

Rotational Molding Technology Hardcover

This book is aimed at designers who have had limited or no experience with plastics materials as well as a more experienced designer who is designing a part for a use, process or an application that they are not familiar with. The reader is provided with an introduction to plastics as a design material and a discussion of materials commonly in use today. There is a discussion of a variety of processes available to the designer to make a part along with the design considerations each process will entail. This section also includes a discussion of useful prototyping processes, including advantages and disadvantages of each. Next, the book will discuss general design considerations applicable to most plastics product designs. In section 2 of the book the author will discuss elements of design of a number of generic plastic product types based on his 40+ years of experience of product design and development for a several companies with a variety of products. This section will include discussions of structural components, gears, bearings, hinges, snap fits, packaging, pressure vessels, and optical components. This section will discuss the general considerations that apply to these applications as well as specific incites about each particular application. The book concludes with a discussion of the general design process.

New Functional Biomaterials for Medicine and Healthcare provides a concise summary of the latest developments in key types of biomaterials. The book begins with an overview of the use of biomaterials in contemporary healthcare and the process of developing novel biomaterials; the key issues and challenges associated with the design of complex implantable systems are also highlighted. The book then reviews the main materials used in functional biomaterials, particularly their properties and applications. Individual chapters focus on both natural and synthetic polymers, metallic biomaterials, and bio-inert and bioactive ceramics. Advances in processing technologies and our understanding of materials and their properties have made it possible for scientists and engineers to develop more sophisticated biomaterials with more targeted functionality. New Functional Biomaterials for Medicine and Healthcare provides an ideal one-volume summary of this important field that represents essential reading for scientists, engineers, and clinicians, and a useful reference text for undergraduate and postgraduate students. Provides a concise summary of the latest developments in key types of biomaterials Highlights key issues and challenges associated with the design of complex implantable systems Chapters focus on both natural and synthetic polymers, metallic biomaterials, and bio-inert and bioactive ceramics

This book provides an in depth and unparalleled presentation of the compositions of virtually all polymer blends.

From the Preface This book is the first extended look at a new and multifaceted polymer processing technology that has already been discussed in numerous articles. Called Solid-State Shear Pulverization (S3P), this innovative process produces polymeric powders with unique physical properties not found in the output of conventional size-reduction methods.... This technology, which utilizes a pulverizer based on a modified co-rotating twin-screw extruder..., has profound implications for both the creation of new polymer blends and recycling of plastic and rubber waste. Unlike [earlier processes] where polymers are melted prior to pulverization, ...pulverizing mixtures of polymers with the S3P process...does not involve melting. By contrast, S3P maintains polymers in the solid state and avoids the additional heat history that occurs during [other processes], which can be detrimental to the physical properties of pulverized materials. The research and development of the S3P technology...has grown significantly since 1990 from the development of a new plastics recycling process to a much broader polymer processing method that allows intimate mixing of polymers with very different viscosities, sold-state dispersion of additives, including pigments, and continuous production of powder with unique shapes and larger surface areas. Polymeric powders are of growing importance to plastics processors due to the increase use of plastics in various applications, such as rotational molding, powder coatings, and compounding, which require powder as the feedstock. ...[I]t has become clear that this process allows for in-situ compatibilization of dissimilar polymers by applying mechanical energy to cause chemical reactions. This aspect of S3P technology that we describe in this book should [be useful in] developing new polymer blends with the use of pre-made compatibilizing agents. In addition, it has been discovered that S3P efficiently mixes polymer blends with different component viscosities, resulting in the elimination of phase inversion. The S3P process directly produces blends with matrix and dispersed phase morphology like those obtained after phase inversion during a long melt-mixing process. This phenomenon is of practical importance because a long processing time is required by conventional melt-mixing to produce a stable blend morphology. S3P is also advantageous for producing thermoplastic or thermoset powder-coating compounds in a one-step process as opposed to a conventional multi-step operation that involves melt extrusion followed by batch grinding. The major capabilities of this new process can be summarized as follows: o Continuous powder production from plastics or rubber feedstocks o Blending of immiscible polymers o Efficient mixing of polymers with unmatched viscosities o Environmentally friendly recycling of multicolored, commingled plastics waste o Sold-state dispersion of heat-sensitive additives o Engineered plastic/rubber blends Materials and processes well illustrated The text is well illustrated with 60 photographs, micrographs, diagrams and others figures. Here is a small sampling of the captions of these figures. o Particle-size distribution for virgin LDPE powder made with PT-25 pulverizer o Optical photograph of virgin LDPE powder made with PT-25 pulverizer o Layout for a three-stage rubber pulverizer o Flow chart for powder coating production by conventional process and with new S3P technology o SEM image of pulverized virgin PP at 40X (first in series of SEM images of polymer powders) o Optical micrograph of melt-crystallized thin films of unpulverized virgin PP under polarized light o Log of viscosity vs. log shear rate for virgin HDPE after S3P processing o Gel permeation chromatograms (GPC) of polystyrene subjected to S3P processing Color-photo section One of the several functions of Solid-State Shear Pulverization technology is recycling mixed plastic waste. This section of twenty full-color photographs and micrographs illustrates different processed materials, as well as the machinery and mixed waste used. Here is a small sampling of the photo and micrograph captions. o Resultant flake feedstock from granulation o S3P-made uniform powder from feedstock o Flake feedstock of post-consumer HDPE/PP blend (90/10 ratio) o Injection-molded test bar (with translucence) made from S3P powder without pelletization o Injection-molded test bar made from S3P powder without pelletization showing uniform color o Several test bars subjected to tensile testing showing exceptionally high elongation at break Useful reference data in tables More than 60 tables provide useful data in convenient form. Here is a small sampling of table captions. o Physical properties of virgin PP 8020 GU injection-molded from S3P-made powder (first in series of tables on physical properties of various plastics processed from S3P-made powder) o Sieve analysis of powder resulting from S3P of virgin LDPE 509.48 (one of series of tables on sieve analysis of polymer powders) o Melt-flow rate before

