

Engineering Principles Of Plasticating Extrusion Polymer Science And Engineering Series

The first survey of polymer processing written on an introductory level, this presentation is grounded in industrial practice. It covers fundamental chemical engineering principles as they are exhibited in polymers, basic operations for production, and product design for applications, as well as recycling and environmental considerations.

This comprehensive book provides guidelines for maximizing plastics processing efficiency in the manufacture of all types of products, using all types of plastics. A practical approach is employed to present fundamental, yet comprehensive, coverage of processing concepts. The information and data presented by the many tables and figures interrelate the different variables that affect injection molding, extrusion, blow molding, thermoforming, compression molding, reinforced plastics molding, rotational molding, reaction injection molding, coining, casting, and other processes. The text presents a great number of problems pertaining to different phases of processing. Solutions are provided that will meet product performance requirements at the lowest cost. Many of the processing variables and their behaviors in the different processes are the same, as they all involve basic conditions of temperature, time, and pressure. The book begins with information applicable to all processes, on topics such as melt softening flow and controls; all processes fit into an overall scheme that requires the interaction and proper control of systems. Individual processes are reviewed to show the effects of changing different variables to meet the goal of zero defects. The content is arranged to provide a natural progression from simple to complex situations, which range from control of a simple manual machine to simulation of sophisticated computerized processes that interface with many different processing functions.

Materials processing and manufacturing are fields of growing importance whereby transport phenomena play a central role in many of the applications. This volume is one of the first collections of contributions on the subject. The five papers cover a wide variety of applications

Pharmaceutical Extrusion Technology is the only resource to provide in-depth descriptions and analyses of the key parameters of extruders and extrusion processes. The book highlights the applicability of melt extrusion in pharmaceutical drug development and product manufacturing, including controlled release, dissolution rate and bioavailability enhancement, and granulation technology. It brings together the technical information necessary to develop and market pharmaceutical dosage forms that meet current quality and regulatory requirements and details extruder hardware and controls, process definition and troubleshooting of single and twin screw extrusion processes, and more.

R&D to Manufacturing

Polymer Processing and Structure Development

Second International Conference, EMO 2003, Faro, Portugal, April 8-11, 2003, Proceedings

Introduction to Polymer Compounding

Chemical Engineering in the Pharmaceutical Industry

ANTEC 2001

An authoritative reference on the processing and finishing of polymeric materials for scientists and practitioners Owing to their versatility and wide range of applications, polymeric materials are of great commercial importance. Manufacturing processes of commercial products are designed to meet the requirements of the final product and are influenced by the physical and chemical properties of the polymeric material used. Based on Wiley's renowned Encyclopedia of Polymer Science and Technology, Processing and Finishing of Polymeric Materials provides comprehensive, up-to-date details on the latest manufacturing technologies, including blending, compounding, extrusion, molding, and coating. Written by prominent scholars from industry, academia, and research institutions from around the globe, this reference features more than forty selected reprints from the Encyclopedia as well as new contributions, providing unparalleled coverage of such topics as: Additives Antistatic agents Bleaching Blowing agents Calendaring Casting Coloring processes Dielectric heating Electrospinning Embedding Processing and Finishing of Polymeric Materials is an ideal resource for polymer and materials scientists, chemists, chemical engineers, materials scientists, process engineers, and consultants, and serves as a valuable addition to libraries of chemistry, chemical engineering, and materials science in industry, academia, and government.

The Science and Technology of Flexible Packaging: Multilayer Films from Resin and Process to End Use, Second Edition provides a comprehensive guide on plastic films in flexible packaging, covering scientific principles, materials properties, processes and end use considerations. Sections discuss the science of multilayer films in a concise and impactful way, presenting the fundamental understanding required to improve product design, material selection and processes. In addition, the book includes information on why one material is favored over another and how film or coating affects material properties. Descriptions and analysis of key properties of packaging films are provided from engineering and scientific perspectives. With essential scientific insights, best practice techniques, environmental sustainability information and key principles of structure design, this book provides information aids in material selection and processing, how to shorten development times and deliver stronger products, and ways to enable engineers and scientists to deliver superior products with reduced development time and cost. Provides essential information on all aspects of multilayer films in flexible packaging, including processing, properties, materials and end use Bridges the gap between scientific principles and practical challenges Includes explanations to assist practitioners in overcoming challenges Enables the reader to address new challenges, such as design for sustainability and eCommerce

