Handbook of Crystal Growth-Peter Rudolph 2014-11-04 Vol 2A: Basic Technologies Handbook of Crystal Growth, 2nd Edition Volume IIA (Basic Technologies) presents basic growth technologies and modern crystal cutting methods. Particularly, the methodical fundamentals and development of technology in the field of bulk crystallization on both industrial and research scales are explored. After an introductory chapter on the formation of minerals, ruling historically the basic crystal formation parameters, advanced basic technologies from melt, solution, and vapour being applied for research and production of the today most important materials, like silicon, semiconductor compounds and oxides are presented in detail. The interdisciplinary and general importance of crystal growth for human live are illustrated. Vol 2B: Growth Mechanisms and Dynamics Handbook of Crystal Growth, 2nd Edition Volume IIB (Growth Mechanisms and Dynamics) deals with characteristic mechanisms and dynamics accompanying each bulk crystal growth method discussed in Volume IIA. Before the atoms or molecules pass over from a position in the fluid medium (gas, melt or solution) to their place in the crystalline face they must be transported in the fluid over macroscopic distances by diffusion, buoyancy-driven convection, surface-tension-driven convection, and forced convection (rotation, acceleration, vibration, magnetic mixing). Further, the heat of fusion and the part carried by the species on their way to the crystal by conductive and convective transport must be dissipated in the solid phase by well-organized thermal conduction and radiation to maintain a stable propagating interface. Additionally, segregation and capillary phenomena play a decisional role for chemical composition and crystal shaping, respectively. Today, the increase of high-quality crystal yield, its size enlargement and reproducibility are imperative conditions to match the strong economy. Volume 2A Presents the status and future of Czochralski and float zone growth of dislocation-free silicon Examines directional solidification of silicon ingots for photovoltaics, vertical gradient freeze of GaAs, CdTe for HF electronics and IR imaging as well as antiferromagnetic compounds and super alloys for turbine blades Focuses on growth of dielectric and conducting oxide crystals for lasers and non-linear optics Topics on hydrothermal, flux and vapour phase growth of III-nitrides, silicon carbide and diamond are explored Volume 2B Explores capillarity control of the crystal shape at the growth from the melt Highlights modeling of heat and mass transport dynamics Discusses control of convective melt processes by magnetic fields and vibration measures Includes imperative information on the segregation phenomenon and validation of compositional homogeneity Examines crystal defect generation mechanisms and their controllability Illustrates proper automation modes for ensuring constant crystal growth process Exhibits fundamentals of solution growth, gel growth of protein crystals, growth of superconductor materials and mass

crystallization for food and pharmaceutical industries

Crystal Growth-Jinjin Li 2017 With the highly competitive development of pharmaceutical and chemical industries, mastering crystal growth is becoming increasingly important. Modern industrial manufacturers place high importance on the ability to grow novel crystals with a specific habit and improve the performance of existed crystals using tailored operating conditions. Therefore, the ability to synthesise a particular morphology and to predict the crystal morphology of new compounds is becoming even more desirable. The recent development of crystal growth is vital for researchers in crystallography and crystallisation to respond and realise this objective. With this need in mind, this book mainly targeted at introducing crystal growth from three aspects ranging from basic concepts and detailed mechanisms to advanced applications in hot areas of materials science. This book introduces various experimental and theoretical methods to grow different crystals, which includes the techniques to grow single crystals, CaCO3 polymorphs, metal-organic crystals, liquid crystals, fenamate crystals, cocrystals, and the theoretical models to predict the crystal morphologies within a different environment. From these carefully selected contents, readers will not only learn of the basic theory and experimental techniques implemented, but also keep abreast with both state-of-the-art crystal growth and its overlap with other subjects.

Crystal Growth-Brian R. Pamplin 2013-09-11 Crystal Growth, Second Edition deals with crystal growth methods and the relationships between them. The chemical physics of crystal growth is discussed, along with solid growth techniques such as annealing, sintering, and hot pressing; melt growth techniques such as normal freezing, cooled seed method, crystal pulling, and zone melting; solution growth methods; and vapor phase growth. This book is comprised of 15 chapters and opens with a bibliography of books and source material, highlighted by a classification of crystal growth techniques. The following chapters focus on the molecular state of a crystal when in equilibrium with respect to growth or dissolution; the fundamentals of classical and modern hydrodynamics as applied to crystal growth processes; creation, control, and measurement of the environment in which a crystal with desired properties can grow; and growth processes where transport occurs through the vapor phase. The reader is also introduced to crystal growth with molecular beam epitaxy; crystal pulling as a crystal growth method; and zone refining and its applications. This monograph will be of interest to physicists and crystallographers.

