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B29 - HOBBS ALBERT

Highlighted by two hundred full-color and black-and-white photographs, a colorful history of the rodeo ranges from its Mexican origins to today's professional circuits, capturing the mystique of the American cowboy and his role in Western folklore.

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.

Organic Electronics is a novel field of electronics that has gained an incredible attention over the past few decades. New materials, device architectures and applications have been continuously introduced by the academic and also industrial communities, and novel topics have raised strong interest in such communities, as molecular doping, thermoelectrics, bioelectronics and many others. Organic Flexible Electronics is mainly divided into three sections. The first part is focused on the fundamentals of organic electronics, such as charge transport models in these systems and new approaches for the design and synthesis of novel molecules. The first section addresses the main challenges that are still open in this field, including the important role of interfaces for achieving high-performing devices or the novel approaches employed for improving reliability issues. The second part discusses the most innovative devices which have been developed in recent years, such as devices for energy harvesting, flexible batteries, high frequency circuits, and flexible devices for tattoo electronics and bioelectronics. Finally the book reviews the most important applications moving from more standard flexible back panels to wearable and textile electronics and more futuristic applications like ingestible systems. Reviews the fundamental properties and methods for optimizing organic electronic materials including chemical doping and techniques to address stability issues; Discusses the most promising organic electronic devices for energy, electronics, and biomedical applications; Addresses key applications of organic electronic devices in imagers, wearable electronics, bioelectronics.

Polymorphism - the multiplicity of structures or forms - is a term that is used in many disciplines. In chemistry it refers to the existence of more than one crystal structure for a particular chemical substance. The properties of a substance are determined by its composition and by its structure. In the last two decades, there has been a sharp rise in the interest in polymorphic systems, as an intrinsically interesting phenomenon and as an increasingly important component in the development and marketing of a variety of materials based on organic molecules (e.g. pharmaceuticals, dyes and pigments, explosives, etc.). This book summarizes and brings up to date the current knowledge and understanding of polymorphism of molecular crystals, and concentrates it in one comprehensive source. The book will be an invaluable reference for students, researchers, and professionals in the field.

Pharmaceutical process research and development is an exacting, multidisciplinary effort but a somewhat neglected discipline in the chemical curriculum. This book presents an overview of the many facets of process development and how recent advances in synthetic organic chemistry, process technology and chemical engineering have impacted on the manufacture of pharmaceuticals. In 15 concise chapters the book covers such diverse subjects as route selection and economics, the interface with medicinal chemistry, the impact of green chemistry, safety, the crucial role of physical organic measurements in gaining a deeper understanding of chemical behaviour, the role of the analyst, new tools and innovations in reactor design, purification and separation, solid state chemistry and its role in formulation. The book ends with an assessment of future trends and challenges. The book provides a valuable overview of: both early and late stage chemical development, how safe and scaleable synthetic routes are designed, selected and developed, the importance of the chemical engineering, analytical and manufacturing interfaces, the key enabling technologies, including catalysis and biocatalysis, the importance of the green chemical perspective and solid form issues. The book, written and edited by experts in the field, is a contemporary, holistic treatise, with a logical sequence for process development and mini-case histories within the chapters to bring alive different aspects of the process. It is completely pharmaceutical themed, encompassing all essential aspects, from route and reagent selection to manufacture of the active compound. The book is aimed at both graduates and postgraduates interested in a career in the pharmaceutical industry. It informs them about the breadth of the work carried out in chemical research and development departments, and gives them a feel for the challenges involved in the job. The book is also of value to academics who often understand the drug discovery arena, but have far less appreciation of the drug development area, and are thus unable to advise their students about the relative merits of careers in chemical