Extrusion Cooking provides a detailed description of extrusion processing with an in-depth exploration of cereal grains processing. In particular, the book addresses the basic principles of extrusion processing, various extruder parts and their design principles, food ingredients and their characteristics as they relate to extrusion. It also discusses physicochemical changes in the different ingredient components as they are processed in an extruder, modeling and control of extrusion process, scale-up aspects, extrusion plant design, food safety in extrusion, new advancements in extrusion, and a look into the future of extrusion. This valuable text serves as a one-volume reference on extrusion processing for food industry professionals and students. Covers the engineering, chemistry, nutrition, and food safety aspects of extrusion cooking Presents both the fundamental and applied aspects of extrusion processing Details the extrusion of whole-grain, high-fiber, and high-protein foods Covers both expanded and texturized products Outlines extrusion processing of different ingredients Addresses new technologies that have expanded the extruder capabilities Analyzes new developments in the area of modeling of extrusion processing First Published in 1981, this two-volume set explores the extrusion of foods. Carefully compiled and filled with a vast repertoire of notes, diagrams, and references this book serves as a useful reference for students of medicine and other practitioners in their respective fields.

Plastics Extrusion Technology Handbook

Extrusion Processing Technology

Handbook of Food Engineering

The Science and Technology of Flexible Packaging

Machinery and Technology

Fundamentals of Polymer Engineering, Third Edition

Intended for students and practitioners who have a basic education in chemical engineering or food science. Contains basic information in each area and describes some of the fundamental ideas of processing development and design. Examines the food industry structure, how it works, consumer products,

For some time there has been a strong need in the plastic and related industries for a detailed, practical book on designing with plastics and composites (reinforced plastics). This one-source book meets this criterion by clearly explaining all aspects of designing with plastics, as can be seen from the Table of Contents and Index. It provides information on what is ahead as well as today's technology. It explains how to interrelate the process of meeting design performance requirements with that of selecting the proper plastic and manufacturing process to make a product at the lowest cost. This book has been prepared with an awareness that its usefulness will depend greatly upon its simplicity. The overall guiding premise has therefore been to provide all essential information. Each chapter is organized to best present a methodology for designing with plastics and composites. of industrial designers, whether in engineering This book will prove useful to all types or involved in products, molds, dies or equipment, and to people in new-product ventures, research and development, marketing, purchasing, and management who are involved with such different products as appliances, the building industry, autos, boats, electronics, furniture, medical, recreation, space vehicles, and others. In this handbook the basic essentials of the properties and processing behaviors of plastics are presented in a single source intended to be one the user will want to keep within easy reach.

As the complexity of the food supply system increases, the focus on processes used to convert raw food materials and ingredients into consumer food products becomes more important. The Handbook of Food Engineering, Third Edition, continues to provide students and food engineering professionals with the latest information needed to improve the efficiency of the food supply system. As with the previous editions, this book contains the latest information on the thermophysical properties of foods and kinetic constants needed to estimate changes in key components of foods during manufacturing and distribution. Illustrations are used to demonstrate the applications of the information to process design. Researchers should be able to use the information to pursue new directions in process development and design, and to identify future directions for research on the physical properties of foods and kinetics of changes in the food throughout the supply system. Features Covers basic concepts of transport and storage of liquids and solids, heating and cooling of foods, and food ingredients New chapter covers nanoscale science in food systems Includes chapters on mass transfer in foods and membrane processes for liquid concentration and other applications Discusses specific unit operations on freezing, concentration, dehydration, thermal processing, and extrusion The first four chapters of the Third Edition focus primarily on the properties of foods and food ingredients with a new chapter on nanoscale applications in foods. Each of the eleven chapters that follow has a focus on one of the more traditional unit operations used throughout the food supply system. Major revisions and/or updates have been incorporated into chapters on heating and cooling processes, membrane processes, extrusion processes, and cleaning operations.

This book is intended to fill a gap between the theoretical studies and the practical experience of the processor in the extrusion of thermoplastic polymers. The former have provided a basis for numerical design of extruders and their components, but generally give scant attention to the practical performance, especially to the conflict between production rate and product quality. In practice extruders are frequently purchased to perform a range of duties; even so, the operator may have to use a machine designed for another purpose and not necessarily suitable for the polymer, process or product in hand.

