

# Sustainable Materials Processes And Production The Manufacturing Guides

The products we purchase and use are assembled from a wide range of naturally occurring and manufactured materials. But too often we create hazards for the ecosystem and human health as we mine, process, distribute, use, and dispose of these materials. Until recently, most research has focused on the waste end of material cycles. This book argues that the safest and least costly point at which to avoid environmental damage is when materials are first designed and selected for use in industrial production. *Materials Matter* presents convincing evidence that we can use fewer materials and eliminate the use of many toxic chemicals by focusing directly on material (chemical) use when products are designed. It also shows how manufacturers can save money by increasing the effectiveness of material use and reducing the use of toxic chemicals. It advocates new directions for the material sciences and government policies on materials. And it argues that manufacturers, suppliers, and customers need to set more socially responsible policies for products and services to achieve higher environmental and health goals.

*Sustainable Remediation of Contaminated Soil and Groundwater: Materials, Processes, and Assessment* provides the remediation tools and techniques necessary for simultaneously saving time and money and maximizing environmental, social and economic benefits. The book integrates green materials, cleaner processes, and sustainability assessment methods for planning, designing and implementing a more effective remediation process for

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both soil and groundwater projects. With this book in hand, engineers will find a valuable guide to greener remediation materials that render smaller environmental footprint, cleaner processes that minimize secondary environmental impact, and sustainability assessment methods that can be used to guide the development of materials and processes.

Addresses materials, processes, and assessment needs for implementing a successful sustainable remediation process  
Provides an integrated approach for the unitization of various green technologies, such as green materials, cleaner processes and sustainability assessment  
Includes case studies based on full-scale commercial soil and groundwater remediation projects

The production of low cost and environmentally friendly highperforming carbon materials is crucial for a sustainable future. Sustainable Carbon Materials from Hydrothermal Processes describes a sustainable and alternative technique to produce carbon from biomass in water at low temperatures, a process known as Hydrothermal Carbonization (HTC).

Sustainable Carbon Materials from Hydrothermal Processes presents an overview of this new and rapidly developing field, discussing various synthetic approaches, characterization of the final products, and modern fields of application for of sustainable carbon materials. Topics covered include:

- Green carbon materials
- Porous hydrothermal carbons
- HTC for the production of valuable carbon hybrid materials
- Functionalization of hydrothermal carbon materials
- Characterization of HTC materials

Applications of HTC in modern nanotechnology:  
Energy storage, electrocatalysis in fuel cells, photocatalysis, gas storage, water purification, sensors, bioapplications

Environmental applications of HTC technology:  
Biochar production, carbon sequestration, and waste conversion

- Scale-up in HTC Sustainable Carbon Materials

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from Hydrothermal Processes will serve as a comprehensive guide for students and newcomers in the field, as well as providing a valuable source of information for researchers and investors looking for alternative technologies to convert biomass into useful products.

**Sustainable Materials, Processes and Production**

Reintroducing Materials for Sustainable Design provides instrumental theory and practical guidance to bring materials back into a central role in the design process and education. To create designs that are sustainable and respond to current environmental, economic and cultural concerns, practitioners and educators require a clear framework for materials use in design and product manufacturing. While much has been written about sustainable design over the last two decades, outlining systems of sustainability and product criteria, to design for material circularity requires a detailed understanding of the physical matter that constitutes products. Designers must not just know of materials but know how to manipulate them and work with them creatively. This book responds to the gap by offering a way to acquire the material knowledge necessary to design physical objects for sustainability. It reinforces the key role and responsibility of designers and encourages designers to take back control over the ideation and manufacturing process. Finally, it discusses the educational practice involved and the potential implications for design education following implementation, addressing didactics, facilities and expertise. This guide is a must-read for designers, educators and researchers engaged in sustainable product design and materials.

