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KEY=II - ELAINE FULLER

Polymer Toughening

CRC Press This work provides comprehensive coverage of the basic theories and hands-on techniques of polymer toughening, demonstrating the similarities in methods of measurement and toughness enhancement found in various classes of polymeric materials, including foams, films, adhesives and moulding grade polymers. It provides a detailed overview, from historical and current points of view, of polymer toughening as practiced in industry, and lays the theoretical groundwork for the analysis and prediction of different modes of toughening.

Polymers

A Property Database, Second Edition

CRC Press Scientific and Commercial Information for More Than 1,000 Polymers Polymers: A Property Database, Second Edition offers a central and reliable source for scientific and commercial information on more than 1,000 polymers. Revised and updated throughout, this edition features 25% new material, including 50 entirely new entries that reflect advances in areas such as conducting polymers, hydrogels, nano-polymers, and biomaterials. The second edition also comes with unlimited access to a complete, fully searchable Web version of the reference. Powerful

retrieval software allows users to customize their searches and refine results. Each entry includes trade names, properties, manufacturing processes, commercial applications, supplier details, references, and links to constituent monomers. Buy the latest print edition and gain access to a complete, fully searchable Web version of the reference, enhanced with powerful retrieval software that allows you to customize searches and refine results. Unlimited access to the Online Version for the lifetime of the Second Edition Revised, Updated, and Expanded with 25% New Material Includes 50 entirely new entries reflecting the latest polymer advances Special Introductory Price! Buy today and SAVE! Purchase the NEW Edition in Print AND Online -For One Price!

Carraher's Polymer Chemistry, Ninth Edition

CRC Press Most of the advancements in communication, computers, medicine, and air and water purity are linked to macromolecules and a fundamental understanding of the principles that govern their behavior. These fundamentals are explored in *Carraher's Polymer Chemistry, Ninth Edition*. Continuing the tradition of previous volumes, the latest edition provides a well-rounded presentation of the principles and applications of polymers. With an emphasis on the environment and green chemistry and materials, this edition offers detailed coverage of natural and synthetic giant molecules, inorganic and organic polymers, biomacromolecules, elastomers, adhesives, coatings, fibers, plastics, blends, caulks, composites, and ceramics. Using simple fundamentals, this book demonstrates how the basic principles of one polymer group can be applied to all of the other groups. It covers reactivities, synthesis and polymerization reactions, techniques for characterization and analysis, energy absorption and thermal conductivity, physical and optical properties, and practical applications. This edition includes updated techniques, new sections on a number of copolymers, expanded emphasis on nanotechnology and nanomaterials, and increased coverage of topics including carbon nanotubes, tapes and glues, photochemistry, and more. With topics presented so students can understand polymer science even if certain parts of the text are skipped, this book is suitable as an undergraduate as well as an introductory graduate-level text. The author begins most chapters with theory followed by application, and generally addresses the most critical topics first. He provides all of the elements of an introductory text, covering synthesis, properties, applications, and characterization. This user-friendly book also contains definitions, learning objectives, questions, and additional reading in each chapter.

Fracture of Polymers, Composites

and Adhesives

Elsevier This book contains a selection of fully peer-reviewed papers which were presented at the 2nd ESIS TC4 Conference, held in Les Diablerets, Switzerland 13 - 15 September 1999. The meeting was designed to reflect the activities of the Committee over the last 15 years, and to plan future activities. The papers have been divided into four chapters under the headings of Composites, Elastic-Plastic Fracture, Adhesion, and Impact and General Fracture. These are convenient groupings, but there are many interactions between the areas, with the common theme of Fracture Mechanics underlying it all.

Engineering Design with Polymers and Composites

CRC Press Engineering Design with Polymers and Composites, Second Edition continues to provide one of the only textbooks on the analysis and design of mechanical components made from polymer materials. It explains how to create polymer materials to meet design specifications. After tracing the history of polymers and composites, the text describes modern des

Dynamic Behavior of Materials, Volume 1

Proceedings of the 2012 Annual Conference on Experimental and Applied Mechanics

Springer Science & Business Media Dynamic Behavior of Materials, Volume 1: Proceedings of the 2012 Annual Conference on Experimental and Applied Mechanics represents one of seven volumes of technical papers presented at the Society for Experimental Mechanics SEM 12th International Congress & Exposition on Experimental and Applied Mechanics, held at Costa Mesa, California, June 11-14, 2012. The full set of proceedings also includes volumes on Challenges in Mechanics of Time -Dependent Materials and Processes in Conventional and Multifunctional Materials, Imaging Methods for Novel Materials and Challenging Applications, Experimental and Applied Mechanics, 2nd International Symposium on the Mechanics of Biological Systems and Materials 13th International Symposium on MEMS and Nanotechnology and, Composite Materials and the 1st International Symposium on Joining Technologies for Composites.