development versus discovery.
Single crystals of over 100 different electronically active materials have been synthesized using a variety of methods, including growth by flame-fusion, flux, melt, gel diffusion, low-temperature solution, vapor, as well as synthesis by ultra-high-pressure techniques. These crystals, including a large number of doped specimens, emphasize oxides, garnets, silicates, ferrites, fluorides, as well as a large variety of other electromagnetic materials. Charts are presented giving summary data on single crystals grown, percentage and kind of dopants, growth methods and apparatus, crystal dimensions and other physical characteristics, primary research interest or use, crystal system, class, space group, and pertinent references. Several of the growth methods and recent Laboratory accomplishments are described. (Author).
It is expected that ongoing advances in optics will revolutionise the 21st century as they began doing in the last quarter of the 20th. Such fields as communications, materials science, computing and medicine are leaping forward based on developments in optics. This series presents leading edge research on optics and lasers from researchers spanning the globe.
Covers a widespread view of Quality by Design (QbD) encompassing the many stages involved in the development of a new drug product. The book provides a broad view of Quality by Design (QbD) and shows how QbD concepts and analysis facilitate the development and manufacture of high quality products. QbD is seen as a framework for building process understanding, for implementing robust and effective manufacturing processes and provides the underpinnings for a science-based regulation of the pharmaceutical industry. Edited by the three renowned researchers in the field, Comprehensive Quality by Design for Pharmaceutical Product Development and Manufacture guides pharmaceutical engineers and scientists involved in product and process development, as well as teachers, on how to utilize QbD practices and applications effectively while complying with government regulations. The material is divided into three main sections: the first six chapters address the role of key technologies, including process modeling, process analytical technology, automated process control and statistical methodology in supporting QbD and establishing the associated design space. The second section consisting of seven chapters present a range of thoroughly developed case studies in which the tools and methodologies discussed in the first section are used to support specific drug substance and drug-product QbD related developments. The last section discussed the needs for integrated tools and reviews the status of information technology tools available for systematic data and knowledge management to support QbD and related activities. Highlights Demonstrates Quality by Design (QbD) concepts through concrete detailed industrial case studies involving of the use of best practices and assessment of regulatory implications Chapters are devoted to applications of QbD methodology in three main processing sectors—drug substance process development, oral drug product manufacture, parenteral product processing, and solid-liquid processing Reviews the spectrum of process model types and their relevance, the range of state-of-the-art real--time monitoring tools and chemometrics, and alternative automatic process control strategies and methods for both batch and continuous processes The role of the design space is demonstrated through specific examples and the importance of understanding the risk management aspects of design space definition is highlighted Comprehensive Quality by Design for Pharmaceutical Product Development and Manufacture is an ideal book for practitioners, researchers, and graduate students involved in the development, research, or studying of a new drug and its associated manufacturing process.

The bond valence model is a recently developed model of the chemical bond in inorganic chemistry that complements the bond model widely used in organic chemistry. It is simple, quantitative, intuitive, and predictive - no more than a pocket calculator is needed to calculate it. This book focuses on the theory that underlies the model, and shows how it has been used in physics, materials science, chemistry, mineralogy, soil science, and molecular biology.
Profiles of Drug Substances, Excipients, and Related Methodology, Volume 43 presents comprehensive reviews of drug substances and additional materials, with critical review chapters that summarize information related to the characterization of drug substances and excipients. The series encompasses review articles and database compilations that fall within a variety of categories, with this release focusing on Ganciclovir, Mirtazapine, Tolfenamic Acid, Mid-Infrared Spectroscopy of Pharmaceutical Solids, and the Validation of Chromatographic Methods of Analysis: Application for drugs that derived from herbs. Contains contributions from leading authorities Informs and updates on all the latest developments in the field of drug substances, excipients and methodologies
This book covers a wide range of topics related to functional dyes, from synthesis and functionality to application. Making a survey of recent progress in functional dye chemistry, it provides an opportunity not only to understand the structure-property relationships of a variety of functional dyes but also to know how they are applied in practical use, from electronic devices to biochemical analyses. From classic dyes such as cyanines, squaraines, porphyrins, phthalocyanines, and others to the newest functional π-conjugation systems, various types of functional dyes are dealt with extensively in the book, focusing especially on the state of the art and the future. Readers will benefit greatly from the scientific context in which organic dyes and pigments are comprehensively explained on the basis of chemistry.
A long history -- Symmetry -- Crystal structures -- Diffraction -- Seeing atoms -- Sources of radiation