**Sustainable Materials for Oil and Gas Applications**, a new release in the Advanced Materials and Sensors for the Oil and Gas Industry series, comprises a list of processes across the upstream and downstream sectors of the industry and the latest research on advanced nanomaterials. Topics include

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enhanced oil recovery mechanisms of nanofluids, health and safety features related to nanoparticle handling, and advanced materials for produced water treatments. Supplied from contributing experts in both academic and corporate backgrounds, the reference contains developments, applications, advantages and challenges. Located in one convenient resource, the book addresses real solutions as oil and gas companies try to lower emissions. As the oil and gas industry are shifting and implementing innovative ways to produce oil and gas in an environmentally friendly way, this resource is an ideal complement to their work. Covers developments, workflows and protocols in advanced materials for today's oil and gas sectors Helps readers gain insights from an experienced list of editors and contributors from both academia and corporate backgrounds Address environmental challenges in oil and gas through technological solutions in nanotechnology

This book presents a collection of studies on state-of-art techniques developed specifically for lignocellulose component derivation, and for the production of functional materials, composite polymers, carbonaceous biocatalysts, and pellets from lignocellulosic biomass, with an emphasis on using sustainable chemistry and engineering to develop innovative materials and fuels for practical application. Technological strategies for the physical processing or biological conversion of biomass for material production are also presented. All chapters were contributed by respected experts in the field from around the globe, providing a broad range of perspectives on cutting-edge applications. The book offers an ideal reference guide for academic researchers and industrial engineers in the fields of natural renewable materials, biorefinery of lignocellulose, biofuels and environmental engineering. It can also be used as a comprehensive reference source for university students in

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chemical engineering, material science and environmental engineering.

Sustainable Materials for Transitional and Alternative Energy, a new release in the Advanced Materials and Sensors for the Oil and Gas Industry series, comprises a list of processes across the energy industry coupled with the latest research involving advanced nanomaterials. Topics include green-based nanomaterials towards carbon capture, the importance of coal gasification in terms of fossil fuels and advanced materials utilized for fuel cells. Supplied from contributing experts in both academic and corporate backgrounds, the reference contains a precise balance on the developments, applications, advantages and challenges remaining. The book addresses real solutions as energy companies continue to deliver energy needs while lowering emissions. The oil and gas industry are shifting and implementing innovative ways to produce energy in an environmentally friendly way. One approach involves solutions developed using advanced materials and nanotechnology. Nanomaterials are delivering new alternatives for engineers making this a timely product for today's market. Teaches readers about developments, workflows and protocols in advanced materials for today's oil and gas sectors Helps readers gain insights from an experienced list of editors and contributors from both academia and corporate backgrounds Addresses environmental challenges in oil and gas through technological solutions in nanotechnology

Describes 35 ecologically sound materials and processes Sustainable development is a globally recognized mandate and it includes green or environment-friendly manufacturing practices. Such practices orchestrate with the self-healing and self-replenishing capability of natural ecosystems. Green manufacturing encompasses synthesis, processing, fabrication, and process optimization, but also testing,

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performance evaluation and reliability. The book shall serve as a comprehensive and authoritative resource on sustainable manufacturing of ceramics, metals and their composites. It is designed to capture the diversity and unity of methods and approaches to materials processing, manufacturing, testing and evaluation across disciplines and length scales. Each chapter incorporates in-depth technical information without compromising the delicate link between factual data and fundamental concepts or between theory and practice. Green and sustainable materials processing and manufacturing is designed as a key enabler of sustainable development. A one-stop compendium of new research and technology of green manufacturing of metals, ceramics and their composites In-depth cutting-edge treatment of synthesis, processing, fabrication, process optimization, testing, performance evaluation and reliability which are of critical importance to green manufacturing Stimulates fresh thinking and exchange of ideas and information on approaches to green materials processing across disciplines

This book discusses recent developments in renewable and sustainable materials from a green technology perspective and how these materials interact with the environment. It highlights the fundamental processes involved in the production of renewable and sustainable materials, including chemical and biological approaches as well as these materials' potential application as green technological option. Written in a didactic style, it offers a guide and insights into renewable and sustainable materials. Each chapter provides in-depth technical information on the material's theory and its applications. The book shows how new materials may help us solve human and environmental issues in the future and suggests where current research may lead.