and after S3P processing for virgin PS and two PP samples o Key physical properties of injection-molded post-consumer polyolefin blends pulverized by S3P process The Authors Klementina Khait, M.S. Ch.E., Ph.D., is Research Associate Professor and Director of the Polymer Technology Center in the Department of Chemical Engineering, Northwestern University. Her industrial experience in polymer science and engineering includes work with Borg-Warner Chemicals and Quantum Chemical Corporation. She received her two advanced degrees, in chemical engineering and polymer chemistry, from the Technological Institute, St. Petersburg, Russia. Dr. Khait holds several patents and has published more than 50 papers in scientific and technical journals. Stephen Carr, Ph.D., is Professor of Materials Science and Engineering and Chemical Engineering at Northwestern University. His industrial work includes work in polymer science and engineering with General Motors Corp. He received a doctorate in polymer science from Case Western Reserve University. He has been on the Northwestern University faculty since 1969. Martin H. Mack is Vice President for R&D with the Berstorff Division of Krauss-Maffei Corporation. He holds an engineering degree from the University of Stuttgart. He has served for more than ten years on the Board of Directors of the Society of Plastics Engineers (SPE).

Polymers are ubiquitous and pervasive in industry, science, and technology. These giant molecules have great significance not only in terms of products such as plastics, films, elastomers, fibers, adhesives, and coatings but also less obviously though none the less importantly in many leading industries (aerospace, electronics, automotive, biomedical, etc.). Well over half the chemists and chemical engineers who graduate in the United States will at some time work in the polymer industries. If the professionals working with polymers in the other industries are taken into account, the overall number swells to a much greater total. It is obvious that knowledge and understanding of polymers is essential for any engineer or scientist whose professional activities involve them with these macromolecules. Not too long ago, formal education relating to polymers was very limited, indeed, almost nonexistent. Speaking from a personal viewpoint, I can recall my first job after completing my Ph.D. The job with E.I. Du Pont de Nemours dealt with polymers, an area in which I had no university training. There were no courses in polymers offered at my alma mater. My experience, incidentally, was the rule and not the exception.

