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. The molecular mechanisms underlying the fact that a crystal can take a variety of external forms is something we have come to understand only in the last few decades. This is due to recent developments in theoretical and experimental investigations of crystal growth mechanisms. Morphology of Crystals is divided into three separately available volumes. Part A contains chapters on roughening transition; equilibrium form; step pattern theory; modern PBC; and surface microtopography. This part provides essentially theoretical treatments of the problem, particularly the solid-liquid interface. Part B contains chapters on ultra-fine particles; minerals; transition from polyhedral to dendrite; theory of dendrite; and snow crystals. All chapters are written by world leaders in their respective areas, and some can be seen as representing the essence of a life's work. This is the first English-language work which covers all aspects of the morphology of crystals - a topic which has attracted top scientific minds for centuries. As such, it is indispensable for anyone seeking an answer to a question relating to this fascinating problem: mineralogists, petrologists, crystallographers, materials scientists, workers in solid-state physics and chemistry, etc. In Parts A: Fundamentals and B: Fine Particles, Minerals and Snow equilibrium and kinetic properties of crystals are generally approached from an `atomistic' point of view. In contrast, Part C: The Geometry of Crystal Growth follows the alternative and complementary `geometrical' description, where bulk phases are considered as continuous media and their interfaces as mathematical surfaces with orientation-dependent properties. Equations of motion for a crystal surface are expressed in terms of vector and tensor operators working on surface free energy and growth rate, both expressed as functions of surface orientation and driving force, or `affinity' for growth. This approach emphasizes the interrelation between equilibrium and kinetic behavior. Part 1 establishes the theoretical framework. Part 2 gives a construction toolbox for explicit (analytic) functions. An extra chapter is devoted to experimental techniques for measuring such functions: a new approach to sphere growth experiments. The emphasis throughout is on principles and new concepts. Audience: Advanced readers familiar with traditional aspects of crystal growth theory. Can be used as the basis for an advanced course, providing supplementation is provided in the areas of atomistic models of the advancing surface, diffusion fields, etc.
Solution and solubility, solubility and supersolubility; The artificial preparation of crystals; The curie theory of crystal growth; The so-called velocities of growth; The diffusion theories; Recent theories of crystal growth; Ideal and real crystals; Miscellaneous types of crystallization; Dissolution phenomena; Crystal habit modification by impurities; Relationship of substances during crystallization; Peculiarities of crystal growth.

Provides an understanding of both basic and more advanced principles and concepts of crystal growth using a direct style of exposition succeeded by systematic and comprehensible applications of these in the actual crystallization of Groups 1 and 2 compounds from solution in melts at high temperatures. Explores final crystal numbers and sizes, systematic quantitative experimental studies on solute and solvent interactions, nucleation processes and crystallization kinetics. A mathematical model for calculating diffusion coefficients and, from there, kinetic and thermodynamic parameters for diffusion-controlled crystal growth that can accurately predict the exact distance of separation between a diffusing particle and its hosts in melts are presented. 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.

What do you think of when you think of crystals? You might think of rich jewels or you may think of a hotel chandelier? Well you would be surprised at how many other things in the world are classed as crystals. Certain substances such as salt, sugar and snow are all classed as crystals.Crystals and Crystal Growing For Children: A guide and introduction to the science of crystallography and mineralogy for kids. This guidebook covers basic chemistry and physics that form the fundamentals behind the art and science of growing crystals.

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.
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.

Early in this century, the newly discovered x-ray diffraction by crystals made a complete change in crystallography and in the whole science of the atomic structure of matter, thus giving a new impetus to the development of solid-state physics. Crystallographic methods, primarily x-ray diffraction analysis, penetrated into materials sciences, molecular physics, and chemistry, and also into many other branches of science. Later, electron and neutron diffraction structure analyses became important since they not only complement x-ray data, but also supply new information on the atomic and the real structure of crystals. Electron microscopy and other modern methods of investigating optical, electronic paramagnetic, nuclear magnetic, and other resonance techniques yield a large amount of information on the atomic, electronic, and real crystal structures. Crystal physics has also undergone vigorous development. Many remarkable phenomena have been discovered in crystals and then found various practical applications. Other important factors promoting the development of crystallography were the elaboration of the theory of crystal growth (which brought crystallography closer to thermodynamics and physical chemistry) and the development of the various methods of growing synthetic crystals dictated by practical needs. Man-made crystals became increasingly important for physical investigations, and they rapidly invaded technology. The production of synthetic crystals made a tremendous impact on the traditional branches: the mechanical treatment of materials, precision instrument making, and the jewelry industry.