Non-renewable materials can no longer be disposed once

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humankind's ever increasing needs cannot be fulfilled anymore due to limited resources. Reuse and recycling become inevitable requirements for product and process design. Renewable resources must not be consumed in quantities higher than can be regained. New technologies have to be developed and applied for a Sustainable Product Development and Life Cycle Engineering to fulfill the needs of humankind, protecting public health, welfare, and environment. The 8th Global Conference on Sustainable Manufacturing brings together some of the world's leading experts to present a scientific conference in Abu Dhabi, one of the world's fastest growing economies and a global leader in the development of sustainable technologies. The conference will focus on 7 areas: Value adding by sustainable manufacturing in the UAE Potentials of renewables Education for sustainability engineering Green supply chain and transportation Microelectronics and resource efficiency Technology driven startups Sustainable products and manufacturing processes

Design for Sustainability: Green Materials and Processes provides fundamental and practical knowledge surrounding product development applications throughout the entire lifecycle of green materials, ranging from conceptual design, material and manufacturing process selection, and environmental lifecycle assessment. In addition, several topics covering recent advances in the application of sustainable design within the automotive, building and construction, packaging and consumer product industries are also included in this book to provide practical examples of this philosophy in current applications. Lastly, a section on implementation of design for sustainability in education is added to aid readers that wish to introduce this philosophy to younger students. This book will be beneficial to researchers, students in higher education institutions, design practitioners

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and engineers in private and public sector organization with aspirations to develop sustainable products in the future. Design for sustainability is one of the primary focuses in human advancement nowadays, with the aim of developing products and services that meet the needs of the present without compromising the ability of future generations to meet their own needs. Provides an overview on materials and process design for sustainability Discusses theoretical aspects about design for sustainability Includes a discussion of the most recent advances and applications in design for sustainability

Nanotechnology has the potential to play an important role in increasing the sustainability of a wide range of industrial sectors. Nanomaterials could contribute to more sustainable manufacturing through cleaner, less wasteful production processes and can substitute conventional materials, leading to savings in raw materials and energy. Nanotechnology for Sustainable Manufacturing discusses recent progress in the areas of energy and materials efficiency related to resource savings and conservation of raw materials, which are drivers for the application of nanotechnology in the industrial setting. Written by leading experts from Europe, North America, Asia, and Australia, the book provides an innovative perspective by establishing connections between the subject areas associated with nanotechnology and by bridging the academic and industrial research gap. The topics covered include electronics, agrifood, aerospace, pulp and paper manufacturing, batteries, catalysts, solar energy, fuel cells, drinking water, and construction materials. The chapters offer insights into the diverse industries that are currently or likely to be impacted by developments in nanotechnology and nanomaterials. They cover applications such as nanotechnology for alternative energy generation, improving water quality, and novel uses in agriculture and forest

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products. The book also addresses the use of life-cycle analysis for assessing the sustainability of nanotechnology-based products and processes.

This book provides a factual analysis of material flows and resource productivity in OECD countries in a global context. 'Materials and Design' offers an accessible and systematic approach to the selection of materials and the ways in which they can be used. The book is aimed at the industrial designer who may have limited technical support.

This book highlights recent research on sustainable production. In today's manufacturing industry, cleaner production has become a central goal. "Sustainable production" describes activities that pose no threat to future generations and are not pursued at their expense. In addition, sustainable production is a concept that can improve environmental performance and focuses on technical aspects that can be used to improve efficiency and productivity. Sustainable production is not limited to the manufacturing sector, but affects all production sectors including energy, environment, and material systems – all of which face significant challenges in connection with sustainability, e.g. efforts to reduce production's impact on the environment and to manage health and safety impacts. Key means of reducing environmental pollution from manufacturing involve reducing the main resources used in production (metals used in the machining processes, fluids/oils in production, water, and energy).

Green Sustainable Process for Chemical and Environmental Engineering and Science: Solid State Synthetic Methods cover recent advances made in the field of solid-state materials synthesis and its various

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applications. The book provides a brief introduction to the topic and the fundamental principles governing the various methods. Sustainable techniques and green processes development in solid-state chemistry are also highlighted. This book also provides a comprehensive literature on the industrial application using solid-state materials and solid-state devices. Overall, this book is intended to explore green solid-state techniques, eco-friendly materials involved in organic synthesis and real-time applications. Provides a broad overview of solid-state chemistry Outlines an eco-friendly solid-state synthesis of modern nanomaterials, organometallic, coordination compounds and pure organic Gives a detailed account of solid-state chemistry, fundamentals, concepts, techniques and applications Deliberates cutting-edge recent advances in industrial technologies involved in energy, environmental, medicinal and organic chemistry fields

