Inorganic And Organometallic Macromolecules Design And Applications

In the ten years since the scientific rationale for the design, synthesis and application of inorganic and organometallic polymers (IOPs) was first conceptualised, we have witnessed the first tentative exploration of IOPs as precursors to new materials, with efforts focusing on the design and synthesis of novel ceramic precursors. Developing expertise led to precursor studies combined with the characterisation of the transformation processes that occur when IOPs are converted to ceramic materials. Now at maturity, the science presented in this volume reveals the polymer precursor approach to materials synthesis together with examples of processing ceramic shapes for a range of mechanical properties, the development of sophisticated, noninvasive analytical techniques, and IOP design rationales relying on well-defined processing-property relationships. The production of multifunctional IOPs is described, providing ion conductivity, gas sensing, bioactivity, magnetic properties, etc., combined with processability. The existence of well-defined IOPs and the exquisite control that can be exerted on sol-gel systems now provide access to such a variety of mixed organic-organometallic and/or inorganic hybrid systems that their exploitation is likely to develop into an entirely new field of materials chemistry. Future exciting avenues of research are also being opened up with the advent of buckyballs, Met-Cars, dopable

preceramics, rigid-rod organometallics, and molecular tinkertoys.

This completely revised and enlarged English edition of the original Russianbook deals with the identification and separation of charged particles in high energy physics experiments. Proportional drift and streamer chambers as well as ionization measurements with cloud, spark, and ionization chambers are discussed. Both scientists and advanced undergraduate students specializing in high energy or nuclear physics will find useful information for planning and performing ionization measurements and their analyses.

As the first polymer book to receive the CHOICE Outstanding Academic Title distinction (2007), Introduction to Polymer Chemistry provided undergraduate students with a much-needed, well-rounded presentation of the principles and applications of natural, synthetic, inorganic, and organic polymers. With an emphasis on the environment and green chemistry and materials, this second edition continues that tradition, offering detailed coverage of natural and synthetic giant molecules, inorganic and organic polymers, elastomers, adhesives, coatings, fibers, plastics, blends, caulks, composites, and ceramics. Using simple fundamentals, the author shows how the basic principles of one polymer group can be applied to all of the other groups. He covers synthesis and polymerization reactions, reactivities, techniques for characterization and analysis, energy absorption and thermal conductivity, physical and optical properties, and practical applications. This edition also addresses environmental concerns and green

polymeric materials, including biodegradable polymers and microorganisms for synthesizing materials. Brief case studies are woven within the text as historical accounts to illustrate various developments and the societal and scientific contexts in which these changes occurred. Introduction to Polymer Chemistry, Second Edition remains the premier text for understanding the behavior of polymers while offering new material on environmental science. Building on undergraduate work in foundational courses, the text fulfills the American Chemical Society Committee on Professional Training (ACS CPT) in-depth course requirement. It also provides a test bank with upon qualifying course adoption.

One of the most important issues, when a nanomaterial is designed, is to control the synthetic pathways to ensure the final desired product. A combination of dry and wet procedures, as well as chemical and physical methodologies, it is possible to successfully prepare new multifunctional nanomaterials, often as a result of multidisciplinary cooperation between chemists, physics, biologist, physicians, material engineers, etc. Drug delivery, environmental detection of contaminants, and many industrial applications directly rely on properties such as water solubility, permeability, cell penetration, shape control, and size of the monodispersed nanoparticle, among others. Functionalized nanomaterials play a crucial role in modern research areas because of their unique physical and chemical properties, explored in many different fields including medicine and biology, new materials, pharmacology as drug delivery

systems, and in environmental analysis for sensing new contaminants, among other technical and industrial applications. For future technological applications, the rational design of these multifunctional nanomaterials is critical, and often depends on the excellent control of the organic and inorganic chemical reactions involved during production. The success of their applications relies directly on the photophysical properties created in the final material, including the emission of light or colorimetric responses, water solubility, selectivity, sensitivity, stability, etc. For example, from an analytical point of view, the detection and quantification of emerging analytes is directly dependent on the selectivity and sensitivity showed by the material in a complex media.

The book covers silicon, phosphorus, sulfur, tin and germanium based inorganic polymers. It also includes chapters on organometallic polymers, transition metal based coordination polymers and geopolymers. The book is ideal for students and career starters in the industry.

Updated to reflect a growing focus on green chemistry in the scientific community and in compliance with the American Chemical Society's Committee on Professional Training guidelines, Carraher's Polymer Chemistry, Eighth Edition integrates the core areas that contribute to the growth of polymer science. It supplies the basic understanding of polymers essential to the training of science, biomedical, and engineering students. New in the Eighth Edition: Updating of analytical, physical, and special characterization techniques Increased emphasis on carbon nanotubes, tapes

and glues, butyl rubber, polystyrene, polypropylene, polyethylene, poly(ethylene glycols), shear-thickening fluids, photo-chemistry and photophysics, dental materials, and aramids New sections on copolymers, including fluoroelastomers, nitrile rubbers, acrylonitrile-butadiene-styrene terpolymers, and EPDM rubber New units on spliceosomes, asphalt, and fly ash and aluminosilicates Larger focus on the molecular behavior of materials, including nano-scale behavior, nanotechnology, and nanomaterials Continuing to provide a user-friendly approach to the world of polymeric materials, the book allows students to integrate their chemical knowledge and establish a connection between fundamental and applied chemical information. It contains all of the elements of an introductory text with synthesis, property, application, and characterization. Special sections in each chapter contain definitions, learning objectives, questions, and additional reading, with case studies woven into the text fabric. Symbols, trade names, websites, and other useful ancillaries appear in the appendices to supplement the text.