Expanded PTFE Applications Handbook: Technology, Manufacturing and Applications is a comprehensive guide to ePTFE, explaining manufacturing technologies, properties, and applications. Technologies that were previously shrouded in secrecy are revealed in detail, as are the origins and history of ePTFE. The book is an essential handbook for scientists and engineers working in PTFE processing industries, and for manufacturers working with fluoropolymers. It is also of use to purchasing managers and academics. Presents every aspect of the manufacturing technologies and properties of ePTFE Provides detailed coverage of ePTFE applications in apparel, medical, and surgical devices, filtration, vents, and industrial uses Follows ePTFE from its original discovery to the latest developments

Fluoroplastics, Volume 2: Melt Processible Fluoropolymers - The Definitive User's Guide and Data Book compiles the working knowledge of the polymer chemistry and physics of melt processible fluoropolymers with detailed descriptions of commercial processing methods, material properties, fabrication and handling information, technologies, and applications, also including history, market statistics, and safety and recycling aspects. Both volumes of Fluoroplastics contain a large amount of specific property data useful for users to readily compare different materials and align material structure with end use applications. Volume Two concentrates on melt-processible fluoropolymers used across a broad range of industries, including automotive, aerospace, electronic, food, beverage, oil/gas, and medical devices. This new edition is a thoroughly updated and significantly expanded revision covering new technologies and applications, and addressing the changes that have taken place in the fluoropolymer markets. Exceptionally broad and comprehensive coverage of melt processible fluoropolymers processing and applications Provides a practical approach, written by long-standing authorities in the fluoropolymers industry Thoroughly updated and significantly expanded revision covering new technologies and applications, and addressing the changes that have taken place in the fluoropolymer markets

The first textbook to cover both properties and processing of reinforced and unreinforced plastics to this level. It assumes no prior knowledge of plastics and emphasizes the practical aspects of the subject. In this second edition over half the book has been rewritten and the remainder has been updated and reorganized. Early chapters give an introduction to the types of plastics which are currently available and describe how a designer goes about selection of a plastic for a particular application. Later chapters lead the reader into more advanced aspects of mechanical design and analysis of polymer melt flow. All techniques developed are illustrated by numerous worked examples, and several problems are given at the end of each chapter - the solutions to which form an Appendix.

The increasing importance of plastic materials in packaging makes it mandatory for everyone in this industry to command a basic understanding of the properties of the common packaging plastics. Low shear polymer powder processing provides unique solutions to many processing problems and offers a set of production techniques, frequently un-paralleled by other production methods. In recent years there has been increased interest in this field but no comprehensive review of the subject has been available until now. In this book, a team of experts have taken the novel approach of treating several processing techniques, such as compacted powder sintering, rotational moulding, powder coating, ram extrusion, and compression moulding, as diverse implementations of a single technology. The first chapters deal with the scientific and engineering fundamentals shared by various polymer powder processing techniques, and are followed by a detailed examination of each technique and some special effects. Polymer Powder Technology will prove invaluable to technologists, plastics and materials engineers, researchers and students working with various aspects of particulate polymer processing. The book has five chapters, each containing invaluable information for PVC manufacturers, processors, and users. The book provides many new formulations which were introduced in the last six years. In the first introductory chapter, the new product development, product re-engineering tools and market for PVC products have been discussed.

Clarifying many of the technical interactions in the rotational molding process, this book distinguishes itself as a seamless story of the advanced aspects of this process. The U.S. market for rotational molding products was one billion pounds in the year 2000, growing 10 to 15 percent annually. With this growth comes an increasing need for details on the complex technical aspects of the process.

Handbook of Thermoplastic Elastomers, Second Edition presents a comprehensive working knowledge of thermoplastic elastomers (TPEs), providing an essential introduction for those learning the basics, but also detailed engineering data and best practice guidance for those already involved in polymerization, processing, and part manufacture. TPEs use short, cost-effective production cycles, with reduced energy consumption compared to other polymers, and are used in a range of industries including automotive, medical, construction and many more. This handbook provides all the practical information engineers need to successfully utilize this material group in their products, as well as the required knowledge to thoroughly ground themselves in the fundamental chemistry of TPEs. The data tables included

in this book assist engineers and scientists in both selecting and processing the materials for a given product or application. In the second edition of this handbook, all chapters have been reviewed and updated. New polymers and applications have been added — particularly in the growing automotive and medical fields — and changes in chemistry and processing technology are covered. Provides essential knowledge of the chemistry, processing, properties, and applications for both new and established technical professionals in any industry utilizing TPEs Datasheets provide "at-a-glance" processing and technical information for a wide range of commercial TPEs and compounds, saving readers the need to contact suppliers Includes data on additional materials and applications, particularly in automotive and medical industries

