Handbook of Industrial Crystallization

Edited by Allan S. Myerson. Deniz Erdemir and Alfred Y. Lee

THIRD EDITION

Handbook Of Industrial Crystallization

Alison Lewis, Marcelo Seckler, Herman Kramer, Gerda van Rosmalen

Handbook Of Industrial Crystallization:

Handbook of Industrial Crystallization Allan S. Myerson, 1993 This volume covers all aspects of industrial crystallization including material related to both fundamentals and applications It provides an introduction to the field for newcomers and a reference to those involved in the various aspects of industrial crystallization **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 fieldCovers all aspects of industrial crystallization in a single complete volume Industrial Crystallization Alison Lewis, Marcelo Seckler, Herman Kramer, Gerda van Rosmalen, 2015-07-02 A comprehensive overview of industrial crystallization its theory and practice including recent advances real world case studies Handbook of Continuous Crystallization Nima Yazdanpanah, Zoltan K Nagy, 2020-02-04 and worked examples Continuous crystallization is an area of intense research with particular respect to the pharmaceutical industry and fine chemicals Improvements in continuous crystallization technologies offer chemical industries significant financial gains through reduced expenditure and operational costs and consistent product quality Written by well known leaders in the field The Handbook of Continuous Crystallization presents fundamental and applied knowledge with attention paid to application and scaling up and the burgeoning area of process intensification Beginning with concepts around crystallization techniques and control strategies the reader will learn about experimental methods and computational tools Case studies spanning fine and bulk chemicals the pharmaceutical industry and employing new mathematical tools put theory into context SMEMineral Processing and Extractive Metallurgy Handbook Courtney A. Young, 2019-02-01 This landmark publication distills the body of knowledge that characterizes mineral processing and extractive metallurgy as disciplinary fields It will inspire and inform current and future generations of minerals and metallurgy professionals Mineral processing and extractive metallurgy are atypical disciplines requiring a combination of knowledge experience and art Investing in this trove of valuable information is a must for all those involved in the industry students engineers mill managers and operators More than 192 internationally recognized experts have contributed to the handbook s 128 thought provoking chapters that examine nearly every aspect of mineral processing and extractive metallurgy This inclusive reference addresses the magnitude of traditional industry topics and also addresses the new technologies and important cultural and social issues

that are important today Contents Mineral Characterization and Analysis Management and ReportingComminutionClassification and WashingTransport and StoragePhysical SeparationsFlotationSolid and Liquid SeparationDisposalHydrometallurgyPyrometallurgyProcessing of Selected Metals Minerals and Materials Industrial Polyethylene and Technology Mark A. Spalding, Ananda Chatterjee, 2017-10-26 This handbook provides an exhaustive description of polyethylene The 50 chapters are written by some of the most experienced and prominent authors in the field providing a truly unique view of polyethylene The book starts with a historical discussion on how low density polyethylene was discovered and how it provided unique opportunities in the early days New catalysts are presented and show how they created an expansion in available products including linear low density polyethylene high density polyethylene copolymers and polyethylene produced from metallocene catalysts With these different catalysts systems a wide range of structures are possible with an equally wide range of physical properties Numerous types of additives are presented that include additives for the protection of the resin from the environment and processing fillers processing aids anti fogging agents pigments and flame retardants Common processing methods including extrusion blown film cast film injection molding and thermoforming are presented along with some of the more specialized processing techniques such as rotational molding fiber processing pipe extrusion reactive extrusion wire and cable and foaming processes. The business of polyethylene including markets world capacity and future prospects are detailed This handbook provides the most current and complete technology assessments and business practices for polyethylene resins **Crystallization of Organic Compounds** Hsien-Hsin Tung, Edward L. Paul, Michael Midler, James A. McCauley, 2023-07-05 Crystallization of Organic Compounds Practical resource covering applications of crystallization principles with methodologies case studies and numerous industrial examples for emphasis Based on the authors hands on experiences as process engineers through the use of case studies and examples of crystallization processes ranging from laboratory development through manufacturing scale up Crystallization of Organic Compounds guides readers through the practical applications of crystallization and emphasizes strategies that have proven to be successful enabling readers to avoid common pitfalls that can render standard procedures unsuccessful Most chapters feature multiple examples that guide readers step by step through the crystallization of active pharmaceutical ingredients APIs including an analysis of the major methods of carrying out crystallization operations their strengths and potential issues as well as numerous examples of crystallization processes from development through manufacturing scale Advancements in the field of crystallization have been integrated throughout the book in the newly revised Second Edition to ensure the content adequately reflects current state of the art industrial know hows and practice The new edition also adds chapters addressing downstream operations after the crystallization including filtration washing and drying together with industrial use cases Crystallization of Organic Compounds includes detailed information on Solubility and solid behavior covering phase rule polymorph salt co crystal chiral resolution and in silico solubility prediction