The Physics of Deformation and Fracture of Polymers

Cambridge University Press Demonstrating through examples, this book presents a mechanism-based perspective on the broad range of deformation and fracture response of solid polymers. It draws on the results of probing experiments and considers the similar mechanical responses of amorphous metals and inorganic compounds to develop advanced methodology for generating more precise forms of modelling. This, in turn, provides a better fundamental understanding of deformation and fracture phenomena in solid polymers. Such mechanism-based constitutive response forms have far-reaching application potential in the prediction of structural responses and in tailoring special microstructures for tough behaviour. Moreover, they can guide the development of computational codes for deformation processing of polymers at any level. Applications are wide-ranging, from large strain industrial deformation texturing to production of precision micro-fluidic devices, making this book of interest to both advanced graduate students and to practising professionals.

Micro- and Nanostructured Multiphase Polymer Blend Systems Phase Morphology and Interfaces

CRC Press Micro- and Nanostructured Multiphase Polymer Blend Systems: Phase Morphology and Interfaces focuses on the formation of phase morphology in polymer blends and copolymers and considers various types of blends including thermosets, thermoplastics, thermoplastic vulcanizates, and structured copolymers. The book carefully debates the processing

Polymer Blends and Alloys

CRC Press Distinguishing among blends, alloys and other types of combinations, clarifying terminology and presenting data on new processes and materials, this work present up-to-date and effective compounding techniques for polymers. It offers extensive analyses on the challenging questions that surround miscibility, compatibility, dynamic processing, interaction/phase behaviour, and computer simulations for predicting behaviours of polymer mixture and interaction.

Thermoplastic Aromatic Polymer

Composites

A Study of the Structure, Processing and Properties of Carbon Fibre Reinforced Polyetheretherketone and Related Materials

Elsevier Thermoplastic Aromatic Polymer Composites: A Study of the Structure, Processing and Properties of Carbon Fibre Reinforced Polyetheretherketone and Related Materials deals with the field of thermoplastic composite materials through a study of carbon fiber reinforced polyetheretherketone. The book is composed of twelve chapters. The first four chapters are an introduction and basic learning of thermoplastic composite materials. These chapters include discussions on the components of thermoplastics, product forms, and the microstructure of aromatic polymer composites. The processing and manufacturing technology, including the fundamental operations, control, and the wide implications of manufacturing the composite material, are analyzed. The service performance structure of three interactions, namely, material, design, and processing, are illustrated. The strength of thermoplastic composites is then considered through an analysis of both shear and extensions with elastic modulus, but in the case of material strength, the differences between tension and compression properties should be taken into account. The book also notes that the durability, temperature sensitivity, and environmental resistance should likewise be regarded for a structural composite to have practical value and satisfactory performance. Lastly, the text explains that the numerous applications of thermoplastic structural composites, such as in medicine, aviation, marine and space technology, automotive, and industrial machinery, are all important and a rigorous evaluation is therefore necessary. The book finally suggests that the research into the future developments in the thermoplastic structural composites and the trend toward new design strategies and processing technology are important in optimizing the composite's great potential. Industrial researchers in the field of chemistry and polymer composites, students, and academicians interested in the design and application of polymer composites will find this book relevant.

Energetic Polymers

John Wiley & Sons This up-to-date overview provides the latest information on the performance, sensitivity, strength and processability aspects of propellants and explosive formulations, with the nature of polymer binder/plasticizer as the variable factor. Apart from applications, this monograph explores the principles behind

energetic polymers, while discussing the synthetic routes and energetic characteristics of individual family of energetic polymers. Furthermore, a number of case studies illustrate the role of energetic polymers on enhancing the performance of formulations as compared to their inert counterparts. The emphasis is on safety throughout, with practical guidance on how to safely handle and formulate energetic polymer based formulations. With the advent of a new generation of energetic polymers, this book is relevant to industry and defense organizations as well as for academic research.