Handbook of Odors in Plastic Materials, Second Edition, analyzes the reasons behind unwanted odor formation and the methods for preventing it. The book covers the fundamentals of odor formation and its transport within a material, the relationship between odor and toxicity, and seventeen methods of odor removal. Odor can play a significant role in the success of a product; it can decide whether a customer purchases the product in the first place, or can be the cause of complaints or returns. Similarly, in scented products, the retention of volatile components is a particular challenge and opportunity. There are several factors which have an impact on the formation of odors in plastic materials, including the properties of the polymer, use of additives in processing, exposure to radiation and oxygen, storage, and recycling. Thirty-seven polymers and forty-one critical product groups are analyzed based on the latest research publications and patents. The book also discusses regulations related to odor in products, effects of odor on health and safety, and the effect of odors from plastic materials on indoor air quality. Analyzes the reasons behind odor formation Provides the best methods to prevent odors in various materials Contains information on testing odor changes and the relationship between odor and toxicity Includes a comprehensive list of methods for removal of unwanted odors from plastic materials

The book provides clear explanations for newcomers to the subject as well as contemporary details and theory for the experienced user in plastics waste management. It is seldom that a day goes by without another story or photo regarding the problem of plastics waste in the oceans or landfills. While important efforts are being made to clear up the waste, this book looks at the underlying causes and focuses on plastics waste management. Plastics manufacturers have been slow to recognize their environmental impact compared with more directly polluting industries. However, the environmental pressures concerning plastics have forced the industry to examine their own recycling operations and implement plastics waste management. Plastics Waste Management realizes two ideals: That all plastics should be able to persist for as long as plastics are required, and that all plastics are recycled in a uniform manner regardless of the length of time for which it persists. The book examines plastics waste management and systems for the environment, as well the management approaches and techniques which are appropriate for managing the environment. It serves as an excellent and thoughtful plastics waste management handbook. This groundbreaking book: Identifies deficiencies in plastics waste management Extrapolates from experiences to draw some conclusions about plastics waste for persistence Describes methods how the waste related processing techniques should be used in recycling Shows how the consumer and industry can assess the performance of plastics waste management Explains waste utilization by recycling techniques as well as waste reduction Life cycle assessment as an important technique for recycling of persistent plastics waste.

Applied Plastics Engineering Handbook: Processing, Materials, and Applications, Second Edition, covers both the polymer basics that are helpful to bring readers quickly up-to-speed if they are not familiar with a particular area of plastics processing and the recent developments that enable practitioners to discover which options best fit their requirements. New chapters added specifically cover polyamides, polyimides, and polyesters. Hot topics such as 3-D printing and smart plastics are also included, giving plastics engineers the information they need to take these embryonic technologies and deploy them in their own work. With the increasing demands for lightness and fuel economy in the automotive industry (not least due to CAFÉ standards), plastics will soon be used even further in vehicles. A new chapter has been added to cover the technology trends in this area, and the book has been substantially updated to reflect advancements in technology, regulations, and the commercialization of plastics in various areas. Recycling of plastics has been thoroughly revised to reflect ongoing developments in sustainability of plastics. Extrusion processing is constantly progressing, as have the elastomeric materials, fillers, and additives which are available. Throughout the book, the focus is on the engineering aspects of producing and using plastics. The properties of plastics are explained, along with techniques for testing, measuring, enhancing, and analyzing them. Practical introductions to both core topics and new developments make this work equally valuable for newly qualified plastics engineers seeking the practical rules-of-thumb they don't teach you in school and experienced practitioners evaluating new technologies or getting up-to-speed in a new field. Presents an authoritative source of practical advice for engineers, providing guidance from experts that will lead to cost savings and process improvements Ideal introduction for both new engineers and experienced practitioners entering a new field or evaluating a new technology Updated to include the latest technology, including 3D Printing, smart polymers, and thorough coverage of biopolymers and biodegradable plastics

