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Melt Extrusion - Michael A. Repka 2013-10-11 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 extruders systems and the array of applications will continue to expand, but the core technologies will remain the same.

Hot-Melt Extrusion - Dennis Douroumis 2012-04-24 Hot-melt extrusion (HME) - melting a substance and forcing it through an orifice under controlled conditions to form a new material - is an emerging processing technology in the pharmaceutical industry for the preparation of various dosage forms and drug delivery systems, for example granules and sustained release tablets. Hot-Melt Extrusion: Pharmaceutical Applications covers the main instrumentation, operation principles and theoretical background of HME. It then focuses on HME drug delivery systems, dosage forms and clinical studies (including pharmacokinetics and bioavailability) of HME products. Finally, the book includes some recent and novel HME applications, scale-up considerations and regulatory issues. Topics covered include: principles and die design of single screw extrusion twin screw extrusion techniques and practices in the laboratory and on production scale HME developments for the pharmaceutical industry solubility parameters for prediction of drug/polymer miscibility in HME formulations the influence of plasticizers in HME applications of polymethacrylate polymers in HME HME of ethylcellulose, hypromellose, and polyethylene oxide bioadhesion properties of polymeric films produced by HME taste masking using HME clinical studies, bioavailability and pharmacokinetics of HME products injection moulding and HME processing for pharmaceutical materials laminar dispersive & distributive mixing with dissolution and applications to HME pharmaceutical technologies related to scale-up of HME processes devices and implant systems by HME an FDA perspective on HME process and product understanding improved process understanding and control of an HME process with near-infrared spectroscopy Hot-Melt Extrusion: Pharmaceutical Applications is an essential multidisciplinary guide to the emerging pharmaceutical uses of this processing technology for researchers in academia and industry working in drug formulation and delivery. pharmaceutical engineering and processing, and polymers and materials science. This is the first book from our brand new series Advances in Pharmaceutical Technology. Find out more about the series here.

Hydrophilic Matrix Tablets for Oral Controlled Release - Peter Timmins 2014-10-11 This detailed volume addresses key issues and subtle nuances involved in developing hydrophilic matrix tablets as an approach to oral controlled release. It brings together information from more than five decades of research and development on hydrophilic matrix tablets and provides perspective on contemporary issues. Twelve comprehensive chapters explore a variety of topics including polymers (hypromellose, natural polysaccharides and polyethylene oxide) and their utilization in hydrophilic matrices, critical interactions impacting tablet performance, in vitro physical and imaging techniques, and microenvironmental pH control and mixed polymer approaches, among others. In one collective volume, hydrophilic matrix tablets and other delivery systems, including marketed products, are described.

Hydrophilic: Matrix Tablets for Oral Controlled Release provides a single source of current knowledge, including sections of previously unpublished data. It is an important resource for industrial and academic scientists investigating and developing these oral controlled release formulations.

Pharmaceutical Extrusion Technology, Second Edition - Isaac Ghebre-Sellasse 2003-05-14 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.

Amorphous Solid Dispersions - Navnit Shah 2014-11-21 This volume offers a comprehensive guide on the theory and practice of amorphous solid dispersions (ASD) for handling challenges associated with poorly soluble drugs. In twenty-three inclusive chapters, the book examines thermodynamics and kinetics of the amorphous state and amorphous solid dispersions, ASD technologies, excipients for stabilizing amorphous solid dispersions such as polymers, and ASD manufacturing technologies, including spray drying, hot melt extrusion, fluid bed layering and solvent-controlled micro-precipitation technology (MBP). Each technology is illustrated by specific case studies. In addition, dedicated sections cover analytical tools and technologies for characterization of amorphous solid dispersions, the prediction of long-term stability, and the development of suitable dissolution methods and regulatory aspects. The book also highlights future technologies on the horizon, such as supercritical fluid processing, mesoporous silica, KinetSol®, and the use of non-salt-forming organic acids and amino acids for the stabilization of amorphous systems. Amorphous Solid Dispersions: Theory and Practice is a valuable reference to pharmaceutical scientists interested in developing bioavailable and therapeutically effective formulations of poorly soluble molecules in order to advance these technologies and develop better medicines for the future.