and kinetics covering seed supersaturation nucleation crystal growth and model based experimental design Critical issues in the crystallization practice covering oiling out seeding wet milling agglomeration aggregation mixing scale up and quality by design principles Cooling anti solvent evaporation and reactive crystallization process design covering batch and continuous operations with industrial examples Special applications covering crystallization with ultrasound reaction selectivity enhancement and computation fluid dynamics and solid dispersion With highly practical coverage of the subject Crystallization of Organic Compounds is an essential resource for engineers and chemists involved with the development scaling or operation of crystallization process in the pharmaceutical and fine chemical industries particularly those with degrees in chemical engineering and chemistry <u>Industrial Chemical Separation</u> Timothy C. Frank, Bruce S. Holden, 2023-08-07 A fresh new treatment written by industry insiders this work gives readers a remarkably clear view into the world of chemical separation The authors review distillation extraction adsorption crystallization and the use of membranes providing historical perspective explaining key features and offering insights from personal experience The book is for engineers and chemists with current or future responsibility for chemical separation on a commercial scale in its design operation or improvement or for anyone wanting to learn more about chemical separation from an industrial point of view The result is a compelling survey of popular technologies and the profession one that brings the art and craft of chemical separation to life Ever wonder how popular separation technologies came about how a particular process functions or how mass transfer units differ from theoretical stages Or perhaps you want some pointers on how to begin solving a separation problem You will find clear explanations and valuable insights into these and other aspects of industrial practice in this refreshing new survey Industrial Separation Processes André B. de Haan, H. Burak Eral, Boelo Schuur, 2025-05-06 Separation processes on an industrial scale account for well over half of the capital and operating costs in the chemical industry Knowledge of these processes is key for every student of chemical or process engineering and makes this book with its wealth of exercises and solutions ideally suited to university teaching The Third edition boasts an even greater number of applied examples and updated chapters on drying adsorption and membranes
Continuous Manufacturing of Pharmaceuticals Peter Kleinebudde, Johannes Khinast, Jukka Rantanen, 2024-10-28 A comprehensive look at existing technologies and processes for continuous manufacturing of pharmaceuticals As rising costs outpace new drug development the pharmaceutical industry has come under intense pressure to improve the efficiency of its manufacturing processes Continuous process manufacturing provides a proven solution Among its many benefits are minimized waste energy consumption and raw material use the accelerated introduction of new drugs the use of smaller production facilities with lower building and capital costs the ability to monitor drug quality on a continuous basis and enhanced process reliability and flexibility Continuous Manufacturing of Pharmaceuticals prepares professionals to take advantage of that exciting new approach to improving drug manufacturing efficiency This book covers key aspects of the continuous manufacturing of