Three Dimensional Weaving is a nascent technology which has triggered research interests around the world. The technology has the potential to finely balance the in-plane and out-of plane properties in composites. This state-of-the-art book focuses on three emerging 3D weaving technologies viz., Orthogonal weaving, Angle interlock weaving and Dual Plane shedding based 3D weaving. It provides focused knowledge about these technologies and has a pragmatic approach to developing customized 3D weaving machines. Fundamental approach to understanding weave design basics, thereupon practical weaving, addressing quality aspects, arriving at testing approaches are all detailed in the book. The applications for these technologies are both in strategic (space, aerospace, defense) as well as societal (medical, automobile) sectors. The book has six chapters, wherein the first three chapters are devoted to Orthogonal and angle interlock weaving and their quality control aspects. Approach to weaving preforms of complex geometries such as T-stiffeners, tapers, Origami-based structures are also discussed The fourth and fifth chapter are entirely devoted to machinery development for Dual plane shedding based 3D weaving often termed as 'True 3D weaving'. The chapters discuss detailed machine design of the sub-elements such as let-off, shedding, picking, beat-up and take-up. The reader is taken through a prototype development of a 3D weaving machine by way of concept, illustrations, practical development and weaving of samples. The sixth chapter summarises the editor's views about the technology. This volume will be beneficial to scientists and researchers in both academia and the industry.

This book contains high-quality papers presented in the conference Recent Advances in Mechanical Infrastructure (ICRAM 2020) held at IITRAM, Ahmedabad, India, from 21-23 August 2020. The topics covered in this book are recent advances in thermal infrastructure, manufacturing infrastructure and infrastructure planning and design.

Wind energy's bestselling textbook- fully revised. This must-have second edition includes up-to-date data, diagrams, illustrations and thorough new material on: the fundamentals of wind turbine aerodynamics; wind turbine testing and modelling; wind turbine design standards; offshore wind energy; special purpose applications, such as energy storage and fuel production. Fifty additional homework problems and a new appendix on data processing make this comprehensive edition perfect for engineering students. This book offers a complete examination of one of the most promising sources of renewable energy and is a great introduction to this cross-disciplinary field for practising engineers. "provides a wealth of information and is an excellent reference book for people interested in the subject of wind energy." (IEEE Power & Energy Magazine, November/December 2003) "deserves a place in the library of every university and college where renewable energy is taught." (The International Journal of Electrical Engineering Education, Vol.41, No.2 April 2004) "a very comprehensive and well-organized treatment of the current status of wind power." (Choice, Vol. 40, No. 4, December 2002)

Rotational moulding has been available as a processing method for hollow plastic products for more than forty years, but for a long time it was regarded as a slow method limited to only a few plastics. Within

the last ten to fifteen years there has been a dramatic change. Engineers and designers recognise the scope that rotational moulding offers for the production of relatively inexpensive, complex shapes with low levels of moulded-in stress. Materials suppliers are continually developing new grades of plastics as well as a wider selection of materials suited to the process. In addition, machinery suppliers are producing more sophisticated moulding equipment so that the moulder now has control over the process that was previously thought impossible. For its second edition, this book has been updated and expanded by the authors, who are leaders in their specialties within the field of rotational moulding. It continues to provide an introduction to the subject, as well as giving comprehensive coverage of the state-of-the-art. Two new chapters have been added. These cover the important areas of pin-hole removal from rotomoulded products and the rotational moulding of liquid polymers. In both cases the new material is the result of extensive research, and the results will be of considerable practical interest to moulders. The book will surely be welcomed again by moulders, materials and equipment suppliers, engineers and designers, and by lecturers looking for up-to-date information to include in their courses.

Processing techniques are critical to the performance of polymer products which are used in a wide range of industries. Advances in polymer processing: From macro- to nano- scales reviews the latest advances in polymer processing, techniques and materials. Part one reviews the fundamentals of polymer processing with chapters on rheology, materials and polymer extrusion. Part two then discusses advances in moulding technology with chapters on such topics as compression, rotational and blow moulding of polymers. Chapters in Part three review alternative processing technologies such as calendaring and coating, foam processing and radiation processing of polymers. Part four discusses micro and nano-technologies with coverage of themes such as processing of macro, micro and nanocomposites and processing of carbon nanotubes. The final section of the book addresses post-processing technologies with chapters on online monitoring and computer modelling as well as joining, machining, finishing and decorating of polymers. With its distinguished editors and team of international contributors, Advances in polymer processing: From macro- to nano- scales is an invaluable reference for engineers and academics concerned with polymer processing. Reviews the latest advances in polymer processing, techniques and materials analysing new challenges and opportunities Discusses the fundamentals of polymer processing considering the compounding and mixing of polymers as well as extrusion Assesses alternative processing technologies including calendaring and coating and thermoforming of polymers

An up-to-date, exhaustive reference of all solids capable of changing the physical and chemical properties of materials. This one volume presents the information needed to market, develop, select, manufacture and apply these versatile new grades of fillers. Contains all the fundamentals and latest advances in fillers technology and the products in which they are used.