Melt Blowing - L.S. Pinchuk 2012-12-06 This book is devoted to a nontraditional class of materials which are manufactured by the melt-blowing process. The text examines the structure and main properties of melt-blown materials as conditioned by peculiarities of overheated polymer melt spraying in oxidizing medium. Information is given about filtering melt-blown materials as conditioned by peculiarities of overheated polymer melt spraying in oxidizing medium. Information is given about filtering
in quickly answering practical day-to-day questions. The first part of the book provides the fundamental principles, for operators and engineers, of polymeric materials extrusion processing in simple terms and troubleshooting techniques.

Extrusion Processing Technology-Jean-Marie Bouvier 2014-03-31 The only up-to-date and important technology, Extrusion Processing Technology: Food and Non-Food Biomaterials bridges the gap between the principles of extrusion science and the practical "know how" of operational engineers and technicians. Written by internationally renowned experts with over forty years of experience between them, this valuable reference for food scientists, food engineers, chemical engineers, and students includes coverage of new, greener technologies as well as case studies to illustrate the practical, real-world application of the principles in various settings.

Formulating Poorly Water Soluble Drugs-Robert O. Williams III 2016-12-16 The objective of this volume is to consolidate within a single text the most current knowledge, practical methods, and regulatory considerations pertaining to formulations development with poorly water-soluble molecules. A pharmaceutical scientist's approach toward solubility enhancement of a poorly water-soluble molecule typically includes detailed characterization of the compound's physiochemical properties, solid-state modifications, advanced formulation design, non-conventional process technologies, advanced analytical characterization, and specialized product performance analysis techniques. The scientist must also be aware of the unique regulatory considerations pertaining to the non-conventional approaches often utilized for poorly water-soluble drugs. One faced with the challenge of developing a drug product from a poorly soluble compound must possess at minimum a working knowledge of each of the abovementioned facets and detailed knowledge of most. In light of the magnitude of the growing solubility problem to drug development, this is a significant burden especially when considering that knowledge in most of these areas is relatively new and continues to develop.

Handbook of Pharmaceutical Granulation Technology-Dülp M. Partik 2016-04-19 The Third Edition presents all pharmaceutical industry personnel and those in academia with critical updates on the recent advances in granulation technology and changes in FDA regulatory guidelines. Addressing precisely how these recent innovations and revisions affect unit operation of particle generation and granulation, this text assists the reader in quickly answering practical day-to-day questions. The first part of the book provides the fundamental principles, for operators and engineers, of polymeric materials extrusion processing in simple terms and troubleshooting techniques.

Extrusion Processing Technology-Jean-Marie Bouvier 2014-03-31 The only up-to-date and important technology, Extrusion Processing Technology: Food and Non-Food Biomaterials bridges the gap between the principles of extrusion science and the practical "know how" of operational engineers and technicians. Written by internationally renowned experts with over forty years of experience between them, this valuable reference for food scientists, food engineers, chemical engineers, and students includes coverage of new, greener technologies as well as case studies to illustrate the practical, real-world application of the principles in various settings.

Polymer Science and Engineering-National Research Council 1994-01-01 Polymers are used in everything from nylon stockings to commercial aircraft to artificial heart valves, and they have a key role in addressing international competitiveness and other national issues. Polymer Science and Engineering explores the universe of polymers, describing their properties and wide-ranging potential, and presents the state of the science, with a hard look at downward trends in research support. Leading experts offer findings, recommendations, and research directions. Lively vignettes provide snapshots of polymers in everyday applications. The volume includes an overview of the use of polymers in such fields as medicine and biotechnology, information and communication, housing and construction, energy and transportation, national defense, and environmental protection. The committee looks at the various classes of polymers–plastics, fibers, composites, and other materials, as well as polymers used as membranes and coatings—and how their composition and specific methods of processing result in unparalleled usefulness. The reader can also learn the science behind the technology, including efforts to model polymer synthesis after nature’s methods, and breakthroughs in characterizing polymer properties needed for twenty-first-century applications. This comprehensive volume will be important to chemists, engineers, materials scientists, researchers, industrialists, and policymakers interested in the role of polymers, as well as to science and engineering educators and students.