This book is important because it is the first textbook in an area that has become very popular in recent times. There are around 250 research groups in crystal engineering worldwide today. The subject has been researched for around 40 years but there is still no textbook at the level of senior undergraduates and beginning PhD students. This book is expected to fill this gap.The writing style is simple, with an adequate number of exercises and problems, and the diagrams are easy to understand. This book consists major areas of the subject, including organic crystals and co-ordination polymers, and can easily form the basis of a 30 to 40 lecture course for senior undergraduates.
Recipes from down the dusty trail.
Crystallization is an important purification process used in a broad range of industries, including pharmaceuticals, foods, and bulk chemicals. In recent years, molecular modeling has emerged as a useful tool in the analysis and solution of problems associated with crystallization. Modeling allows more focused experimentation based on structural and energetic calculations instead of intuition and trial and error. This book offers a general introduction to molecular modeling techniques and their application in crystallization. After explaining the basic concepts of molecular modeling and crystallization, the book discusses how modeling techniques are used to solve a variety of practical

problems related to crystal size, shape, internal structure, and properties. With chapters written by leading experts and an emphasis on problem solving, this book will appeal to scientists, engineers, and graduate students involved in research and the production of crystalline materials.
Most people are familiar with the fact that diamond and graphite are both composed only of carbon; yet they have very different properties which result from the very different structures of the two solids - they are polymorphs of carbon. Understanding the relationship between the structures and the properties of materials is of fundamental importance in developing and producing new materials with improved or new properties. The existence of polymorphic systems allows the direct study of the connection between structures and properties. This book provides grounding on the fundamental structural and energetic basis for polymorphism, the preparation and characterization of polymorphic substances and its importance in the specific areas of pharmaceuticals, pigments and high energy (explosive) materials. The closing chapter describes the intellectual property implications and some of the precedent patent litigations in which polymorphism has played a central role. The book contains over 2500 references to provide a ready entry into the relevant literature.

Edited by one of the leading experts in the field, this handbook emphasizes why solid-state issues are important, which approaches should be taken to avoid problems and exploit the opportunities offered by solid state properties in the pharmaceutical and agricultural industries. With its practical approach, this is at once a guideline for development chemists just entering the field as well as a high-quality source of reference material for specialists in the pharmaceutical and chemical industry, structural chemists, physicochemists, crystallographers, inorganic chemists, and patent departments.

This book deals with polymorphism - the existence of different solid structures of the same chemical entity (for example graphite and diamond, both composed of carbon) which provide ideal systems for investigating the relationship between the structure and properties of a wide variety of materials.
A guide to the development and manufacturing of pharmaceutical products written for professionals in the industry, revised second edition The revised and updated second edition of Chemical Engineering in the Pharmaceutical Industry is a practical book that highlights chemistry and chemical engineering. The book’s regulatory quality strategies target the development and manufacturing of pharmaceutically active ingredients of pharmaceutical products. The expanded second edition contains revised content with many new case studies and additional example calculations that are of interest to chemical engineers. The 2nd Edition is divided into two separate books: 1) Active Pharmaceutical Ingredients (API’s) and 2) Drug Product Design, Development and Modeling. The active pharmaceutical ingredients book puts the focus on the chemistry, chemical engineering, and unit operations specific to development and manufacturing of the active ingredients of the pharmaceutical product. The drug substance operations section includes information on chemical reactions, mixing, distillations, extractions, crystallizations, filtration, drying, and wet and dry milling. In addition, the book includes many applications of process modeling and modern software tools that are geared toward batch-scale and continuous drug substance pharmaceutical operations. This updated second edition: Contains 30new chapters or revised chapters specific to API, covering topics including: manufacturing quality by design, computational approaches, continuous manufacturing, crystallization and final form, process safety Expanded topics of scale-up, continuous processing, applications of thermodynamics and thermodynamic modeling, filtration and drying Presents updated and expanded example calculations Includes contributions from noted experts in the field Written for pharmaceutical engineers, chemical engineers, undergraduate and graduate students, and professionals in the field of pharmaceutical sciences and manufacturing, the second edition of Chemical Engineering in the Pharmaceutical Industryf ocuses on the development and chemical engineering as well as operations specific to the design, formulation, and manufacture of drug substance and products.
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.