The operator's experience enables him to make good product in unpromising circumstances, but a large number of variables and interactions often give apparently contradictory results. The hope is that this book will provide a logical background, based on both theory and experience, which will help the industrial processor to obtain the best performance from his equipment, to recognize its limitations, and to face new problems with confidence. Mathematics is used only to the extent that it clarifies effects which cannot easily be expressed in words; if it is passed over, at least a qualitative understanding should remain. The approximate theory will not satisfy the purist, but this seems to the authors less important than a clear representation of the physical mechanisms on which so much of the polymer

processing industry depends. M. J. STEVENS J. A.

Technologies and Applications

Extrusion Of Foods

Extruding Plastics

Extruder Principles and Operation

Polymer Mixing and Extrusion Technology

Polymer compounding plays an important role in the successful use of polymers. It helps to extend the properties of polymers such as durability, stiffness or thermal resistance so that these properties can be incorporated into an improved end-product. Several thousand of compounds currently used incorporate additives such as antioxidants, fillers or lubricants. Innovation is an essential element in polymer compounding with respect to the manufacture of increasingly sophisticated products such as polymer blends and composites. This book gives an idea of the productive area of polymer compounding. Volume 2 focusses on manufacturing technology and processing and provides an overview of the basic and fundamental aspects of polymer compounding. This volume should interest students, scientists and engineers, and constitutes a reference text for the experimental polymer technologist. Written in a simple and accurate style this book can be understood even by the reader who is not familiar with polymer compounding. The book is also very informative and helps give an overall view of compounding. The figures are well organised with technical and economic considerations, as well as consideration of the problems associated with polymer compounding. Therefore, the book is distinctly quantitative in nature and designed to inspire a large audience of industrial and academic polymer scientists interested in the technology of polymer compounding.

Extrusion cooking is an ideal method for manufacturing a number of food products from snacks and breakfast cereals to baby foods. However, as a complex multivariate process it requires careful control if product quality is to be maintained. Edited by a leading authority in the field, and with an international team of contributors, this important collection reviews the key factors affecting quality and how they can be controlled in manufacturing a range of extruded products. The first part of Extrusion Cooking looks at general influences on quality. There are chapters on the selection of raw materials, criteria for selecting the right extruder, analysing and optimising thermal performance in extrusion cooking, and effective process control. There is also an important chapter on maintaining nutritional quality in extruded products. The second part of the book looks at the application of extrusion in particular product groups. Each chapter examines the range of extruded products within the product group, the specific production issues and future trends. It also includes chapters on key products such as breakfast cereals, snack foods and baby foods. Extrusion cooking will be widely welcomed as a major reference in maximising the quality of extruded products. A key reference to improving efficiency and quality on extruded products

Exploring the chemistry of synthesis, mechanisms of polymerization, reaction engineering of step-growth and chain-growth polymerization, polymer characterization, thermodynamics and structural, mechanical, thermal and transport behavior of polymers as melts, solutions and solids, Fundamentals of Polymer Engineering, Third Edition covers essential concepts and breakthroughs in reactor design and polymer production and processing. It contains modern theories and real-world examples for a clear understanding of polymer function and development. This fully updated edition addresses new materials, applications, processing techniques, and interpretations of data in the field of polymer science. It discusses the conversion of biomass and coal to plastics and fuels, the use of porous polymers and membranes for water purification, and the use of polymeric membranes in fuel cells. Recent developments are brought to light in detail, and there are new sections on the improvement of barrier properties of polymers, constitutive equations for polymer melts, additive manufacturing and polymer recycling. This textbook is aimed at senior undergraduate students and first year graduate students in polymer engineering and science courses, as well as professional engineers, scientists, and chemists. Examples and problems are included at the end of each chapter for concept reinforcement.

Worldwide, extrusion lines successfully process more plastics into products than other processes by consuming at least 36 wt% of all plastics. They continue to find practical solutions for new products and/or problems to meet new product performances. This book, with its practical industry reviews, is a unique handbook (the first of its kind) that covers over a thousand of the potential combinations of basic variables or problems with solutions that can occur from up-stream to down-stream equipment. Guidelines are provided for maximizing processing efficiency and operating at the lowest possible cost. It has been prepared with an awareness that its usefulness will depend greatly upon its simplicity and provision of essential information. It should be useful to: (0) those already extruding and desiring to obtain additional information for their line and/or provide a means of reviewing other lines that can provide their line with operating improvements; (2) those processing or extruding plastics for the first time; (3) those considering going into another extrusion process; (4) those desiring additional information about employing the design of various products more efficiently, with respect to both performance and cost; (5) those contemplating entering the business of extrusion; (6) those in new venture groups, materials development, and/or market development; (7) those in disciplines such as nonplastics manufacturers, engineers, designers, quality control, financial, and management; and (8) those requiring a textbook on extrusion in trade schools and high schools or colleges.