3D Printing of Pharmaceuticals and Drug Delivery Devices-Dimitrios A. Lamprou 2020-07-01 The 3D printing (3DP) process was patented in 1986; however, only in the last decade has it begun to be used for medical applications, as well as in the fields of prosthetics, biofabrication, and pharmaceutical printing. 3DP or additive manufacturing (AM) is a family of technologies that implement layer-by-layer processes in order to fabricate physical models based on a computer-aided design (CAD) model. 3D printing permits the formation of high-dimensional products in a cost-effective manner. The 3DP technology offers a paradigm for direct manufacturing of individual dosage forms and has the potential to allow for variations in size and geometry as well as control dose and release behavior. Furthermore, the low cost and ease of use of 3DP systems means that the possibility of manufacturing in-medicine devices and medical devices at the point of dispensing or at the point of need could become a reality. 3DP thus offers the perfect innovative manufacturing route to address the critical capability gap that hinders the widespread exploitation of personalized medicines for molecules that are currently not easy to deliver. This Special Issue will address new developments in the area of 3D printing and bioprinting for drug delivery applications, covering the recent advantages and future directions of additive manufacturing for pharmaceutical products.

Additive Manufacturing Technologies-Ian Gibbon 2014-11-26 This book covers in detail the various aspects of joining materials to form parts. A conceptual overview of rapid prototyping and layered manufacturing is given, beginning with the fundamentals so that readers can get up to speed quickly. Unusual and emerging applications such as micro-scale manufacturing, medical applications, aerospace, and rapid manufacturing are also discussed. This book provides a comprehensive overview of rapid prototyping technologies as well as support technologies such as software systems, vacuum casting, investment casting, plating, infiltration and other systems. This book also: Reflects recent developments and trends and adheres to the ASTM, SI, and other standards Includes chapters on automotive technology, aerospace technology and low-cost AM technologies Provides a broad range of technical questions to ensure comprehensive understanding of the concepts covered.

Extrusion-Harold F. Giles Jr 2013-09-21 The second edition of Extrusion is designed to aid operators, engineers, and managers in extrusion processing
Plastics Extrusion Technology Handbook-Sidney Levy 1989 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.

Extrusion Cooking-R Guy 2001-07-09 The first part of this book introduces extrusion technology. Chapters examine extruders and their use in thermal transitions of raw materials into functional forms for the manufacture of particular foods. They also offer valuable guidance on the range of extruders and how to select the correct one, as well as the basic requirements in a typical extrusion process. The second part looks at the application of extrusion in specific product groups. Each chapter examines the range of extruded products within the product group, the specific production issues to the products, and future trends.

Disordered Pharmaceutical Materials-Marc Descamps 2016-03-28 A one-stop resource for researchers, developers, and post graduate students in pharmaceutical science. This handbook and ready reference provides detailed, but not overloaded information—presenting the topic without unnecessarily complex formalism. As such, it gives a systematic and coherent overview of disordered materials for pharmaceutical applications, covering functional materials as well as processing and characterization techniques for the target-oriented development of drug delivery systems based on disordered crystals and amorphous solids. Special attention is paid to examine the different facets and levels of disorder in their structural and dynamic aspects as well as the effect of disorder on dissolution and stability. Chapters on processing induced disorder and on patenting issues round off the book. As a result the book helps overcoming the challenges of using these materials in the pharmaceutical industry. For pharmaceutical and medicinal chemists, materials scientists, clinical physicists, and pharmaceutical laboratories looking to make better and more potent pharmaceuticals.

Materials Technology-Yvonne Dean 2016-07-01 Materials Technology clearly identifies materials and technology as the fundamental generators of buildings and examines how they determine the structure, overall form and quality. It examines the issues that determine the choice of materials, and argues that the decision-making of architects, engineers and designers should take account of the environmental impact of sourcing the basic materials, and of the energy implications of their processing and use in manufacturing. Materials Technology is an essential resource for Materials Technology units in building, architecture and surveying degree and postgraduate courses; and students of BTEC HNC/D building and surveying. It will also be a useful reference tool for Advanced GNVQ Construction and the Built Environment courses and Built Environment NVQs at levels 3 and 4.