Shaped Crystals-Tsuguo Fukuda 2007-08-10 This volume offers an overview of the growth of shaped crystals (oxides, fluorides, etc.) by the micro-pulling-down technique. Both melt and solution (flux) growth are considered. The advantages and disadvantages of the method are discussed in detail and compared with related crystal-growth processes. The authors attempt to give a practical introduction to this technique, thereby also explaining how its application can help to solve problems commonly encountered in other melt-growth methods.

Metal Halide Perovskite Crystals: Growth Techniques, Properties and Emerging Applications-Wei Zhang 2019-01-31 This book is a printed edition of the Special Issue "Metal Halide Perovskite Crystals: Growth Techniques, Properties and Emerging Applications" that was published in Crystals

Рост Кристаллов / Rost Kristallov / Growth of Crystals-A. A. Chernov 2012-12-06 Volumes 11 and 12 contain the papers read at the Fourth All-Union Conference on Crystal Growth in Tsakhkadzor, September 17-22, 1972; this volume contains papers on crystal growth from melts, from low-temperature solutions, hydrothermal solutions, and hot solutions, and also from the gas state, including processes involving reactions. In addition, there are papers on crystal perfection in relation to conditions of formation and the effects of electric and mag netic fields on crystallization. These papers reflect researches directed to the development and industrial production of perfect crystals required for advanced techniques in solid-state physics and chemistry, as well as for other purposes such as novel materials. There are many different scientific and technical problems in producing large perfect single crystals, and advances in this area made in the USSR and elsewhere are reflected in the papers in both volumes. On the one hand, any particular defective structure in a crystal originates from some mechanism and growth conditions; in particular, inclusions are trapped on account of the physicochemical parameters of the melt, the surface processes, and the sta bility of the growth front under particular crystallization conditions. Further, impurity trap ping is decisively influenced by the surface kinetics, growth-front stability, composition and structure of the boundary layer, any complexes present in the liquid, and (of course) the crys tallochemical relationships between the impurity and the crystal.

International School on Crystal Growth of Technologically Important Electronic Materials-K. Byrappa 2003

Crystal Growth and Evaluation of Silicon for VLSI and ULSI-Golla Eranna 2014-12-08 Silicon, as a single-crystal semiconductor, has sparked a revolution in the field of electronics and touched nearly every field of science and technology. Though available abundantly as silica and in various other forms in nature, silicon is difficult to separate from its chemical compounds because of its reactivity. As a solid, silicon is chemically inert and stable, but growing it as a single crystal creates many technological challenges. Crystal Growth and Evaluation of Silicon for VLSI and ULSI is one of the first books to cover the systematic growth of silicon single crystals and the complete evaluation of silicon, from sand to useful wafers for device fabrication. Written for engineers and researchers working in semiconductor fabrication industries, this practical text: Describes different techniques used to grow silicon single crystals Explains how grown single-crystal ingots become a complete silicon wafer for integrated-circuit fabrication Reviews different methods to evaluate silicon wafers to determine suitability for device applications Analyzes silicon wafers in terms of resistivity and impurity concentration mapping Examines the effect of intentional and unintentional impurities Explores the defects found in regular silicon-crystal lattice Discusses silicon wafer preparation for VLSI and ULSI processing Crystal Growth and Evaluation of Silicon for VLSI and ULSI is an essential reference for different approaches to the selection of the basic silicon-containing compound, separation of silicon as metallurgical-grade pure silicon, subsequent purification, single-crystal growth, and defects and evaluation of the deviations within the grown crystals.

Field Guide to Crystal Growth-A. K. Batra 2018 "Crystal growth is the art and science of growing crystals to facilitate high-technology applications in lasers, semiconducting devices, computers, magnetic and optical devices, optical processors, and pharmaceuticals, among others. This Field Guide examines the basic phenomena and techniques of growing bulk single crystals from solution, melt, and vapors. Some techniques for growth in the microgravity environment of space are also addressed. Other topics include how to choose the right crystallization method (concentration gradient or thermal gradient) based on the physical and chemical properties of the system, and the best solvents, agents, and temperatures to produce high-quality crystals"--

Crystals and Crystal Growth-James C. Brice 1962

Crystal Growth of Intermetallics-Peter Gille 2018-12-17 Intermetallic compounds are in the focus of solid-state research for a wide range of future applications, e.g. in heterogeneous catalysis, for thermoelectric generators, and basic research of quantum critical effects. A comprehensive overview is given on various crystal growth techniques that are particularly adopted to intermetallic phases. Experienced authors from leading institutes give detailed descriptions of the specific problems in crystal growth of intermetallic compounds and approaches to solve them.