Applied Soft Computing Technologies: The Challenge of Complexity

Processability and Applications

Transport Phenomena in Materials Processing

Designing with Plastics and Composites: A Handbook

Rheology of Filled Polymer Systems

Melt Extrusion

This book constitutes the refereed proceedings of the Second International Conference on Evolutionary Multi-Criterion Optimization, EMO 2003, held in Faro, Portugal, in April 2003. The 56 revised full papers presented were carefully reviewed and selected from a total of 100 submissions. The papers are organized in topical sections on objective handling and problem decomposition, algorithm improvements, online adaptation, problem construction, performance analysis and comparison, alternative methods, implementation, and applications.

This book discusses the process theories and automation levels of the most important polymer processes which are necessary to achieve product quality and process economy. The book describes mixing, calendaring, screw plastications, sheet and tube extrusion, film blowing, blow moulding and injection moulding. The control methods employed for each of these individual processes are presented in detail. The book is designed to provide information on static and dynamic processes and viable control systems.

More than 900 authors from over 35 countries contributed to the 1992 International Congress on Rheology. These proceedings volumes comprise 17 plenary and keynote papers, 250 oral contributions and some 200 poster presentations. All relevant aspects of rheology are covered, e.g., theoretical rheology, molecular theories, fluid mechanics, rheometry, experimental methods, foams, polymer solutions, polymer melts, rubber, solids, composites, biorheology, industrial rheology, polymer processing, food rheology and electrorheology, reflecting the development of rheology into a broad, multidisciplinary field of recognized academic and industrial relevance.

This volume presents the proceedings of the 9th Online World Conference on Soft Computing in Industrial Applications, held on the World Wide Web in 2004. It includes lectures, original papers and tutorials presented during the conference. The book brings together outstanding research and developments in soft computing, including evolutionary computation, fuzzy logic, neural networks, and their fusion, and its applications in science and technology.

Proceedings of the XIth International Congress on Rheology, Brussels, Belgium, August 17-21, 1992

A practical processing handbook

Theoretical and Applied Rheology

Pharmaceutical Extrusion Technology

Extrusion Cooking

Multilayer Films from Resin and Process to End Use

This comprehensive, long-needed reference provides the thorough understanding required to modify and manipulate rigid PVC's thermal/shear sensitivity and rheological properties, helping you utilize rigid PVC most effectively in manufacturing applications as diverse as pipes, house siding, bottles, window frames, and packaging films. With complete, up-to-the-minute coverage in one convenient source, Engineering with Rigid PVC encompasses rheological principles, resin properties, and additive modification, as well as polymer preparation, melt processing, and forming techniques ... major conversion operations and their manufacturing applications-including actual commercial formulations and processes ... quality control procedures necessary to monitor compounding processes ... aspects of processability critical for product development and improvement ... and much more. International in scope, this time- and money-saver is an essential daily resource for all professionals involved in Engineering with Rigid PVC, including plastics engineers, polymer chemists, process engineers, and plastics processors and technicians. Furthermore, the volume is ideal for training programs and professional seminars, and is an outstanding supplement for students in polymer chemistry, materials science, and plastics engineering.

Since many processes in the food industry involve fluid flow and heat and mass transfer, Computational Fluid Dynamics (CFD) provides a powerful early-stage simulation tool for gaining a qualitative and quantitative assessment of the performance of food processing, allowing engineers to test concepts all the way through the development of a process or system. Published in 2007, the first edition was the first book to address the use of CFD in food processing applications, and its aims were to present a comprehensive review of CFD applications for the food industry and pinpoint the research and development trends in the development of the technology; to provide the engineer and technologist working in research, development, and operations in the food industry with critical, comprehensive, and readily accessible information on the art and science of CFD; and to serve as an essential reference source to undergraduate and postgraduate students and researchers in universities and research institutions. This will continue to be the purpose of this second edition. In the second edition, in order to reflect the most recent research and development trends in the technology, only a few original chapters are updated with the latest developments. Therefore, this new edition mostly contains new chapters covering the analysis and optimization of cold chain facilities, simulation of thermal processing and modeling of heat exchangers, and CFD applications in other food processes.