1 The content of this article is based on a German book version which appeared at the end of the year 1986. The author tried to incorporate - as far as possible - new important results published in the last year. But the literature in the field of "convection and inhomogeneities in crystal growth from the melt" has increased so much in the meantime that the reader and the colleagues should make allowance for any incompleteness, also in the case that their important contributions have not been cited. This could for example hold for problems related to the Czochralski growth. But especially for this topic the reader may be referred to the forthcoming volume of this series, which contains special contributions on "Surface Tension Driven Flow in Crystal Growth Melts" by D. Schwabe and on "Convection in Czochralski Melts" by M. Mihelcic, W. Uelhoff, H. Wenzl and K. Wingerath. The preparation of this manuscript has been supported by several women whose help is gratefully acknowledged by the author: Mrs. Gisela Neuner for the typing, Mrs. Abigail Sanders, Mrs. Fiona Eels and especially Prof. Nancy Haegel for their help in questions of the English language and Mrs. Christa...
Hydrothermal crystal growth offers a complementary alternative to many of the classical techniques of crystal growth used to synthesize new materials and grow bulk crystals for specific applications. This specialized 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 hi.

The series will present critical reviews of recent developments in the field of crystal growth, properties, and applications. A substantial portion of the new series will be devoted to the theory, mechanisms, and techniques of crystal growth. Occasionally, clear, concise, complete, and tested instructions for growing crystals will be published, particularly in the case of methods and procedures that promise to have general applicability. Responding to the ever-increasing need for crystal substances in research and industry, appropriate space will be devoted to methods of crystal characterization and analysis in the broadest sense, even though reproducible results may be expected only when structures, microstructures, and composition are really known. Relations among procedures, properties, and the morphology of crystals will also be treated with reference to specific aspects of their practical application. In this way, the series will bridge the gaps between the needs of research and industry, the possibilities and limitations of crystal growth, and the properties of crystals. Reports on the broad spectrum of new applications - in electronics, laser technology, and nonlinear optics, to name only a few - will be of interest not only to industry and technology, but to wider areas of applied physics as well and to solid state physics in particular. In response to the growing interest in and importance of organic crystals and polymers, they will also be treated.

In this book top experts treat general thermodynamic aspects of crystal fabrication; numerical simulation of industrial growth processes; commercial production of bulk silicon, compound semiconductors, scintillation and oxide crystals; X-ray characterization; and crystal machining. Also, the role of crystal technology for renewable energy and for saving energy is discussed. It will be useful for scientists and engineers involved in crystal and epilayer fabrication as well as for teachers and graduate students in material science, chemical and metallurgical engineering, and micro- and optoelectronics, including nanotechnology.