pharmaceuticals The first part provides an overview of key chemical engineering principles and the current regulatory environment The second covers existing technologies for manufacturing both small molecule based products and protein peptide products The following section is devoted to process analytical tools for continuously operating manufacturing environments The final two sections treat the integration of several individual parts of processing into fully operating continuous process systems and summarize state of art approaches for innovative new manufacturing principles Brings together the essential know how for anyone working in drug manufacturing as well as chemical food and pharmaceutical scientists working on continuous processing Covers chemical engineering principles regulatory aspects primary and secondary manufacturing process analytical technology and quality by design Contains contributions from researchers in leading pharmaceutical companies the FDA and academic institutions Offers an extremely well informed look at the most promising future approaches to continuous manufacturing of innovative pharmaceutical products Timely comprehensive and authoritative Continuous Manufacturing of Pharmaceuticals is an important professional resource for researchers in industry and academe working in the fields of pharmaceuticals development and manufacturing Fundamentals of Early Clinical Drug Development Ahmed F. Abdel-Magid, Stéphane Caron, 2006-09-29 An informative look at the intricacies of today s drug development process Once a discovery organization has identified a potential new drug candidate it is the daunting task of synthetic organic chemists to identify the chemical process suitable for preparation of this compound in a highly regulated environment Only through a multi layered chemical process that takes into account such factors as safety environmental considerations freedom to operate and cost effectiveness can researchers begin to refine the drug in terms of quality and yield This book covers both recent advances in the design and synthesis of new drugs as well as the myriad other issues facing a new drug candidate as it moves through the development process Utilizing recent case studies the authors provide valuable insights into the complexities of the process from designing new synthetic methodologies and applying new automated techniques for finding optimal reaction conditions to selecting the final drug form and formulation Both novice and active researchers will appreciate the inclusion of chapters on such diverse topics as Cross coupling methods Asymmetric synthesis Automation Chemical Engineering Application of radioisotopes Final form selection Formulations Intellectual property A wealth of real world examples and contributions from leading process scientists engineers and related professionals make this book a valuable addition to the scientific literature Pharmaceutical Salts and Co-crystals Johan Wouters, Luc Quéré, 2011 His unique book focuses on the currently hot topic of Pharmaceutical Salts and Co crystals Combining both reports of the latest academic research and comprehensive overviews of basic principles with more applied contributions from selected experts in industry Industrial Applications of Molecular Simulations Marc Meunier, 2016-04-19 The field of guantum and molecular simulations has experienced strong growth since the time of the early software packages A recent study showed a large increase in the number of people publishing papers based on ab initio

Calcium Phosphates in Biological and Industrial Systems Zahid Amjad,2013-11-27 Calcium Phosphates in Biological and Industrial Systems Zahid Amjad,2013-11-27 Calcium Phosphates in Biological and Industrial Systems provides a comprehensive discussion on calcium phosphates in the diverse areas of their applications. The authors are all respected specialists in their particular fields possessing wide knowledge and experience and able to analyze recent results and relate them to their respective areas of expertise. New information as well as a review of current concepts highlights the individual contributions. Due to the broad scope of the subject covered and the large number of contributions this book is divided into three parts Whilst each section contains a basic theme there is a considerable overlapping of ideas and approaches. This reflects the excitement and interdisciplinary nature of investigations by researchers interested in dissimilar aspects of calcium phosphates. Considering the general interest in calcium phosphates. Calcium Phosphates in Biological and Industrial Systems is directed at an audience of researchers in the fields of biology chemistry dentistry geology chemical engineering environmental engineering and medicine. It will also be useful to

technology focused researchers in industry whose investigations might be related directly or indirectly to calcium phosphates

Batch Processes Ekaterini Korovessi, Andreas A. Linninger, 2005-09-26 Reduced time to market lower production costs and improved flexibility are critical success factors for batch processes Their ability to handle variations in feedstock and product specifications has made them key to the operation of multipurpose facilities and therefore quite popular in the specialty chemical pharmaceutical agricultural and Solvent Systems and Their Selection in Pharmaceutics and Biopharmaceutics Patrick Augustijns, Marcus Brewster, 2007-08-06 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 **Practical Process**