A collection of research originating from WIT Conferences on Computational Methods and Earthquake Resistant Engineering Structures. In its 19th year the CEMEM conference continues to provide highest quality research which forms part 1 of this book. Part 2 includes leading research as presented at the 12th edition of the ERES conference.

Polymeric materials have been replacing other conventional materials like metals, glass and wood in a number of applications. The use of various types of fillers incorporated into the polymer has become quite common as a means of reducing cost and to impart certain desirable mechanical, thermal, electrical and magnetic properties to the polymers. Due to the energy crisis and high prices of petrochemicals, there has been a greater demand to use more and more fillers to cheapen the polymeric materials while maintaining and/or improving their properties. The advantages that filled polymer systems have to offer are normally offset to some extent by the increased complexity in the rheological behavior that is introduced by the inclusion of the fillers. Usually when the use of fillers is considered, a compromise has to be made between the improved mechanical properties in the solid state, the increased difficulty in melt processing, the problem of achieving uniform dispersion of the filler in the polymer matrix and the economics of the process due to the added step of compounding. It has been recognized that addition of filler to the polymer brings a change in processing behavior. The presence of the filler increases the melt viscosity leading to increases in the pressure drop across the die but gives rise to less die swell due to decreased melt elasticity.

Applied Mechanics Reviews

Reactive Extrusion Systems

Principles of Polymer Processing

Elastomer Technology Handbook

Engineering Principles of Plasticating Extrusion

Computational Methods and Experimental Measurements XIX & Earthquake Resistant Engineering Structures XII

Exploring the characterization, thermodynamics and structural, mechanical, thermal and transport behavior of polymers as melts, solutions and solids, this text covers essential concepts and breakthroughs in reactor design and polymer production and processing. It contains modern theories, end-of-chapter problems and real-world examples for a clear understanding of polymer function and development. *Fundamentals of Polymer Engineering, Second Edition* provides a thorough grounding in the fundamentals of polymer science for more advanced study in the field of polymers. Topics include reaction engineering of step-growth polymerization, emulsion polymerization, and polymer diffusion.

Offering complete and in-depth data and information on plastics extrusion, this practical handbook presents the technology of the subject rather than the theory. Presents an overview of extrusion technology as applied to the operation of extrusion systems and the design of tooling and equipment for use in the process. Provides basic technical information on the behavior of polymer and plastics materials in the extrusion process. Contains tool descriptions that provide a basis for the analysis of existing product lines as examples for the design of new systems. Includes illustrations of and background material on control systems for the extruder and extrusion process.

A guide to the important chemical engineering concepts for the development of new drugs, revised second edition The revised and updated second edition of *Chemical Engineering in the Pharmaceutical Industry* offers a guide to the experimental and computational methods related to drug product design and development. The second edition has been greatly expanded and covers a range of topics related to formulation design and process development of drug products. The authors review basic analytics for quantitation of drug product quality attributes, such as potency, purity, content uniformity, and dissolution, that are addressed with consideration of the applied statistics, process analytical technology, and process control. The 2nd Edition is divided into two separate books: 1) *Active Pharmaceutical Ingredients (API's)* and 2) *Drug Product Design, Development and Modeling*. The contributors explore technology transfer and scale-up of batch processes that are exemplified experimentally and computationally. Written for engineers working in the field, the book examines in-silico process modeling tools that streamline experimental screening approaches. In addition, the authors discuss the emerging field of continuous drug product manufacturing. This revised second edition: Contains 21 new or revised chapters, including chapters on quality by design, computational approaches for drug product modeling, process design with PAT and process control, engineering challenges and solutions Covers chemistry and engineering activities related to dosage form design, and process development, and scale-up Offers analytical methods and applied statistics that highlight drug product quality attributes as design features Presents updated and new example calculations and associated solutions Includes contributions from leading experts in the field Written for pharmaceutical engineers, chemical engineers, undergraduate and graduation students, and professionals in the field of pharmaceutical sciences and manufacturing, *Chemical Engineering in the Pharmaceutical Industry, Second Edition* contains information designed to be of use from the engineer's perspective and spans information from solid to semi-solid to lyophilized drug products.