Dictionary of Composite Materials Technology-Stuart M. Lee 1995-11-26 Over 6,000 definitions of terms used in both the scientific and engineering aspects of composite materials (in its broadest sense), from simple fibrous materials to the most advanced aerospace applications. Includes listings such as smart and low observability composites, squeeze casting, LARC, PMR, etc.

Food Materials Science and Engineering-Bhesh Bhandari 2012-07-30 Food Materials Science and Engineering covers a comprehensive range of topics in relation to food materials, their properties and characterisation techniques, thus offering a new approach to understanding food production and quality control. The opening chapter will define the scope and application of food materials science, explaining the relationship between raw material structure and processing and quality in the final product. Subsequent chapters will examine the structure of food materials and how they relate to quality, sensory perception, processing attributes and nutrient delivery. The authority on expression and applications of food and packaging science. Methods of manufacturing food systems with improved shelf-life and quality attributes will be highlighted in the book.

Functional 3D Tissue Engineering Scaffolds-Ying Deng 2017-10-17 In order to grow replacement tissues, 3D scaffolds are widely used as a template for tissue engineering and regeneration. These scaffolds, which are typically ‘seeded’ with cells, support the growth of new tissues. However, in order to achieve successful tissue growth, the scaffold must meet specific requirements and are often ‘functionalized’ to accentuate particular properties. Functional 3D tissue engineering scaffolds: materials, technologies, and applications, is a comprehensive review of functional 3D scaffolds, providing information on the fundamentals, technologies, and applications. Part 1 focuses on the fundamentals of 3D tissue scaffolds examining information on materials, properties, and trends. Part 2 discusses a wide range of conventional technologies for engineering functional 3D scaffolds, leading the way to a discussion on CAD and advanced technologies for functional 3D scaffold engineering. Chapters in part 3 study methods for functionalizing scaffolds to support a variety of in vivo functions whilst the final set of chapters provides an important review of the most significant applications of functional 3D scaffolds within tissue engineering. This book is a valuable resource for biomaterial scientists and biomedical engineers in academia and industry, with interests in tissue engineering and regenerative medicine. Provides a self-contained work for the field of biomaterials and tissue engineering Discusses all the requirements a scaffold must meet and a wide range of strategies to create them Highlights significant and successful applications of functional 3D scaffolds.

Continuous Manufacturing of Pharmaceuticals-Peter Kleinebudde 2017-09-05 10.7.3 State of Control

Aerospace Materials and Material Technologies-N. Eswaran Prasad 2016-11-11 This book is a comprehensive compilation of chapters on aerospace materials (both established and evolving) and material technologies that are important for aerospace systems. It considers aerospace materials in three Parts. Part I covers Metallic Materials (Mg, Al, Al-Li, Ti, aero steels, Ni, intermetallics, bronze and Nb alloys); Part II deals with Composites (GLARE, PMCs, CMCs and Carbon based CMCs); and Part III considers Special Materials. This compilation has ensured that no important aerospace material system is ignored. Emphasis is laid in each chapter on the underlying scientific principles as well as basic and fundamental mechanisms leading to processing, characterization, property evaluation and applications. This book will be useful to students, researchers and professionals working in the domain of aerospace materials.

Polyolefin Fibres-S C O Ugbohue 2009-01-28 Polyolefins are one of the most widely used commercial polymers. This book reviews the most important polyolefins, including polyethylene and polypropylene. These versatile fibres are durable, chemically resistant, lightweight, economical and functional. Polyolefin fibres: industrial and medical applications provides a comprehensive review of the structure and properties of this group of fibres, together with methods to improve the functionality of polyolefins and their range of applications. The first set of chapters discusses the different types of polyolefins, their structural and chemical properties as well as the production methods and applications. The final group of chapters examines how to improve the functionality of polyolefins. A final group of chapters addresses how polyolefins can be incorporated into specific applications such as industrial, medical and automotive products. Written by a distinguished team of international contributors, Polyolefin fibres: industrial and medical applications is a quintessential reference for textile technologists, fibre scientists, yarn and fabric manufacturers and those also in academia. Reviews the most important polyolefins including polyethylene and polypropylene, their structural and chemical properties as well as production methods Examines methods to improve the functionality of polyolefin fibres including production methods and quality control.