Reinforced Polymer Composites

MDPI This book, consisting of 21 articles, including three review papers, written by research groups of experts in the field, considers recent research on reinforced polymer composites. Most of them relate to the fiber-reinforced polymer composites, which are a real hot topic in the field. Depending on the reinforcing fiber nature, such composites are divided into synthetic and natural fiber-reinforced ones. Synthetic fibers, such as carbon, glass, or basalt, provide more stiffness, while natural fibers, such as jute, flax, bamboo, kenaf, and others, are inexpensive and biodegradable, making them environmentally friendly. To acquire the benefits of design flexibility and recycling possibilities, natural reinforcers can be hybridized with small amounts of synthetic fibers to make them more desirable for technical applications. Elaborated composites have great potential as structural materials in automotive, marine and aerospace application, as fire resistant concrete, in bridge systems, as mechanical gear pair, as biomedical materials for dentistry and orthopedic application and tissue engineering, as well as functional materials such as proton-exchange membranes, biodegradable superabsorbent resins and polymer electrolytes.

Mineral-Filled Polymer Composites Handbook, Two-Volume Set

CRC Press Mineral-filled polymer composites exhibit several advantages that make this material class attractive for a variety of applications, including their low cost, light weight, excellent rigidity, and high mechanical strength. Mineral-Filled Polymer Composites Handbook serves as a comprehensive overview of the latest research, trends, applications, and future directions of advanced mineral fiber-reinforced polymer composites. Comprised of 2 volumes: Mineral-Filled Polymer Composites: Perspective, Properties, and New Materials Mineral-Filled Polymer Composites: Selection, Processing, and Applications Presents details on processing, applications, and ageing of macro- to nanosized mineral reinforced polymer composites Examines fabrication techniques, novel synthesis methods, and mechanical behavior, thermal, flammability, and functional properties of a wide array of mineral filled polymer composite materials Covers a broad range of different research fields, including organic and inorganic filler used in the development of composites for various types of engineering applications Offers the latest developments in nano/micromineral-

based polymer composites This book serves as an excellent reference guide for researchers, advanced students, academics, and industry professionals interested in the synthesis of mineral-filled polymer and biopolymer composites, as well as those pursuing research in the broad fields of composite materials, polymers, organic/inorganic hybrid materials, and nano-assembly.

Polymer Nanocomposite Foams

CRC Press Advancements in polymer nanocomposite foams have led to their application in a variety of fields, such as automotive, packaging, and insulation. Employing nanocomposites in foam formation enhances their property profiles, enabling a broader range of uses, from conventional to advanced applications. Since many factors affect the generation of nanost

Frontiers of Polymer Research

Springer Science & Business Media This book represents the proceedings of the First International Conference on Frontiers of Polymer Research held in New Delhi, India during January 20-25, 1991. Polymers have usually been perceived as substances to be used in insulations, coatings, fabrics, and structural materials. Defying this classical view, polymers are emerging as a new class of materials with potential applications in many new technologies. They also offer challenging opportunities for fundamental research. Recognizing a tremendous growth in world wide interest in polymer research and technology, a truly global "1st International Conference on Frontiers of Polymer Research" was organized by P. N. Prasad (SUNY at Buffalo), F. E. Karasz (University of Massachusetts) and J. K. Nigam (Shriram Institute for Industrial Research, India). The 225 participants represented 25 countries and a wide variety of academic, industrial and government groups. The conference was inaugurated by the Prime Minister of India, Mr. Chandra Shekhar and had a high level media coverage. The focus of the conference was on three frontier areas of polymer research: (i) Polymers for photonics, where nonlinear optical properties of polymers show great promise, (ii) Polymers for electronics, where new conduction mechanisms and photophysics have generated considerable enthusiasm and (iii) High performance polymers as new advanced polymers have exhibited exceptionally high mechanical strength coupled with light weight.