Sustainable Materials and Green Processing for Energy Conversion provides a concise reference on green processing and synthesis of materials required for the next generation of devices used in renewable energy conversion and storage. The book covers the processing of bio-organic materials, environmentally-friendly organic and inorganic sources of materials, synthetic green chemistry, bioresorbable and transient properties of functional materials, and the concept of sustainable material design. The book features chapters by worldwide experts and is an important reference for students, researchers, and engineers interested in gaining extensive knowledge concerning green

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processing of sustainable, green functional materials for next generation energy devices. Additionally, functional materials used in energy devices must also be able to degrade and decompose with minimum energy after being disposed of at their end-of-life. Environmental pollution is one of the global crises that endangers the life cycles of living things. There are multiple root causes of this pollution, including industrialization that demands a huge supply of raw materials for the production of products related to meeting the demands of the Internet-of-Things. As a result, improvement of material and product life cycles by incorporation of green, sustainable principles is essential to address this challenging issue. Offers a resourceful reference for readers interested in green processing of environmentally-friendly and sustainable materials for energy conversion and storage devices Focuses on designing of materials through green-processing concepts Highlights challenges and opportunities in green processing of renewable materials for energy devices

Provides an in-depth understanding of the fundamentals of a wide range of state-of-the-art materials manufacturing processes Modern manufacturing is at the core of industrial production from base materials to semi-finished goods and final products. Over the last decade, a variety of innovative methods have been developed that allow for manufacturing processes that are more versatile, less energy-consuming, and more environmentally friendly. This book provides readers with everything they need to know about the many manufacturing processes of today. Presented in three

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parts, Modern Manufacturing Processes starts by covering advanced manufacturing forming processes such as sheet forming, powder forming, and injection molding. The second part deals with thermal and energy-assisted manufacturing processes, including warm and hot hydrostamping. It also covers high speed forming (electromagnetic, electrohydraulic, and explosive forming). The third part reviews advanced material removal process like advanced grinding, electro-discharge machining, micro milling, and laser machining. It also looks at high speed and hard machining and examines advances in material modeling for manufacturing analysis and simulation. Offers a comprehensive overview of advanced materials manufacturing processes Provides practice-oriented information to help readers find the right manufacturing methods for the intended applications Highly relevant for material scientists and engineers in industry Modern Manufacturing Processes is an ideal book for practitioners and researchers in materials and mechanical engineering.

Part of the hugely popular Without the Hot Air series, this book is accessibly written from an engineering perspective on a wide range of materials Presenting a vision of change for how future generations can still use steel, cement, plastics, etcetera, but with less impact on the environment, this book is a wake-up call first, and then a solutions manual. By providing an evidence-based vision of change, the book can play a significant role in influencing our future. Written for designers; engineers; operations, technical, and business

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managers; traders; and government and NGO officials associated with business, climate, energy, environment, waste, trade and financing. It is relevant to a wide range of industries, including energy, construction, consulting, manufacturing, transport, and architecture, but will also appeal to those who love popular science. This second edition is updated with the latest developments in both science and industry.

The development of catalysts is the most sophisticated art in chemical sciences. It can be read like a story book when the critical scientific contents are presented in a chronological manner with short and simple sentences. This book will meet these criteria. To address the sustainability issues of existing chemical manufacturing processes or producing new chemicals, researchers are developing alternate catalysts to eliminate toxic chemicals use and by-products formation. Sustainable Catalytic Processes presents critical discussions of the progress of such catalytic development. This book of contemporary research results in sustainable catalysis area will benefit scientists in both industries and academia, and students to learn recent catalysts/process development. Reports the most recent developments in catalysis with a focus on environmentally friendly commercial processes, such as waste water treatment, alternate energy, etc Bridges the theory, necessary for the development of environmentally friendly processes, and their implementation through pilot plant and large scale Contains mainly laboratory scale data and encourages industrial scientists to test these processes on a pilot scale Includes work examples featuring the

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development of the new catalysts/processes using bio-renewable feedstock satisfactorily addressing environmental concerns Includes one chapter demonstrating real industrial examples motivating the industrial and academic researchers to pursue similar research

This book provides an overview on current sustainable machining. Its chapters cover the concept in economic, social and environmental dimensions. It provides the reader with proper ways to handle several pollutants produced during the machining process. The book is useful on both undergraduate and postgraduate levels and it is of interest to all those working with manufacturing and machining technology.