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. Science and art of crystal growth represent an interdisciplinary activity based on fundamental principles of physics, chemistry and crystallography. Crystal growth has contributed over the years essentially to a widening of knowledge in its basic disciplines and has penetrated practically into all fields of experimental natural sciences. It has acted, more over, in a steadily increasing manner as a link between science and technology as can be seen best, for example, from the achievements in modern microelectronics. The aim of the course "Crystal Growth in Science and Technology" being to stress the interdisciplinary character of the subject, selected fundamental principles are reviewed in the following contributions and cross links between basic and applied aspects are illustrated. It is a very well-known fact that the intensive development of crystal growth has led to a progressive narrowing of interests in highly specialized directions which is in particular harmful to young research scientists. The organizers of the course did sincerely hope that the program would help to broaden up the horizon of the participants. It was equally their wish to contribute within the traditional spirit of the school of crystallography in Erice to the promotion of mutual understanding, personal friendship and future collaboration between all those who were present at the school. The processes of new phase formation and growth are of fundamental importance in numerous rapidly developing scientific fields such as modern materials science, micro- and optoelectronics, and environmental science. Crystal Growth for Beginners combines the depth of information in monographs, with the thorough analysis of review papers, and presents the resulting content at a level understandable by beginners in science. The book covers, in practice, all fundamental questions and aspects of nucleation, crystal growth, and epitaxy. This book is a non-eclectic presentation of this interdisciplinary topic in materials science. The third edition brings existing chapters up to date, and includes new chapters on the growth of nanowires by the vapor-liquid-solid mechanism, as well as illustrated short biographical texts about the scientists who introduced the basic ideas and concepts into the fields of nucleation, crystal growth and epitaxy. All formulae and equations are illustrated by examples that are of technological importance. The book presents not only the fundamentals but also the state of the art in the subject. Crystal Growth for Beginners is a valuable reference for both graduate students and researchers in materials science. The reader is required to possess some basic knowledge of mathematics, physics and thermodynamics. 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.

The present volume continues the tradition of previous issues in covering all the main divisions in the science of crystal growth: growth from vapor, solution, and melt. At the same time, it reflects the recent tendency to more detailed research on solid-state crystalization. In compiling the collection, preference has been given to papers that not only present novel scientific results but also contain surveys of the published data, although certain of the papers are purely original ones and some are purely of review character. The need for these surveys is dictated by at least two circumstances. First, there is an ongoing expansion of specialized publications on crystal growth and, correspondingly, there is an increase in the volume of the publications requiring review. Second, rapid advances in crystal making for various purposes (particularly microelectronics and quantum electronics) have meant that many important facts and observations on crystal formation are dispersed in numerous unspecialized publications and thus in part are lost to fundamental science.

Experiments and problems to be done by the non-specialist to aid in his understanding of crystals

The goal of the series Physics and Chemistry of Materials with Layered Structures is to give a critical survey of our present knowledge on a large family of materials which can be described as solids containing molecules which in two dimensions extend to infinity and which are loosely stacked on top of each other to form three dimensional crystals. Of course, the physics and chemistry of these crystals are specific chapters in ordinary solid state science, and many a scientist hunting for new phenomena has in the past been disappointed to find that materials with layered structures are not entirely exotic. Their electron and phonon states are not two dimensional, and the high hopes held by some for spectacular dimensionality effects in superconductivity were shattered. Nevertheless, the structural features and their physical and chemical consequences singularize layered structures sufficiently to make them a fascinating subject of research. This is all the more true since they are met in insulators and semiconductors as well as in normal and superconducting metals. Although for the time being the series is intentionally limited to cover inorganic materials only, the many known organic layered structures may well be the subject of future volumes. Among the noteworthy peculiarities of layered structures, we mention specific growth mechanisms and crystal habits. Polytypism is very common and it is fascinating indeed to find up to 240 different polytypes in the same chemical substance.

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 specifically 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-Im crystals because cover a wide range of materials from silicon and III–V of their electronic, optical, mechanical, microstructural, compounds to oxides and urides. 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. This tenth volume completes the first series of "Growth of Crystals," which began in 1957. The sources of the volumes are as follows: for Vol. I, the 1st All-Union Conference on Crystal Growth; for Vol. 3, the 2nd; and for Vols. 5 and 6, the 3rd; Vols. 7 and 8 reported the International Symposium on Crystal Growth at the Seventh International Crystallography Congress, and Vol. 9 the 1969 symposium on crystal growth dedicated to E. S. Fedorov; Vols. 2, 4, and 10 did not originate in conferences. The main problem that largely occupied the conferences and symposia and also the inter mediate volumes was that of real crystal formation, as well as the relation of crystal growth theory to practical crystal production. This tenth volume, which completes this first series, is to a considerable extent a survey. It contains more extensive theoretical and experimental original papers, as well as some shorter papers dealing with particular but important aspects of real crystal formation. The volume opens with a paper by V. V. Voronkov, which deals with the structure of crystal surface in Kossel's model. The model as proposed by Kossel is extremely simple. It deals qualitatively with the basic trends in the growth of an idealized crystal in its own vapor at absolute zero, and naturally does not allow one to perform quantitative studies on complex real processes."