Solvent systems are integral to drug development and pharmaceutical technology. This single topic encompasses numerous allied subjects running the gamut from recrystallization solvents to biorelevant media. The goal of this contribution to the AAPS Biotechnology: Pharmaceutical Aspects series is to generate both a practical handbook as well as a reference allowing the reader to make effective decisions concerning the use of solvents and solvent systems. To this end, the monograph was created by inviting recognized experts from a number of fields to author relevant sections. Specifically, 15 chapters have been designed covering the theoretical background of solubility, the effect of ionic equilibria and pH on solubilization, the use of solvents to effect drug substance crystallization and polymorph selection, the use of solvent systems in high throughput screening and early discovery, solvent use in preformulation, the use of solvents in bio-relevant dissolution and permeation experiments, solvents and their use as toxicology vehicles, solubilizing media and excipients in oral and parenteral formulation development, specialized vehicles for protein formulation and solvent systems for topical and pulmonary drug administration. The chapters are organized such that useful decision trees are included together with the scientific underpinning for their application. In addition, trends in the use of solvent systems and a balance of current views make this monograph useful to both the novice and experienced researcher and to scientists at all developmental stages from early discovery to late pharmaceutical operations.
This title provides a brief but accurate summary of all the basic ideas, theories, methods, and conspicuous results of structure analysis and molecular modelling of the condensed phases of organic compounds.

An important resource that puts the focus on understanding and handling of organic crystals in drug development Since a majority of pharmaceutical solid-state materials are organic crystals, their handling and processing are critical aspects of drug development. Pharmaceutical Crystals: Science and Engineering offers an introduction to and thorough coverage of organic crystals, and explores the essential role they play in drug development and manufacturing. Written contributions from leading researchers and practitioners in the field, this vital resource provides the fundamental knowledge and explains the connection between pharmaceutically relevant properties and the structure of a crystal. Comprehensive in scope, the text covers a range of topics including: crystallization, molecular interactions, polymorphism, analytical methods, processing, and chemical stability. The authors clearly show how to find solutions for pharmaceutical form selection and crystallization processes. Designed to be an accessible guide, this book represents a valuable resource for improving the drug development process of small drug molecules. This important text: Includes the most important aspects of solid-state organic chemistry and its role in drug development Offers solutions for pharmaceutical form selection and crystallization processes Contains a balance between the scientific fundamental and pharmaceutical applications Presents coverage of crystallography, molecular interactions, polymorphism, analytical methods, processing, and chemical stability Written for both practicing pharmaceutical scientists, engineers, and senior undergraduate and graduate students studying pharmaceutical solid-state materials, Pharmaceutical Crystals: Science and Engineering is a reference and textbook for understanding, producing, analyzing, and designing organic crystals which is an imperative skill to master for anyone working in the field.

Molecular modeling techniques have been widely used in drug discovery fields for rational drug design and compound screening. Now these techniques are used to model or mimic the behavior of molecules, and help us study formulation at the molecular level. Computational pharmaceutics enables us to understand the mechanism of drug delivery, and to develop new drug delivery systems. The book discusses the modeling of different drug delivery systems, including cyclodextrins, solid dispersions, polymorphism prediction, dendrimer-based delivery systems, surfactant-based micelle, polymeric drug delivery systems, liposome, protein/peptide formulations, non-viral gene delivery systems, drug-protein binding, silica nanoparticles, carbon nanotube-based drug delivery systems, diamond nanoparticles and layered double hydroxides (LDHs) drug delivery systems. Although there are a number of existing books about rational drug design with molecular modeling techniques, these techniques still look mysterious and daunting for pharmaceutical scientists. This book fills the gap between pharmaceutics and molecular modeling, and presents a systematic and overall introduction to computational pharmaceutics. It covers all introductory, advanced and specialist levels. It provides a totally different perspective to pharmaceutical scientists, and will greatly facilitate the development of pharmaceutics. It also helps computational chemists to look for the important questions in the drug delivery field. This book is included in the Advances in Pharmaceutical Technology book series.