Citing recently realized applications for extruders as polymerization, modification, and degradation reactors and presenting a telling array of new research results and illustrative experimental cases, *Reactive Extrusion*

Systems sheds light on the complex set of interactions underlying reactions in extruders. The book succeeds as a three-part survey

Engineering with Rigid PVC

Food Processing Operations and Scale-up

Drug Product Design, Development, and Modeling

Processing and Finishing of Polymeric Materials, 2 Volume Set

SPE/ANTEC 2001 Proceedings

Control Methods in Polymer Processing

Conference proceedings from 'Antec 2001' held on 6-10 May 2001 in Dallas, Texas. This includes the Volume III topic of Special Areas Color and Appearance Division.

Addressing the two major unit operations—mixing and extrusion—fundamental to processing elastomers and plastic materials, this reference summarizes design equations that can be employed effectively in scaling up product performance parameters, and contains a thorough survey of rheological principles. In addition, the book provides a wealth of practical information, relating molecular and compositional properties of polymers to processing characteristics and end-use properties so that engineers can select polymers suitable for specific equipment as well as products. *Polymer Mixing and Extrusion Technology* examines viscometric techniques and demonstrates their importance to product quality assurance ... reviews design-related literature/correlations and calculation procedures for mixing and extrusion ... defines needs and precision standards for setting up a polymer processing laboratory so that product quality control can be implemented in physical testing and processing research. ... plus more. Illustrated with over 200 diagrams, tables, and photographs that facilitate readers' understanding of the processes. *Polymer Mixing and Extrusion Technology* is an authoritative source for plastics, polymer, and chemical engineers, manufacturers of plastics processing equipment, and advanced undergraduate and graduate students in these disciplines.

Elastomer Technology Handbook is a major new reference on the science and technology of engineered elastomers. This contributed volume features some of the latest work by international experts in polymer science and rubber technology. Topics covered include theoretical and practical information on characterizing rubbers, designing engineering elastomers for consumer and engineering applications, properties testing, chemical and physical property characterization, polymerization chemistry, rubber processing and fabrication methods, and rheological characterization. The book also highlights both conventional and emerging market applications for synthetic rubber products and emphasizes the latest technology advancements. *Elastomer Technology Handbook* is a "must have" book for polymer researchers and engineers. It will also benefit anyone involved in the handling, manufacturing, processing, and designing of synthetic rubbers.

Extrusion is the operation of forming and shaping a molten or dough-like material by forcing it through a restriction, or die. It is applied and used in many batch and continuous processes. However, extrusion processing technology relies more on continuous process operations which use screw extruders to handle many process functions such as the transport and compression of particulate components, melting of polymers, mixing of viscous media, heat processing of polymeric and biopolymeric materials, product texturization and shaping, defibering and chemical impregnation of fibrous materials, reactive extrusion, and fractionation of solid-liquid systems. Extrusion processing technology is highly complex, and in-depth descriptions and discussions are required in order to provide a complete understanding and analysis of this area: this book aims to provide readers with these analyses and discussions. *Extrusion Processing Technology: Food and Non-Food Biomaterials* provides an overview of extrusion processing technology and its established and emerging industrial applications. Potency of process intensification and sustainable processing is also discussed and illustrated. The book aims to span the gap between the principles of extrusion science and the practical knowledge of operational engineers and technicians. The authors bring their research and industrial experience in extrusion processing technology to provide a comprehensive, technical yet readable volume that will appeal to readers from both academic and practical backgrounds. This book is primarily aimed at scientists and engineers engaged in industry, research, and teaching activities related to the extrusion processing of foods (especially cereals, snacks, textured and fibrated proteins, functional ingredients, and instant powders), feeds (especially aquafeeds and petfoods), bioplastics and plastics, biosourced chemicals, paper pulp, and biofuels. It will also be of interest to students of food science, food engineering, and chemical engineering. Also available *Formulation Engineering of Foods* Edited by J.E. Norton, P.J. Fryer and I.T. Norton ISBN 978-0-470-67290-7 *Food and Industrial Bioproducts and Bioprocessing* Edited by N.T. Dunford ISBN 978-0-8138-2105-4 *Handbook of Food Process Design*

Edited by J. Ahmed and M.S. Rahman ISBN 978-1-4443-3011-3

Evolutionary Multi-Criterion Optimization

Food and Non-Food Biomaterials

Polymer Process Engineering

Plastics Processing Data Handbook

Materials, Technology and Drug Product Design

Computational Fluid Dynamics in Food Processing

Engineering Principles of Plasticating Extrusion Krieger Publishing Company **Principles of Polymer Processing** John Wiley & Sons