This tenth volume completes the first series of "Growth of Crystals," which began in 1957. The sources of the volumes are as follows: for Vol. I, the 1st All-Union Conference on Crystal Growth; for Vol. 3, the 2nd; and for Vols. 5 and 6, the 3rd; Vols. 7 and 8 reported the International Symposium on Crystal Growth at the Seventh International Crystallography Congress, and Vol. 9 the 1969 symposium on crystal growth dedicated to E. S. Fedorov; Vols. 2, 4, and 10 did not originate in conferences. The main problem that largely occupied the conferences and symposia and also the inter mediate volumes was that of real crystal formation, as well as the relation of crystal growth theory to practical crystal production. This tenth volume, which completes this first series, is to a considerable extent a survey. It contains more extensive theoretical and experimental original papers, as well as some shorter papers dealing with particular but important aspects of real crystal formation. The volume opens with a paper by V. V. Voronkov, which deals with the structure of crystal surface in Kossel's model. The model as proposed by Kossel is extremely simple. It deals qualitatively with the basic trends in the growth of an idealized crystal in its own vapor at absolute zero, and naturally does not allow one to perform quantitative studies on complex real processes.

There is no question that the field of solid state electronics, which essentially began with work at Bell laboratories just after World War II, has had a profound impact on today's Society. What is not nearly so widely known is that advances in the art and science of crystal growth underpin this technology. Single crystals, once valued only for their beauty, are now found, in one form or another in most electronic, optoelectronic and numerous optical devices. These devices, in turn, have permeated almost every home and village throughout the world. In fact it is hard to imagine what our electronics industry, much less our entire civilization, would have been like if crystal growth scientists and engineers were unable to produce the large, defect free crystals required by device designers. This book brings together two sets of related articles describing advances made in crystal growth science and technology since World War II. One set is from the proceedings of a Symposium held in August 2002 to celebrate 50 years of progress in the field of crystal growth. The second contains articles previously published in the newsletter of the American Association for Crystal Growth in a series called "Milestones in Crystal Growth". The first section of this book contains several articles which describe some of the early history of crystal growth prior to the electronics revolution, and upon which modern crystal growth science and technology is based. This is followed by a special article by Prof. Sunagawa which provides some insight into how the successful Japanese crystal growth industry developed.
The next section deals with crystal growth fundamentals including concepts of solute distribution, interface kinetics, constitutional supercooling, morphological stability and the growth of dendrites. The following section describes the growth of crystals from melts and solutions, while the final part involves thin film growth by MBE and OMVPE. These articles were written by some of the most famous theorists and crystal growers working in the field. They will provide future research workers with valuable insight into how these pioneering discoveries were made, and show how their own research and future devices will be based upon these developments. Articles written by some of the most famous theorists and crystal growers working in the field. Valuable insight into how pioneering discoveries were made. Show how their own research and future devices will be based upon these developments.

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.