This is the first book to provide a comprehensive treatment of theories and applications in the rapidly expanding field of the crystallography of modular materials. Molecules are the natural modules from which molecular crystalline structures are built. Most inorganic structures, however, are infinite arrays of atoms and some kinds of surrogate modules, e.g. co-ordination polyhedra, are usually used to describe them. In recent years the attention has been focused on complex modules as the basis for a systematic description of polytypes and homologous/polysomatic series (modular structures). This representation is applied to the modelling of unknown structures and understanding nanoscale defects and intergrowths in materials. The Order/Disorder (OD) theory is fundamental to developing a systematic theory of polytypism, dealing with those structures based on both ordered and disordered stacking of one or more layers. Twinning at both unit-cell and micro-scale, together with disorder, causes many problems, "demons", for computer-based methods of crystal structure determination. This book develops the theory of twinning with the inclusion of worked examples, converting the "demons" into useful indicators for unravelling crystal structure. In spite of the increasing use of the concepts of modular crystallography for characterising, understanding and tailoring technological crystalline materials, this is the first book to offer a unified treatment of the results, which are spread across many different journals and original papers published over the last twenty years.

An eminently readable book on the symmetry of crystals and molecules, starting from first principles

The crystalline state is the most commonly used essential solid active pharmaceutical ingredient (API). The characterization of pharmaceutical crystals encompasses many scientific disciplines, but the core is crystal structure analysis, which reveals the molecular structure of essential pharmaceutical compounds. Crystal structure analysis provides important structural information related to the API's wide range of physicochemical properties, such as solubility, stability, tablet performance, color, and hygroscopicity. This book entitled “Pharmaceutical Crystals" focuses on the relationship between crystal structure and physicochemical properties. In particular, the new crystal structure of pharmaceutical compounds involving multi-component crystals, such as co-crystals, salts, and hydrates, and polymorph crystals are reported. Such crystal structures were investigated in the latest studies that combined morphology, spectroscopic, theoretical calculation, and thermal analysis with crystallographic study. This book highlights the importance of crystal structure information in many areas of pharmaceutical science and presents current trends in the structure–property study of pharmaceutical crystals. The Guest Editors of this book hope the readers enjoy a wide variety of recent studies on Pharmaceutical Crystals.

Crystal growth is the key step of a great number of very important applications. The development of new devices and products, from the traditional microelectronic industry to pharmaceutical industry and many others, depends on crystallization processes. The objective of this book is not to cover all areas of crystal growth but just present, as specified in the title, important selected topics, as applied to organic and inorganic systems. All authors have been selected for being key researchers in their field of specialization, working in important universities and research labs around the world. The first section is mainly devoted to biological systems and covers topics like proteins, bone and ice crystallization. The second section brings some applications to inorganic systems and describes more general growth techniques like chemical vapor crystallization and electrodeposition. This book is mostly recommended for students working in the field of crystal growth and for scientists and engineers in the fields of crystalline materials, crystal engineering and the industrial applications of crystallization processes.

This thesis investigates a range of experimental and computational approaches for the discovery of solid forms. Furthermore, we gain, as readers, a better understanding of the key factors underpinn-

ing solid-structure and diversity. A major part of this thesis highlights experimental work carried out on two structurally very similar compounds. Another important section involves looking at the influence of small changes in structure and substituents on solid-structure and diversity using computational tools including crystal structure prediction, PIXEL calculations, Xpac, Mercury and statistical modeling tools. In addition, the author presents a fast validated method for solid-state form screening using Raman microscopy on multi-well plates to explore the experimental crystallization space. This thesis illustrates an inexpensive, practical and accurate way to predict the crystallizability of organic compounds based on molecular structure alone, and additionally highlights the molecular factors that inhibit or promote crystallization.

This book provides an account of the structure and properties of crystalline binary adducts. Such crystals are perhaps better known as molecular compounds and complexes and are estimated to make up one quarter of the world's crystals. More than 600 figures, 200 tables and 3500 references are included in the book.