This third edition has been written to thoroughly update the coverage of injection molding in the World of Plastics. There have been changes, including extensive additions, to over 50% of the content of the second edition. Many examples are provided of processing different plastics and relating the results to critical factors, which range from product design to meeting performance requirements to reducing costs to zero-defect targets. Changes have not been made that concern what is basic to injection molding. However, more basic information has been added concerning present and future developments, resulting in the book being more useful for a long time to come. Detailed explanations and interpretation of individual subjects (more than 1500) are provided, using a total of 914 figures and 209 tables. Throughout the book there is extensive information on problems and solutions as well as extensive cross referencing on its many different subjects. This book represents the ENCYCLOPEDIA on IM, as is evident from its extensive and detailed text that follows from its lengthy Table of CONTENTS and INDEX with over 5200 entries. The worldwide industry encompasses many hundreds of useful plastic-related computer programs. This book lists these programs (ranging from operational training to product design to molding to marketing) and explains them briefly, but no program or series of programs can provide the details obtained and the extent of information contained in this single sourcebook.

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 single manual machine to simulation of sophisticated computerized processes that interface with many different processing functions.

Egyptian hieroglyphs, Chinese scrolls, and Ayurvedic literature record physicians administering aromatic oils to their patients. Today society looks to science to document health choices and the oils do not disappoint. The growing body of evidence of their efficacy for more than just scenting a room underscores the need for production standards, quality control parameters for raw materials and finished products, and well-defined Good Manufacturing Practices. Edited by two renowned experts, the Handbook of Essential Oils covers all aspects of essential oils from chemistry, pharmacology, and biological activity, to production and trade, to uses and regulation. Bringing together significant research and market profiles, this comprehensive handbook provides a much-needed compilation of information related to the development, use, and marketing of essential oils, including their chemistry and biochemistry. A select group of authoritative experts explores the historical, biological, regulatory, and microbial aspects. This reference also covers sources, production, analysis, storage, and transport of oils as well as aromatherapy, pharmacology, toxicology, and metabolism. It includes discussions of biological activity testing, results of antimicrobial and antioxidant tests, and penetration-enhancing activities useful in drug delivery. New information on essential oils may lead to an increased understanding of their multidimensional uses and better, more ecologically friendly production methods. Reflecting the immense developments in scientific knowledge available on essential oils, this book brings multidisciplinary coverage of essential oils into one all-inclusive resource.

Hollow plastic parts range in size from small unit dose liquor bottles, doll heads and syringe bulbs to large gasoline tanks, pallets, and playground equipment. Designers and design engineers are often familiar with one way of making these parts but may not be aware of other methods that may offer greater design and performance flexibility. The book provides comprehensive design and manufacturing comparisons of three major methods - blow molding, rotational molding and twin-sheet thermoforming- as well as an overview of other methods used to produce hollow plastic parts. Not only will the seasoned designer be able to determine the advantages and limitations of specific technologies,

but the newcomer will also be able to quickly select the best manufacturing method for his particular hollow product.

• A comprehensive book which collates the experience of two well-known US plastic engineers. • Enables engineers to make informed decisions. • Includes a unique chronology of the world of plastics. The use of plastics is increasing year on year, and new uses are being found for plastics in many industries. Designers using plastics need to understand the nature and properties of the materials which they are using so that the products perform to set standards. This book, written by two very experienced plastics engineers, provides copious information on the materials, fabrication processes, design considerations and plastics performance, thus allowing informed decisions to be made by engineers. It also includes a useful chronology of the world of plastics, a resource not found elsewhere.