This book deals with various unique elements in the drug development process within chemical engineering science and pharmaceutical R&D. The book is intended to be used as a professional reference and potentially as a text book reference in pharmaceutical engineering and pharmaceutical sciences. Many of the experimental methods related to pharmaceutical process development are learned on the job. This book is intended to provide many of those important concepts that R&D Engineers and manufacturing Engineers should know and be familiar if they are going to be successful in the Pharmaceutical Industry. These include basic analytics for quantitation of reaction components—often skipped in ChE Reaction Engineering and kinetics books. In addition *Chemical Engineering in the Pharmaceutical Industry* introduces contemporary methods of data analysis for kinetic modeling and extends these concepts into Quality by Design strategies for regulatory filings. For the current professionals, in-silico process modeling tools that streamline experimental screening approaches is also new and presented here. Continuous flow processing, although mainstream for ChE, is unique in this context given the range of scales and the complex economics associated with transforming existing batch-plant capacity. The book will be split into four distinct yet related parts. These parts will address the fundamentals of analytical techniques for engineers, thermodynamic modeling, and finally provides an appendix with common engineering tools and examples of their applications.

Thoroughly revised edition of the classic text on polymer processing The Second Edition brings the classic text on polymer processing thoroughly up to date with the latest fundamental developments in polymer processing, while retaining the critically acclaimed approach of the First Edition. Readers are provided with the complete panorama of polymer processing, starting with fundamental concepts through the latest current industry practices and future directions. All the chapters have been revised and updated, and four new chapters have been added to introduce the latest developments. Readers familiar with the First Edition will discover a host of new material, including: * Blend and alloy microstructuring * Twin screw-based melting and chaotic mixing mechanisms * Reactive processing * Devolatilization—theory, mechanisms, and industrial practice * Compounding—theory and industrial practice * The increasingly important role of computational fluid mechanics * A systematic approach to machine configuration design The Second Edition expands on the unique approach that distinguishes it from comparative texts. Rather than focus on specific processing methods, the authors assert that polymers have a similar experience in any processing machine and that these experiences can be described by a set of elementary processing steps that prepare the polymer for any of the shaping methods. On the other hand, the authors do emphasize the unique features of particular polymer processing methods and machines, including the particular elementary step and shaping mechanisms and geometrical solutions. Replete with problem sets and a solutions manual for instructors, this textbook is recommended for undergraduate and graduate students in chemical engineering and polymer and materials engineering and science. It will also prove invaluable for industry professionals as a fundamental polymer processing analysis and synthesis reference.

Polymer science is fundamentally interdisciplinary, yet specialists in one aspect, such as chemistry or processing, frequently encounter difficulties in understanding the effects of other disciplines on their own. This book describes clearly how polymer chemistry and polymer processing interact to affect polymer properties. As such, specialists in both disciplines can gain a deeper understanding of how these subjects underpin each other. Coverage includes step-by-step introductions to polymer processing technologies; details of fluid flow and heat transfer behaviour; shaping methods and physical processes during cooking and curing, and analyses of moulding and extrusion processes.

Dallas, Texas, May 6-10 : Conference Proceedings

Cereal Grains Processing

Fundamentals of Polymer Engineering, Revised and Expanded

The first comprehensive and functionally useful engineering analysis of underlying principles and mechanisms. Takes a novel approach suggesting that any of the prevailing processing methods can be broken down into a shaping step and into a set of clearly defined elementary steps that prepare the polymeric raw material for shaping. The shaping steps include calendaring and coating; die forming; mold coating; molding and casting; and secondary shaping; whereas the elementary steps are handling of particulate solids; melting; pressurization and pumping; mixing; and stripping and devolatilization.

This volume provides readers with the basic principles and fundamentals of extrusion technology and a detailed description of the practical applications of a variety of extrusion processes, including various pharma grade extruders. In addition, the downstream production of films, pellets and tablets, for example, for oral and other delivery routes, are presented and discussed utilizing melt extrusion. This book is the first of its kind that discusses extensively the well-developed science of extrusion technology as applied to pharmaceutical drug product development and manufacturing. By covering a wide range of relevant topics, the text brings together all technical information necessary to develop and market pharmaceutical dosage forms that meet current quality and regulatory requirements. As extrusion technology continues to be refined further, usage of extruder systems and the array of applications will continue to expand, but the core technologies will remain the same.