This edited volume presents the research results of the Collaborative Research Center 1026 "Sustainable manufacturing - shaping global value creation". The book aims at providing a reference guide of sustainable manufacturing for researchers, describing methodologies for development of sustainable manufacturing solutions. The volume is structured in four chapters covering the following topics: sustainable manufacturing technology, sustainable product development, sustainable value creation networks and systematic change towards sustainable manufacturing. The target audience comprises both researchers and practitioners in the field of sustainable manufacturing, but the book may also be beneficial for graduate students.

This is a follow-up book to the author's Sustainable Energy Without the Hot Air, which had a large influence on both government policy and public opinion of how we

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should plan our energy for the future. This book faces up to the impacts of making materials in the 21st century. We are already making materials well, but demand keeps growing and we need to plan for a sustainable material future. The steel and aluminium industries alone account for nearly 30 per cent of global emissions, and demand is rising. The world target is to reduce industry's carbon emissions by 50 per cent by 2050. However, projections are that world demand for materials will double by 2050, so to meet our emissions target, we have to achieve a 4-fold reduction in emissions per unit of material used: industry will have to make huge changes, not just to the processes involved, but to the entire product life-cycle. This book presents a vision of change for how future generations can still use steel, cement, plastics etc., but with less impact on the environment. First it is a wake-up call, then it is a solutions manual. The solutions presented here are ahead of the game now. By providing an evidence-based vision of change, this book can play a significant role in influencing our energy future.

Sustainable process engineering is a methodology to design new and redesign existing processes that follow the principles of green chemistry and green engineering, and ultimately contribute to a sustainable development. The newest achievements of chemical engineering, opened new opportunities to design more efficient, safe, compact and environmentally benign chemical processes. The book provides a guide to sustainable process design applicable in various industrial fields. • Discusses the topic from a wide angle: chemistry,

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materials, processes, and equipment. • Includes state-of-the-art research achievements that are yet to be industrially implemented. • Transfers knowledge between chemists and chemical engineers. • QR codes direct the readers to animations, short videos, magazines, and blogs on specific topics • Worked examples deepen the understanding of the sustainable assessment of chemical manufacturing processes

Environmental issues are playing an increasingly important role in the textile industry, both from the point of view of government regulation and consumer expectations. Sustainable textiles reviews ways of achieving more sustainable materials and technologies as well as improving recycling in the industry. The first part of the book discusses ways of improving sustainability at various points in the supply chain. Chapters discuss how sustainability can be integrated into textile design, ensuring more sustainable production of both natural and synthetic fibres, improving sustainability in processes such as dyeing as well as more environmentally-friendly technologies including enzyme and plasma technologies. The second part of the book reviews consumer perceptions of recycled textiles, eco-labelling, organic textiles and the use of recycled materials in textile products. With a distinguished editor and an impressive range of international contributors, Sustainable textiles is an important reference for the textile industry and those researching this important topic. Reviews government regulations and consumer expectations about environmental impact on the textiles industry Discusses

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ways of achieving more sustainable materials and technologies as well as textiles recycling Examines how sustainability can be integrated into textile design, production and processes

Encyclopedia of Renewable and Sustainable Materials provides a comprehensive overview, covering research and development on all aspects of renewable, recyclable and sustainable materials. The use of renewable and sustainable materials in building construction, the automotive sector, energy, textiles and others can create markets for agricultural products and additional revenue streams for farmers, as well as significantly reduce carbon dioxide (CO<sub>2</sub>) emissions, manufacturing energy requirements, manufacturing costs and waste. This book provides researchers, students and professionals in materials science and engineering with tactics and information as they face increasingly complex challenges around the development, selection and use of construction and manufacturing materials. Covers a broad range of topics not available elsewhere in one resource Arranged thematically for ease of navigation Discusses key features on processing, use, application and the environmental benefits of renewable and sustainable materials Contains a special focus on sustainability that will lead to the reduction of carbon emissions and enhance protection of the natural environment with regard to sustainable materials Sustainable Engineering Products and Manufacturing Technologies provides the reader with a detailed look at the latest research into technologies that reduce the environmental impacts of manufacturing. All points