This reference book provides a comprehensive overview of the nature, manufacture, structure, properties, processing, and applications of commercially available polymers. The main feature of the book is the range of topics from both theory and practice, which means that physical properties and applications of the materials concerned are described in terms of the theory, chemistry and manufacturing constraints which apply to them. It will therefore enable scientists to understand the commercial implications of their work as well as providing polymer technologists, engineers and designers with a theoretical background. Provides a comprehensive overview of commercially available polymers Offers a unique mix of theory and application Essential for both scientists and technologists

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.

The purpose of MetFoam conference series is to provide a state-of-the-art review on lightweight porous metals and metallic foams and a forum for discussions and networking opportunities for scientists working in this field. Topics included in this volume include the following: • Fabrication by conventional and novel methods including additive manufacturing • Characterization • Properties of compressed and uncompressed foam • Design of porous metals, metallic foams, and lattice structures • Fluid, heat, and mass transfer • Porous biomaterials • Nanoporous metals • Industrial applications of porous metals and metallic foams

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The history of the business and technology that was responsible for the enormous growth of the global polyethylene industry from the laboratory discovery in 1933 to reach an annual production of over 75 million metric tons in 2012 and become the leading plastic material worldwide. This book is an in-depth look at the history of the scientists and engineers that created the catalysts and the methods used for the modern commercial manufacture of polyethylene and its products. The book outlines the processes used for the manufacture of polyethylene are reviewed which include the high-pressure process and the three low-pressure processes; slurry, solution and the gas-phase methods. The techniques used to fabricate polyethylene into end-use products are reviewed with a discussion of blow-molding, injection molding, rotational molding, blown-film, cast-film and thermoforming are also discussed in detail.

Materials Processing is the first textbook to bring the fundamental concepts of materials processing together in a unified approach that highlights the overlap in scientific and engineering principles. It teaches students the key principles involved in the processing of engineering materials, specifically metals, ceramics and polymers, from starting or raw materials through to the final functional forms. Its self-contained approach is based on the state of matter most central to the shaping of the material: melt, solid, powder, dispersion and solution, and vapor. With this approach, students learn processing fundamentals and appreciate the similarities and differences between the materials classes. The book uses a consistent nomenclature that allow for easier comparisons between various materials and processes. Emphasis is on fundamental principles that gives students a strong foundation for understanding processing and manufacturing methods. Development of connections between processing and structure builds on students' existing knowledge of structure-property relationships. Examples of both standard and newer additive manufacturing methods throughout provide students with an overview of the methods that they will likely encounter in their careers. This book is intended primarily for upper-level undergraduates and beginning graduate students in Materials Science and Engineering who are already schooled in the structure and properties of metals, ceramics and polymers, and are ready to apply their knowledge to materials processing. It will also appeal to students from other engineering disciplines who have completed an introductory materials science and engineering course. Coverage of metal, ceramic and polymer processing in a single text provides a self-contained approach and consistent nomenclature that allow for easier comparisons between various materials and processes Emphasis on fundamental principles gives students a strong foundation for understanding processing and manufacturing methods Development of connections between

processing and structure builds on students' existing knowledge of structure - property relationships. Examples of both standard and newer additive manufacturing methods throughout provide students with an overview of the methods that they will likely encounter in their careers.

As a consultant to the plastics industry, Ottmar Brandau's focus is on using his engineering knowhow and production management experience to improve quality and productivity, cut down cycle time and introduce secondary processes such as inline printing. This book is a thoroughly practical handbook that provides engineers and managers with the toolkit to improve production and engineering aspects in their own businesses - saving money, increasing output and improving competitiveness by adopting new technologies. In this book, Brandau covers the engineering aspects of bottle production and the relevant production processes (focusing on blow molding), along with plant layout and organization and production management, to produce the definitive handbook for engineers and managers alike. Learn the tricks of the trade from an experienced engineer and manager. Save money: Practical strategies to improve cycle times. Increase productivity: Improve plant layout and organization and implement secondary processes such as inline printing.