Science and Engineering of Short Fibre Reinforced Polymer Composites

Elsevier When fibres in a composite are discontinuous and are shorter than a few millimetres, the composite is called a 'short fibre reinforced composite (SFRP)'. SFRPs have found extensive applications in automobiles, business machines, durable consumer items, sporting goods and electrical industries owing to their low cost,

easy processing and superior mechanical properties over the parent polymers. The book summarises recent developments in this area, focusing on the fundamental mechanisms that govern the mechanical properties including strength, modulus, fracture toughness and thermal properties of SFRP materials. This book covers the following topics: extrusion compounding and injection moulding, major factors affecting mechanical performance, stress transfer, strength, elastic modulus flexural modulus, thermal conductivity and expansion, non-linear stress-strain behaviour and fracture mechanics of short fibre reinforced polymers. With its distinguished team of authors, Science and engineering of short fibre reinforced polymer composites is a standard reference for anyone involved in the development, manufacture and use of SFRPs. It will also provide an in-depth understanding of the behaviour of these versatile materials. Reviews the mechanical properties and functions of short fibre reinforced polymer composites (SFRP) Examines recent developments in the fundamental mechanisms of SFRP's Assesses major factors affecting mechanical performance such as stress transfer and strength

Essential Orthopedics: Principles and Practice 2 Volumes

JP Medical Ltd Essential Orthopedics: Principles & Practice is an extensive, illustrated guide to the field of orthopaedics. Principles and practice for shoulder, hip, spine, hand, foot and ankle are covered, including anatomy, physiology, pathology and diseases. Essential Orthopedics: Principles & Practice includes all modern research methodologies, such as biostatistics, advanced imaging and gene therapy. Enhanced by 2000 full colour illustrations this is a comprehensive resource for all interns, residents and orthopaedic surgeons.

Official Gazette of the United States Patent and Trademark Office

Patents

Polymer Nanocomposites

Towards Multi-Functionality

Springer This highlights ongoing research efforts on different aspects of polymer nanocomposites and explores their potentials to exhibit multi-functional properties. In this context, it addresses both fundamental and advanced concepts, while delineating the parameters and mechanisms responsible for these potentials. Aspects considered include embrittlement/toughness; wear/scratch behaviour;

thermal stability and flame retardancy; barrier, electrical and thermal conductivity; and optical and magnetic properties. Further, the book was written as a coherent unit rather than a collection of chapters on different topics. As such, the results, analyses and discussions presented herein provide a guide for the development of a new class of multi-functional nanocomposites. Offering an invaluable resource for materials researchers and postgraduate students in the polymer composites field, they will also greatly benefit materials

Metal-Polymer Multi-Material Structures and Manufacturing Techniques in Transportation

MDPI The reduction of greenhouse gas emissions—particularly from fossil fuel-powered vehicles and airplanes by means of weight savings and leaner fuel consumption, helps to restrain environmental impacts. In general, for a variety of industries, and specifically in the case of transport, where both weight savings and increased energy efficiency are pursued, the use of metal-polymer multi-material structures has been growing at an increasing and particularly fast pace in recent years. Several manufacturing techniques have been, or are being, developed, with the aim of being used for producing dissimilar materials in cost-efficient manners. This book presents recent developments in the state of the art of advanced additive manufacturing and the joining of metal-polymer multi-material structures in transportation. This publication mainly focuses on the correlations between microstructure, manufacturing process (i.e., AddJoining, adhesive bonding, friction riveting, friction-based staking and friction spot joining) properties, and the mechanical performance of metal-polymer multi-material structures.

Eco-friendly and Smart Polymer Systems

Springer Nature This proceedings book presents the main findings of the 13th International Seminar on Polymer Science and Technology (ISPST 2018), which was held at Amirkabir University of Technology, Tehran, on November 10–22, 2018. This forum was the culmination of more than three decades of academic and industrial activities of Iranian scholars and professionals, and the participation of many notable international scientists, in covering various important polymer-related subjects of concern to Iran and the world at large, including polymer synthesis, processing and properties, as well as issues concerning polymer degradation, stability, and environmental aspects. For the past half a century, the growing concern for advancing human health, quality of life, and – especially in the last few decades – avoiding and combating environmental pollution have shaped and driven scientific activities geared toward the creation of smart materials that are compatible with the

human body, and have prompted scientists and technologists to pursue research using natural and sustainable sources. This book highlights efforts to responsibly address the problems caused by, and which can potentially be solved by, polymers and plastics.