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where engineering decisions can influence the environmental sustainability of a product are examined, including the sourcing of non-toxic, sustainable raw materials, how to choose manufacturing processes that use energy responsibly and minimize waste, and how to design products to maximize reusability and recyclability. The subject of environmental regulation is also addressed, with references to both the US and EU and the future direction of legislation. Finally, sustainability factors are investigated alongside other product considerations, such as quality, price, manufacturability and functionality, to help readers design processes and products that are economically viable and environmentally friendly. Helps readers integrate product sustainability alongside functionality, manufacturability and cost Describes the latest technologies for energy efficient and low carbon manufacturing Discusses relevant environmental regulations around the globe and speculates on future directions

The main objective of the book is to expose readers to the basics of sustainable material forming and joining technologies, and to discuss the relationship between conventional and sustainable processes. It also provides case studies for sustainable issues in material forming and joining processes, workouts for converting conventional processes to green processes, and highlights the importance of awareness on sustainable and green manufacturing through education. The book will include green and sustainability concepts in material forming like bulk forming and sheet forming emphasizing hot forming, materials development, lubrication, and

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minimizing defects. Key Features Conceptualizes green and sustainability issues towards efficient material forming and joining Addresses important aspects of sustainable manufacturing by forming operations Presents comparison between traditional and sustainable manufacturing processes Includes practical case studies from industry experts Discusses green and sustainability concepts in material forming like bulk forming and sheet forming emphasizing hot forming, materials development, lubrication, and minimizing defects

Written by an educator with close to 40 years of experience in developing and teaching design and manufacturing courses at the graduate and undergraduate levels, *Green Design and Manufacturing for Sustainability* integrates green design and manufacturing within the framework of sustainability, emphasizing cost, recyclables, and reuse. It includes the *Sustainable Construction Technologies: Life-Cycle Assessment* provides practitioners with a tool to help them select technologies that are financially advantageous even though they have a higher initial cost. Chapters provide an overview of LCA and how it can be used in conjunction with other indicators to manage construction. Topics covered include indoor environment quality, energy efficiency, transport, water reuse, materials, land use and ecology, and more. The book presents a valuable tool for construction professionals and researchers that want to apply sustainable construction techniques to their projects. Practitioners will find the international case studies and

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discussions of worldwide regulation and standards particularly useful. Provides a framework for analyzing sustainable construction technologies and economic viability Introduces key credit criteria for different sustainable construction technologies Covers the most relevant construction areas Includes technologies that can be employed during the process of construction, or to the product of the construction process, i.e. buildings Analyzes international rating systems and provides supporting case studies

An encyclopaedic guide to production techniques and materials for product and industrial designers, engineers, and architects. Today's product designers are presented with a myriad of choices when creating their work and preparing it for manufacture. They have to be knowledgeable about a vast repertoire of processes, ranging from what used to be known as traditional "crafts" to the latest technology, to enable their designs to be manufactured effectively and efficiently. Information on the internet about such processes is often unreliable, and search engines do not usefully organize material for designers. This fundamental new resource explores innovative production techniques and materials that are having an impact on the design industry worldwide. Organized into four easily referenced parts—Forming, Cutting, Joining, and Finishing—over seventy manufacturing processes are explained in depth with full technical

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descriptions; analyses of the typical applications, design opportunities, and considerations each process offers; and information on cost, speed, and environmental impact. The accompanying step-by-step case studies look at a product or component being manufactured at a leading international supplier. A directory of more than fifty materials includes a detailed technical profile, images of typical applications and finishes, and an overview of each material's design characteristics. With some 1,200 color photographs and technical illustrations, specially commissioned for this book, this is the definitive reference for product designers, 3D designers, engineers, and architects who need a convenient, highly accessible, and practical reference.