Practical Guide to Hot-Melt Extrusion-Mohammed Maniruzzaman 2015-07-22 Over the past few decades, hot-melt extrusion (HME) techniques have been shown to exhibit remarkable potential for the manufacture of various pharmaceutical products. HME is an emerging processing technology used primarily for the manufacture of pharmaceutical solid dispersions through the use of solvent-free process with fewer production steps making it suitable for easy to scale-up and continuous manufacturing applications. A single unit HME based operation, employing heat and mechanical shear, has displayed a significant potential to retain the stability even of thermo-labile therapeutics e.g., proteins. HME has now explicitly been established from a quality-by-design viewpoint for in-line data monitoring as per the recent guidelines issued by the US Food and Drugs Administration (FDA). This book will focus primarily on the foregoing subject areas and will be of significant interest to a broad/interdisciplinary readership across the industries and academia for, (but not limited to) the following reasons:- Emerging HME processes and
Extrusion of Metals, Polymers, and Food Products—Sayyad Zahid Qamar 2018-02-28 Extrusion is a very popular manufacturing process, especially because of its versatility in terms of materials and shapes. Representing the vast and multifaceted field of extrusion, this book contains write-ups on latest developments from experts in the field. Part (A) on Metal Extrusion contains chapters on spur gear manufacturing, stiff vacuum extrusion, and indirect extrusion for subsurface tubular expansion. Part (B) on Food and Polymer Extrusion includes chapters on extrusion cooking of functional foods, changes in nutritional properties in extrusion of cereals, physicochemical changes of starch in extrusion of corn flour, extruded aquaculture feed, optimal design of polymer extrusion dies, and extrusion cooking technology for food products.

Reactive Extrusion—Günter Bayer 2018-01-11 This first comprehensive overview of reactive extrusion technology for over a decade combines the views of contributors from both academia and industry who share their experiences and highlight possible applications and markets. They also provide updated information on the underlying chemical and physical concepts, summarizing recent developments in terms of the material and machinery used. As a result, readers will find here a compilation of potential applications for reactive extrusion to access new and cost-effective polymeric materials, while using existing compounding machines.


Polymer Melt Fracture—Rudy Koopmans 2010-08-03 The continually growing plastics market consists of more than 250 million tons of product annually, making the recurring problem of polymer melt fracture one of the most common food and feed extrusion problems. The book begins with a collection of optical and scanning electron microscopy pictures. These photos show distorted capillary die extrudates for a number of commercially available polymers. The authors present a brief introduction to the basic science and technology of polymers. They explain what polymers are, how they are made, and how they can be characterized. They also discuss polymer rheology, review the principles of continuum mechanics, and define linear viscoelastic material functions. Techniques for observing and measuring fracture Next, the book explains how polymer melt fracture is actually experienced in the polymer processing industry. It explains the various ways polymer melt fracture may appear during polymer melt processing in different extrusion processes. The authors provide comprehensive reviews of the polymer melt fracture literature, with chapters on experimental findings and the techniques used to observe and measure polymer melt fracture, and the influence of polymer architecture and polymer processing conditions on the onset and types of polymer melt fracture. Positing a hypothesis about the phenomenon, the book presents the current understanding of polymer melt fracture. Mathematical equations Recognizing the importance of models for simulations that may indicate potential solutions, the book discusses aspects of non-linear constitutive equations and microscopic theory and develops a macroscopic model. Explaining the various ways polymer melt fracture may appear during polymer melt processing in different extrusion processes. The book presents an overview of practical tools and methods that have been used to prevent the appearance of polymer melt fracture and explains how to use them to suppress defects.