Conference Proceedings

Oxydative Ageing of Polymers

John Wiley & Sons This book aims to rehabilitate kinetic modeling in the domain of polymer ageing, where it has been almost abandoned by the research community. Kinetic modeling is a key step for lifetime prediction, a crucial problem in many industrial domains in which needs cannot be satisfied by the common empirical methods. The book proposes a renewed approach of lifetime prediction in polymer oxidative ageing. This approach is based on kinetic models built from relatively simple mechanistic schemes but integrating physical processes (oxygen diffusion and stabilizer transport), and use property (for instance mechanical failure) changes. An important chapter is dedicated to radiation-induced oxidation and its most important applications: radiochemical ageing at low dose rates and photo-chemical ageing under solar radiation. There is also a chapter devoted to the problem of ageing under coupled oxidation and mechanical loading.

Polymer Composites for Electrical Engineering

John Wiley & Sons Explore the diverse electrical engineering application of polymer composite materials with this in-depth collection edited by leaders in the field Polymer Composites for Electrical Engineering delivers a comprehensive exploration of the fundamental principles, state-of-the-art research, and future challenges of polymer composites. Written from the perspective of electrical engineering applications, like electrical and thermal energy storage, high temperature applications, fire retardance, power cables, electric stress control, and others, the book covers all major application branches of these widely used materials. Rather than focus on polymer composite materials themselves, the distinguished editors have chosen to collect contributions from industry leaders in the area of real and practical electrical engineering applications of polymer composites. The books relevance will only increase as advanced polymer composites receive more attention and interest in the area of advanced electronic devices and electric power equipment. Unique amongst its peers, Polymer Composites for Electrical Engineering offers readers a collection of practical and insightful materials that will be of great interest to both academic and industrial audiences. Those resources include: A comprehensive discussion of glass fiber reinforced polymer composites for power equipment, including GIS, bushing, transformers, and more) Explorations of polymer composites for capacitors, outdoor insulation, electric stress control, power cable

insulation, electrical and thermal energy storage, and high temperature applications
A treatment of semi-conductive polymer composites for power cables In-depth
analysis of fire-retardant polymer composites for electrical engineering An
examination of polymer composite conductors Perfect for postgraduate students and
researchers working in the fields of electrical, electronic, and polymer engineering,
Polymer Composites for Electrical Engineering will also earn a place in the libraries of
those working in the areas of composite materials, energy science and technology,
and nanotechnology.

Binder and Polymer Assisted Powder Processing

ASM International Binder and Polymer Assisted Powder Processing is an engineering
guide to powder-binder-based manufacturing methods. It covers the basic principles,
current and emerging practices, implementation, and cost.

Polymer Composites From Nano- to Macro-Scale

Springer Science & Business Media The use of polymer composites in various
engineering applications has become state of the art. This multi-author volume
provides a useful summary of updated knowledge on polymer composites in general,
practically integrating experimental studies, theoretical analyses and computational
modeling at different scales, i. e. , from nano- to macroscale. Detailed consideration
is given to four major areas: structure and properties of polymer nanocomposites,
characterization and modeling, processing and application of macrocomposites, and
mechanical performance of macrocomposites. The idea to organize this volume
arose from a very impressive workshop - The First International Workshop on
Polymers and Composites at IVW Kaiserslautern: Invited Humboldt-Fellows and
Distinguished Scientists, which was held on May 22-24,2003 at the University of
Kaiserslautern, Germany. The contributing authors were invited to incorporate
updated knowledge and developments into their individual chapters within a year
after the workshop, which finally led to these excellent contributions. The success of
this workshop was mainly sponsored by the German Alexander von Humboldt
Foundation through a Sofia Kovalevskaja Award Program, financed by the Federal
Ministry for Education and Research within the "Investment in the Future Program" of
the German Government. In 2001, the Humboldt Foundation launched this new
award program in order to offer outstanding young researchers throughout the world
an opportunity to establish their own work-groups and to develop innovative
research concepts virtually in Germany. One of the editors, Z.