Covering the latest technologies, Nanotechnology in eco-efficient construction provides an authoritative guide to the role of nanotechnology in the development of eco-efficient construction materials and sustainable construction. The book contains a special focus on applications concerning concrete and cement, as nanotechnology is driving significant development in concrete technologies. The new edition has 14 new chapters, including 3 new parts: Mortars and concrete related applications; Applications for pavements and other structural materials; and Toxicity, safety handling and environmental impacts. Civil engineers requiring an

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understanding of eco-efficient construction materials, as well as researchers and architects within any field of nanotechnology, eco-efficient materials or the construction industry will find this updated reference to be highly valuable. Addresses issues such as toxicity and LCA aspects New chapters covering safety handling on occupational exposure of nanoparticles and the assessment of personal exposure to airborne nanomaterials Discusses the effects of adding nano-particles on the durability and on the properties of geopolymers

Print and Production Finishes for Sustainable Design is an indispensable ideas sourcebook and practical guide to what has become an important consideration for many designers: sustainability. The book shows examples of environmentally friendly inks, varnishes, pigments, and finishes that can be used in a wide range of standard printed media. Printing innovations and specialized printing techniques using environmentally friendly ingredients are also included. The book provides an overview of different printable materials available to both 2-D and 3-D designers, including recyclable paper, paper substitutes, and biodegradable plastics. Innovative 3-D designs that demonstrate clear environmental benefits derived from the application of printing, types of manufacturing techniques or use of specific materials are showcased and explained. Environmentally sound printing and production

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finishes are often one of the outcomes of a lengthy design process by companies dedicated to reducing their impact on the environment. *Print and Production Finishes for Sustainable Design* includes case studies of companies where the entire organizational objective is based on achieving organizational sustainability (i.e. zero net impact) and where printing and production processes have been integral to achieving this.

Individuals who will be involved in design and manufacturing of finished products need to understand the grand spectrum of manufacturing technology. *Comprehensive and fundamental, Manufacturing Technology: Materials, Processes, and Equipment* introduces and elaborates on the field of manufacturing technology—its processes, materials, tooling, and equipment. The book emphasizes the fundamentals of processes, their capabilities, typical applications, advantages, and limitations. Thorough and insightful, it provides mathematical modeling and equations as needed to enhance the basic understanding of the material at hand. Designed for upper-level undergraduates in mechanical, industrial, manufacturing, and materials engineering disciplines, this book covers complete manufacturing technology courses taught in engineering colleges and institutions worldwide. The book also addresses the needs of production and manufacturing engineers and technologists

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participating in related industries.

This monograph presents a reliable methodology for characterising the energy and eco-efficiency of unit manufacturing processes. The Specific Energy Consumption, SEC, will be identified as the key indicator for the energy efficiency of unit processes. An empirical approach will be validated on different machine tools and manufacturing processes to depict the relationship between process parameters and energy consumptions. Statistical results and additional validation runs will corroborate the high level of accuracy in predicting the energy consumption. In relation to the eco-efficiency, the value and the associated environmental impacts of manufacturing processes will also be discussed. The interrelationship between process parameters, process value and the associated environmental impact will be integrated in the evaluation of eco-efficiency. The book concludes with a further investigation of the results in order to develop strategies for further efficiency improvement. The target audience primarily comprises researchers and experts in the field, but the book may also be beneficial for graduate students.

According to the NACFAM (National Council for Advanced Manufacturing USA) Sustainable Manufacturing is defined as the creation of manufactured products that use processes that are non-polluting, conserve energy and natural

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resources, and are economically sound and safe for employees, communities, and consumers. The book covers Sustainable Manufacturing techniques such as materials and manufacturing for renewable energies; clean manufacturing technology; ecological manufacturing; energy-efficient manufacturing; remanufacturing; recycling of materials; environmentally conscious design and manufacturing processes; sustainable advanced manufacturing systems; manufacturability in sustainable product design; education and training for sustainable manufacturing.

A hot-button societal issue, sustainability has become a frequently heard term in every industrial segment. Sustainability in apparel production is a vast topic and it has many facets. Handbook of Sustainable Apparel Production covers all aspects of sustainable apparel production including the raw materials employed, sustainable manufacturing processes, and environmental as well as social assessments of apparel production. The book highlights the environmental and social impacts of apparel and its assessment. It explores the complexities involved in implementing sustainable measures in the massive supply chain of apparel production. The discussion then turns to sustainability and consumption behavior of the apparel industry and the assessment of sustainability aspects and parameters. The text details

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technologies that can pave the way toward sustainability in production and closes with coverage of design aspects, particularly sustainable design/eco design and new approaches to fashion sustainability. A vast and complex topic, sustainability in apparel production has many faces and facets. With contributions from an international panel of experts, this book unites all the elements, including very minute details, and supports them with detailed and interesting case studies. It gives you a framework for moving towards sustainability.

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