Finite Element Analysis of Polymer Melt Extrusion—David Scott Gollob 1980

Extrusion Problems Solved—M N Riaz 2011-11-09 Extrusion is widely used for the preparation of a variety of foodstuffs including breakfast cereals, snack food and pasta, as well as pet food and animal and aquaculture feed. Extrusion problems solved provides responses to more than 300 frequently asked questions about the process of food extrusion and the techniques and equipment involved, in a practical question-and-answer format. The book is divided into twelve chapters for ease of reference: the opening chapters concentrate on introductory queries and on different components of an extruder system, followed by chapters that break down the correct type of extruder for a product. Chapters five and six discuss the impact of factors such as protein content and particle size on the extrusion process, while the use of pre-conditioners is discussed in chapter seven. The latter part of the book discusses specific types of extruder and die and knife assemblies, followed by a chapter on issues relating to drying extruded food products. The final chapter offers practical guidelines and rules of thumb for the most common issues relating to food and feed extrusion. Written by two leading experts in the field, Extrusion problems solved is an essential reference source and troubleshooting guide for professionals working in food, pet food and feed extrusion. It will also be a valuable training resource for students of extrusion technology. The book contains practical guidelines and rules of thumb for the most common food and feed extrusion problems Chapters concentrate on introductory queries, types of extruders and components of extruder systems, knife assemblies, the use of pre-conditioners and issues in drying extruded food products Provides responses to more than 300 frequently asked questions about the processes, equipment and techniques of food extrusion in a practical question-and-answer format.

Engineering of Scintillation Materials and Radiation Technologies—Mikhail Korzhik 2019-09-13 This proceedings book presents dual approaches to examining new theoretical models and their applicability in the search for new scintillation materials and radiation detector designs and solutions, and includes papers on the microtheory of scintillation and the initial phase of luminescence development, applications of the various materials, as well as the development and characterization of ionizing radiation detection equipment. It also touches on the increased demand for cryogenic scintillators, the resurgence of garnet materials for scintillator applications, and nano-structuring in scintillator development, trends in and applications for security, and exploration of hydrocarbons and ecological monitoring.

Handbook of Encapsulation and Controlled Release—Munmaya Mishra 2015-12-01 The field of encapsulation, especially microencapsulation, is a rapidly growing area of research and product development. The Handbook of Encapsulation and Controlled Release covers the entire field, presenting the fundamental processes involved and exploring how to use those processes for different applications in industry. Written at a level comp
**Extrusion** by Harold F. Giles Jr. (2004-12-31)

Why is it important to get to equilibrium and how long does it take? Are there problems running polypropylene profiles on a single screw extruder? This unique reference work is designed to aid operators, engineers, and managers in quickly answering such practical day-to-day questions in extrusion processing. This comprehensive volume is divided into 7 Parts. It contains detailed reference data on such important operating conditions as temperatures, start-up procedures, shear rates, pressure drops, and safety. This reference is a practical guide to extrusion bringing together both the equipment and materials processing aspects. It provides basic and advanced topics about the thermoplastics processing in the extruder, for reference and training. Parts 1 û 3, emphasize the fundamentals, for operators and engineers, of polymeric materials extrusion processing in single and twin screw extruders. Parts 4 û 7 treat advanced topics including troubleshooting, auxiliary equipment, and coextrusion for operators, engineers, and managers. Extensive applications in Part 7 cover such contemporary areas as compounding, blown film, extrusion blow molding, coating, foam, and reprocessing. Each chapter includes review topics.

**Additive and Subtractive Manufacturing** by J. Paulo Davim (2020-01-20)

Additive manufacturing (AM) and subtractive manufacturing (SM) offer numerous advantages in the production of single and multiple components. They provide incomparable design independence and are used to fabricate products in several industries, e.g.: aeronautic, automotive, biomedical, etc. The book presents recent results of processes including 3D printing, SLS (selective laser sintering), EBM (electron beam melting) and Precise Cutting and Drilling.

**Materials Processing** by Lorraine F. Francis (2015-12-28)

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.