Polyimides and Other High Temperature Polymers: Synthesis, Characterization and Applications, volume 2

CRC Press This volume documents the proceedings of the Second International Symposium on Polyimides and Other High Temperature Polymers: Synthesis, Characterization and Applications, held in Newark, New Jersey, December 3-6, 2001. Polyimides possess many desirable attributes, so this class of materials has found applications in many technologies ranging from

Failure Criteria in Fibre Reinforced Polymer Composites

The World-Wide Failure Exercise

Elsevier Fiber reinforced polymer composites are an extremely broad and versatile class of material. Their high strength coupled with lightweight leads to their use wherever structural efficiency is at a premium. Applications can be found in aircraft, process plants, sporting goods and military equipment. However they are heterogeneous in construction and anisotropic, which makes making strength prediction extremely difficult especially compared to that of a metal. This book brings together the results of a 12year worldwide failure exercise encompassing 19 theories in a single volume. Each contributor describes their own theory and employs it to solve 14 challenging problems. The accuracy of predictions and the performance of the theories are assessed and recommendations made on the uses of the theories in engineering design. All the necessary information is provided for the methodology to be readily employed for validating and benchmarking new theories as they emerge. Brings together 19 failure theories, with many application examples. Compares the leading failure theories with one another and with experimental data Failure to apply these theories could result in potentially unsafe designs or over design.

Wear of Materials

Elsevier The 14th International Conference on Wear of Materials took place in Washington, DC, USA, 30 March - 3 April 2003. These proceedings contain over two-hundred peer reviewed papers containing the best research, technical developments and engineering case studies from around the world. Biomaterials and nano-

tribology receive special attention in this collection reflecting the general trends in the field. Further highlights include a focus on the new generation of instrumentation to probe wear at increasingly small scales. Approximately ninety communications and case studies, a popular format for the academic community have also been included, enabling the inclusion of the most up-to-date research. Over 200 peer-reviewed papers including hot topics such as biomaterials and nano-tribology Keeping you up-to-date with the latest research from leading experts Includes communications and case studies

Journal of Polymer Science

General papers. Part A

Antimicrobial Polymer-Based Materials for Food Packaging Applications

MDPI Antimicrobial packaging has recently attracted a great deal of interest from the food industry due to the boost in consumer demand for minimally-processed, preservative-free products. Antimicrobial polymeric packaging systems can be considered an emerging technology that could have an important impact on shelf life extension and food safety. Novel polymeric-based packaging materials are continually being developed. This book collects carefully chosen examples of the most recent and relevant advances in the preparation and characterization of antimicrobial composites for food packaging applications. Different polymer nanocomposites with improved packaging properties are discussed along with their mechanisms of action. Further, future perspectives for antimicrobial polymeric nanomaterials are provided.

Cellular Polymers IV

4th International Conference,
5th-6th June 1997 Held at Rapra
Technology Limited, Shawbury,

Shrewsbury

iSmithers Rapra Publishing

Scientific and Technical Aerospace Reports

Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database.

Handbook of Polymer Testing

Physical Methods

CRC Press The Handbook of Polymer Testing: Physical Methods provides virtually currently used techniques for measuring and testing the physical properties of polymers. A concise but detailed technical guide to the physical testing methods of synthetic polymers in plastics, rubbers, cellular materials, textiles, coated fabrics, and composites, the book analyses a wide array of physical parameters and features complete coverage of mechanical, optical, and electrical, and thermal properties. Topics of interest include sample preparation, time-dependent properties, coated fabrics, weathering, permeability, and nondestructive testing.

Preliminary Survey of Polymer-impregnated Rock

Natural and Synthetic Fibers

Yearbook

Polymers

Chemistry and Physics of Modern Materials, 2nd Edition

CRC Press This text follows a broad sequence of preparation, characterization, physical and mechanical properties and structure-property relations. Polymers:

Chemistry and Physics of Modern Materials, Second Edition covers several methods of polymerization, properties, and advanced applications such as liquid crystals and polymers used in the electronics industry. Topics also include Step-Growth, Free Radical Addition, and Ionic Polymerization; Copolymerization; Polymer Stereochemistry and Characterization; Structure-Property Relationship; Polymer Liquid Crystals; and Polymers for the Electronics Industry.

Novel Matrix Resins for Composites for Aircraft Primary Structures, Phase 1

Concrete-polymer Materials

Second Topical Report

Polymers

The Environment and Sustainable Development

John Wiley and Sons * Timely information on the environmental impact of polymer recycling. * Ample sample questions and answers in chapters. * Provides material on the economics and legislation of recycling, and on LCA. * Examines the advantages and disadvantages of polymer recycling.