Research and Development Neal G. Anderson, 2012-04-09 Designed to provide a comprehensive step by step approach to organic process research and development in the pharmaceutical fine chemical and agricultural chemical industries this book describes the steps taken following synthesis and evaluation to bring key compounds to market in a cost effective manner It describes hands on step by step approaches to solving process development problems including route reagent and solvent selection optimising catalytic reactions chiral syntheses and green chemistry Second Edition highlights Reflects the current thinking in chemical process R D for small molecules Retains similar structure and orientation to the first edition Contains approx 85% new material Primarily new examples work up and prospective considerations for pilot plant and manufacturing scale up Some new expanded topics e g green chemistry genotoxins enzymatic processes Replaces the first edition although the first edition contains useful older examples that readers may refer to Provides insights into generating rugged practical cost effective processes for the chemical preparation of small molecules Breaks down process optimization into route reagent and solvent selection development of reaction conditions workup crystallizations and more Presents quidelines for implementing and troubleshooting processes Food Processing Kshirod Kumar Dash, Sourav Chakraborty, 2021-08-09 Advances in thermal and non thermal food processing aims to discuss emerging trends based on the future scope and challenges and to explain uncertain challenges in food processing In thermal processing different operations in food engineering namely advance drying methods evaporation extrusion cooking different extraction techniques crystallizations are covered in terms food engineering and process modeling aspect For non thermal processing high pressure processing ultrasound ohmic heating pulse electric field pulse light technology osmotic dehydration and so forth are discussed Relevant mathematical modeling and numerical simulations has been included in every chapter Features Presents engineering focus on thermal and non thermal food processing technologies Discusses sub classification for recent trends and relevant industry information examples Describes advances in drying evaporation blanching crystallization and ohmic heating Covers high pressure processing pulse electric field pulse light technology irradiation and ultrasonic techniques Includes mathematical modeling and numerical simulations The book is aimed at graduate students professionals in food engineering and food technology biological systems engineering Frontiers On Separation Science And Technology, Proceedings Of The **4th International Conference** Zhangfa Tong, Sung Hyun Kim, 2004-06-07 This book presents the latest achievements of separation science and technology It highlights the application of separation with regard to problems of current interest such as the protection of the environment and the development of emerging technology including chemical engineering biotechnology renewable energy sources and recycling of materials **Continuous Pharmaceutical Processing** Zoltan K Nagy, Arwa El Hagrasy, Jim Litster, 2020-06-10 Continuous pharmaceutical manufacturing is currently receiving much interest from industry and regulatory authorities with the joint aim of allowing rapid access of novel therapeutics and existing medications to the public without compromising high quality Research groups from different academic institutions have

significantly contributed to this field with an immense amount of published research addressing a variety of topics related to continuous processing The book is structured to have individual chapters on the different continuous unit operations involved in drug substance and drug product manufacturing A wide spectrum of topics are covered including basic principles of continuous manufacturing applications of continuous flow chemistry in drug synthesis continuous crystallization continuous drying feeders and blenders roll compaction and continuous wet granulation. The underlying theme for each of these chapters is to present to the reader the recent advances in modeling experimental investigations and equipment design as they pertain to each individual unit operation The book also includes chapters on quality by design QbD and process analytical technology PAT for continuous processing process control strategies including new concepts of quality by control QbC real time process management and plant optimization business and supply chain considerations related to continuous manufacturing as well as safety guidelines related to continuous chemistry A separate chapter is dedicated to discussing regulatory aspects of continuous manufacturing with description of current regulatory environment quality GMP aspects as well as regulatory gaps and challenges Our aim from publishing this book is to make it a valuable reference for readers interested in this topic with a desire to gain a fundamental understanding of engineering principles and mechanistic studies utilized in understanding and developing continuous processes In addition our advanced readers and practitioners in this field will find that the technical content of Continuous Pharmaceutical Processing is at the forefront of recent technological advances with coverage of future prospects and challenges for this technology

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