Critical overviews from the front line of ionic liquids research Ionic Liquids Completely UnCOILed: Critical Expert Overviews concludes the discussion of new processes and developments in ionic liquid technology introduced in the previously published volumes, Ionic Liquids UnCOILed and Ionic Liquids Further UnCOILed. The goal of this volume is to provide expert overviews that range from applied to theoretical, synthetic to structural, and analytical to toxicological. The value of book lies in the authors' expertise, and their willingness to share it with the reader. Written by an international group of chemists, the book presents eleven overviews of specific areas of ionic liquid chemistry including: What is an Ionic Liquid? Molecular modelling Crystallography Chemical engineering of ionic liquid processes Toxicology and Biodegradation Organic reaction mechanisms Edited by Professor Ken Seddon and Dr Natalia Plechkova, world leaders in the field of ionic liquids, this book is a must read for R&D chemists, educators, and students, and for commercial developers of environmentally sustainable processes. It offers insight and appreciation for the direction in which the field is going, while also highlighting the best published works available, making it equally valuable to new and experienced chemists alike.

"Polymorphism in the Pharmaceutical Industry - Solid Form and Drug Development" highlights the relevance of polymorphism in modern pharmaceutical chemistry, with a focus on quality by design (QbD) concepts. It covers all important issues by way of case studies, ranging from properties and crystallization, via thermodynamics, analytics and theoretical modelling right up to patent issues. As such, the book underscores the importance of solid-state chemistry within chemical and pharmaceutical development. It emphasizes why solid-state issues are important, the approaches needed to avoid problems and the opportunities offered by solid-state properties. The authors include true polymorphs as well as solvates and hydrates, while providing information on physicochemical properties, crystallization thermodynamics, quantum-mechanical modelling, and up-scaling. Important analytical tools to characterize solid-state forms and to quantify mixtures are summarized, and case studies on solid-state development processes in industry are also provided. Written by acknowledged experts in the field, this is a high-quality reference for researchers, project managers and quality assurance managers in pharmaceutical, agrochemical and fine chemical companies as well as for academics and newcomers to organic solid-state chemistry.

Bridging the gap between theory and practice, this text provides the reader with a comprehensive overview of industrial crystallization. Newcomers will learn all of the most important topics in industrial crystallization, from key concepts and basic theory to industrial practices. Topics covered include the characterization of a crystalline product and the basic process design for crystallization, as well as batch crystallization, measurement techniques, and details on precipitation, melt crystallization and polymorphism. Each chapter begins with an introduction explaining the importance of the topic, and is supported by homework problems and worked examples. Real world case studies are also provided, as well as new industry-relevant information, making this is an ideal resource for industry practitioners, students, and researchers in the fields of industrial crystallization, separation processes, particle synthesis, and particle technology.

The essential introduction to the understanding of the structure of inorganic solids and materials. This revised and updated 2nd Edition looks at new developments and research results within Structural Inorganic Chemistry in a number of ways, special attention is paid to crystalline solids, elucidation and description of the spatial order of atoms within a chemical compound. Structural principles of inorganic molecules and solids are described through traditional concepts, modern bond-theoretical theories, as well as taking symmetry as a leading principle.

Technological and computational advances in the past decade have meant a vast increase in the study of crystalline matter in both organic, inorganic and organometallic molecules. These studies revealed information about the conformation of molecules and their coordination geometry as well as the role of intermolecular interactions in molecular packing especially in the presence of different intermolecular interactions in solids. This resulting knowledge plays a significant role in the design of improved medicinal, mechanical, and electronic properties of single and multi-component solids in their crystalline state. Understanding Intermolecular Interactions in the Solid State explores the different techniques used to investigate the interactions, including hydrogen and halogen bonds, lone pair–pi, and pi–pi interactions, and their role in crystal formation. From experimental to computational approaches, the book covers the latest techniques in crystallography, ranging from high pressure and in situ crystallization to crystal structure prediction and charge density analysis. Thus this book provides a strong introductory platform to those new to this field and an overview for those already working in the area. A useful resource for higher level undergraduates, postgraduates and researchers across crystal engineering, crystallography, physical chemistry, solid-state chemistry, supramolecular chemistry and materials science.

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

An exploration of new and emerging techniques, processes and applications in the behaviour, crystallization, and polymorphic transformations of fats and oils. It presents research and information on advanced analytical tools, computer modelling, molecular structures, mixing behaviour, and interactions with seeding materials and surfactants. The con

The existence of the weak hydrogen bond has been postulated for some years, but only recently has it become evident that the bond plays a distinctive role in the characteristics of certain molecules. This book provides a critical assessment.