An outstanding and thorough presentation of the complete field of plastics processing. Handbook of Plastic Processes is the only comprehensive reference covering not just one, but all major processes used to produce plastic products - helping designers and manufacturers in selecting the best process for a given product while enabling users to better understand the performance characteristics of each process. The authors, all experts in their fields, explain in clear, concise, and practical terms the advantages, uses, and limitations of each process, as well as the most modern and up-to-date technologies available in their application. Coverage includes chapters on: Injection molding. Compression and transfer molding. Sheet extrusion. Blow molding. Calendaring. Foam processing. Reinforced plastics processing. Liquid resin processing. Rotational molding. Thermoforming. Reaction injection molding. Compounding, mixing, and blending. Machining and mechanical fabrication. Assembly, finishing, and decorating. Each chapter details a particular process, its variations, the equipment used, the range of materials utilized in the process, and its advantages and limitations. Because of its increasing impact on the industry, the editor has also added a chapter on nanotechnology in plastics processing.

In an era of dramatic environmental change, social change is desperately needed to curb burgeoning consumption. Many calls to action have focused on individual behaviour or technological innovation, with relative silence from the social sciences on other modes and methods of intervening in social life. This book shows how we can go beyond behaviour change in the pursuit of sustainability. Inspired by the 'practice turn' in consumption studies, this interdisciplinary book looks through the lens of social practice theory to explore important and timely questions about how to intervene in social life. It discusses a range of applied sustainability topics including energy consumption, housing provision, water demand, transport, climate change, curbside recycling and smart grids, seeking to redefine what intervention is, how it happens, and who or what can intervene to address the growing list of environmental calamities facing contemporary societies. These issues are explored through a range of specific case studies from Australia, the UK and the US, providing theoretical insights that are of international relevance. The book will be of interest to researchers and students in the fields of sociology, consumption studies, environmental studies, geography, and science and technology studies, as well as policy makers and practitioners seeking to intervene in social life for sustainability.

Integral, or structural, foams are one of the most remarkable materials that have been developed over the last fifteen years. As with all rapidly growing fields, the terminology seems to have grown even faster. Thus there are two names for the material structure itself. In the United States and in Japan the term for these plastics is Structural Foams, whereas in Europe and the USSR the term used is usually Integral Foams. We have adhered to the European term in the text and hope our colleagues will bear with us. Integral foams have a specific structure: a cellular core that gradually turns into a solid skin. The skin gives the part its form and stiffness, while the cellular core contributes to the very high strength-to-weight values of the material. These are higher than those of some unfoamed plastics and metals. The sandwich-like structure with its unique mechanical properties was prompted by nature. Wood and bone are strong and light-weight natural materials having a cellular structure. Since the sandwich-like structure of the integral foams resembles that of natural wood, the foams are often referred to as artificial wood or plastic wood, thereby emphasizing not only the formal structural similarity of these materials, but also one of the main functional applications of integral foams - replacement of wooden articles in various fields of engineering and construction.

The authoritative introduction to all aspects of plastics engineering — offering both academic and industry perspectives in one complete volume. Introduction to Plastics Engineering provides a self-contained introduction to plastics engineering. A unique synergistic approach explores all aspects of material use — concepts, mechanics, materials, part design, part fabrication, and assembly — required for converting plastic materials, mainly in the form of small pellets, into useful products. Thermoplastics, thermosets, elastomers, and advanced composites, the four disparate application areas of polymers normally treated as separate subjects, are covered together. Divided into five parts — Concepts, Mechanics, Materials, Part Processing and Assembly, and Material Systems — this inclusive volume enables readers to gain a well-rounded, foundational knowledge of plastics engineering. Chapters cover topics including the structure of polymers, how concepts from polymer physics explain the macro behavior of plastics, evolving concepts for plastics use, simple mechanics principles and their role in plastics engineering, models for the behavior of solids and fluids, and the mechanisms underlying the stiffening of plastics by embedded fibers. Drawing from his over fifty years in both academia and industry, Author Vijay Stokes uses the synergy between fundamentals and applications to provide a more meaningful introduction to plastics. Examines every facet of plastics engineering from materials and fabrication methods to advanced composites. Provides accurate, up-to-date information for students and engineers both new to plastics and highly experienced with them. Offers a practical guide to large number of materials and their

applications Addresses current issues for mechanical design, part performance, and part fabrication Introduction to Plastics Engineering is an ideal text for practicing engineers, researchers, and students in mechanical and plastics engineering and related industries.

The Powder Technology Handbook, Third Edition provides a comprehensive guide to powder technology while examining the fundamental engineering processes of particulate technology. The book offers a well-rounded perspective on powder technologies that extends from particle to powder and from basic problems to actual applications. Pro

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