Coverage This bibliography of over 5000 references is restricted to the crystal growth of inorganic materials and is largely drawn from the literature collection of the Research Materials Information Center, although other sources were used in the attempt to attain (an always unattainable) completeness. It includes theoretical, review, and experimental, or "recipe," papers, technical reports, and books. The period covered is from 1972 through 1977, with several hundred more recent and earlier references, for various reasons, added. Information on specific materials not listed may be requested from R M C. I The coverage of epitaxy presented a problem, since authors do not always make it clear whether or not the epitaxial growth described resulted in single or polycrystalline structures. Papers are of course included where single crystallinity was claimed or illustrated by a definite electron diffraction pattern. Stated attempts to grow single crystals, even when failures, are included. As for the many where a decision could not be made, exclusion was the general rule. Theoretical and review papers are included. Two books, of the many good books on crystal growth, are essential complements to this bibliography: The Chemistry of Imperfect Crystals, 2nd Revised Edition. Volume 1, Preparation, Purification, Crystal Growth and Phase Theory Kroger, F. A. North-Holland Publishing Company, Amsterdam-London; American Elsevier Publishing Company, Inc., New York (1973) (Includes an extensive tabulation of crystals grown by a variety of methods, with over 1100 references for the table alone.) Crystal Growth Wilke, K. -T. 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
The present volume continues the tradition of the preceding volumes, covering a wide range of crystal growth problems and treating aspects of critical importance for crystallization. Changes in this field of knowledge have, however, changed the criteria for selection of papers for inclusion in this series. The increasing role of crystals in science and technology is even more apparent today. The study and utilization of these highly perfect objects of nature considerably facilitates progress in the physics and chemistry of solids, quantum electronics, optics, microelectronics, and other sciences. The demand for crystals and crystal devices has grown steadily and has led to the emergence and rapid growth of the single crystal industry (we can safely say that the state of the art in this industry is indicative of the overall scientific and technological potential of a country). At the same time, the introduction of crystallization techniques into other industries is gaining ever-increasing importance. To illustrate this last statement, we can mention the fabrication of textured structural materials and direct methods of metal reduction in ores by using chemical vapor transport techniques. Crystallization techniques progress both in "width" and in "depth": traditional methods are modernized, and novel techniques appear, some of them at the junction of the already existing technologies (for example, flux growth of crystals, growth from vapor with participation of the liquid phase, etc.).

Crystals and Crystal Growing
MIT Press

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

Springer-Verlag, Berlin Heidelberg, in conjunction with Springer-Verlag New York, is pleased to announce a new series: CRYSTALS Growth, Properties, and Applications. The series presents critical reviews of recent developments in the field of crystal growth, properties, and applications. A substantial portion of the new series will be devoted to the theory, mechanisms, and techniques of crystal growth. Occasionally, clear, concise, complete, and tested instructions for growing crystals will be published, particularly in the case of methods and procedures that promise to have general applicability. Responding to the ever-increasing need for crystal substances in research and industry, appropriate space will be devoted to methods of crystal characterization and analysis in the broadest sense, even though reproducible results may be expected only when structures, microstructures, and composition are really known. Relations among procedures, properties, and the morphology of crystals will also be treated with reference to specific aspects of their practical application. In this way the series will bridge the gaps between the needs of research and industry, the possibilities and limitations of crystal growth, and the properties of crystals. Reports on the broad spectrum of new applications - in electronics, laser technology, and nonlinear optics, to name only a few - will be of interest not only to industry and technology, but to wider areas of applied physics as well and to solid state physics in particular. In response to
the growing interest in and importance of organic crystals and polymers, they will also be treated.

In the last decade or so the growth of single crystals has assumed enormous importance for both academic research, and technology (particularly in the field of 'electronics'). The range of fields involved is great: from electro-optics to metal corrosion, from semiconductors to magnetic bubble materials-one can add to the list almost indefinitely. However, while the general principles of crystal growth can be applied almost right across the board, it turns out that the precise way in which one can grow a particular crystal best varies considerably from material to material. This, of course, is to emphasise the obvious; nonetheless, except in specialised papers in the scientific literature, little attempt seems to have been made to deal in any detail with the causes of the difficulties in growing particular kinds of materials and with methods of circumventing them. These specialised papers may be inaccessible, and in any case cannot be, usually, very broad in scope or detailed in treatment simply because of the pressure to keep papers short. And unfortunately few specialised monographs seem to have been produced. These points and others similar emerged repeatedly in discussions with crystal growers from all parts of the World and indicated that there was a need for a publication which would deal in detail with problems and techniques for specialised areas of crystal growth.

Copyright: 387ed00a38b180604032aca10f2baaa3