Reflecting the growing volume of published work in this field, researchers will find this book an invaluable source of information on current methods and applications.

This book presents the foundations of the science of polymer derived ceramics, enriched with many descriptions of applications. Written by a team of selected researchers, the text is a systematic, comprehensive introduction to all phases of polymer derived ceramics from synthesis strategies through properties measurement,

and applications. New material is given on the nanolevel structure of PDCs, and it is shown how nano-sized modifications can alter and improve the properties of polymer derived ceramics, including high chemical durability, oxidation resistance, luminescence, and piezo-resistivity. Groundbreaking work is also described on novel precursors such as stoichiometric SiC, BN, and SiBCN ceramics. In terms of technology, this volume explains how PDCs are fabricated and how these novel materials are used in membranes, filters, MEMS, fibers, and micro-components. This book covers: synthesis, structure, properties and applications; strategies for characterizing and synthesizing PDCs; and, original research on pre-ceramic PDC precursors.

This book presents these important facts: a) The mechanism of anionic polymerization, a more than 50-year challenge in polymer chemistry, has now become better understood; b) Precise synthesis of many polymers with novel architectures (triblock, multi-block, graft, exact graft, comb, cyclic, many armed stars with multi-components, dendrimer-like hyper-branched, and their structural mixed (co)polymers, etc.) have been advanced significantly; c) Based on such polymers, new morphological and self-organizing nano-objects and supra molecular assemblies have been created and widely studied and are considered nanodevices in the fields of nano science and technology; d) New high-tech and industrial applications for polymeric materials synthesized by anionic polymerization have been proposed. These remarkable developments have

taken place in the last 15 years. Anionic polymerization continues to be the only truly living polymerization system (100 % termination free under appropriate conditions) and consequently the only one with unique capabilities in the synthesis of well-defined (i.e., precisely controlled molecular weight, nearly mono-disperse molecular weight distribution, structural and compositional homogeneity) complex macromolecular architectures. This book, with contributions from the world's leading specialists, will be useful for all researchers, including students, working in universities, in research organizations, and in industry.

The past two decades have seen tremendous developments in the field of metal- and metalloid-containing macromolecules. The design of new monomers containing metal and metalloid elements and their subsequent polymerization has resulted in a vast array of inorganic and organometallic polymers with interesting properties and applications. This volume features 30 articles based on presentations given in the Metal- and Metalloid-Containing Macromulecules Symposium at the 39th IUPAC Congress and 86th Conference of the Canadian Society for Chemistry in Ottawa from August 10-15, 2003. The articles, written by some of the leading researchers in the field, describe the synthesis, properties and applications of inorganic and organometallic polymers and the current focuses of research in these fields. The purpose of this symposium was to generate dialogue between these researchers and to allow them to present some of their most recent findings.

Carraher's Polymer Chemistry, Tenth Edition integrates the core areas of polymer science. Along with updating of each chapter, newly added content reflects the growing applications in Biochemistry, Biomaterials, and Sustainable Industries. Providing a user-friendly approach to the world of polymeric materials, the book allows students to integrate their chemical knowledge and establish a connection between fundamental and applied chemical information. It contains all of the elements of an introductory text with synthesis, property, application, and characterization. Special sections in each chapter contain definitions, learning objectives, questions, case studies and additional reading.

Advances in Organometallic Chemistry, Volume 74, the latest release in this longstanding serial, is known for its comprehensive coverage of topics in organometallic synthesis, reactions, mechanisms, homogeneous catalysis, and more. It is ideal for a wide range of researchers involved in organometallic chemistry, with this updated release including chapters on Metal dendrimers used in biomedical applications, Sigma-bond activation reactions induced by unsaturated osmium (IV) complexes with bulky phosphines, Base metal pincer complexes, and more. Contains contributions from leading authorities in the field of organometallic chemistry Covers topics in organometallic synthesis, reactions, mechanisms, homogeneous catalysis, and more Informs and updates readers on the latest developments in the field Carefully edited to provide easy-to-read material

This book deals with the chemistry of polymeric metal chelates. The main results and the production and chemical structure of polymers with chelate units as well as the specificity of metal complex binding of different structure are presented here. This book also reveals the transformations which components undergo in the course of chelation. Special attention is paid not only to synthetic but also to natural (including living) systems. The usage of polymeric metal chelates and their development are examined. The related research was performed for chelates with chain structure. This book is useful to researchers being active in synthesis and design of macromolecular metal chelates

Dr. George P. Thomon, Nobel Laureate in Physics said, "We have labelled civilizations by the main materials which they have used: The Stone Age, the Bronze Age and the Iron Age ••• a civilization is both developed and limited by the materials at its disposal. Today, man lives on the boundary between the Iron Age and a New Materials Age." The ever more stringent requirements for materials to accomplish specific functions and withstand extreme conditions, as dictated by the needs of industry and defense, con tinue to spur ever more intensive research in Materials Science. According to the recent report "Trends and Opportunities in Materials Research" a vital goal of materials research is to design synthesize and fabricate in high yield, new materials with properties that can be pre dicted, varied and controlled. In the past this has been a fairly empirical process, but as we gain more comprehensive understanding of the

behavior of matter on an atomic and molecular scale this goal becomes ever more attain able. An important recent trend is the increasing sophistication and power of theoretical approaches. Aided by the development of computers and versa tile numerical techniques, as well as concepts from statistical mechanics, theorists are beginning to confront the complexity of real materials. Important advances are expected through a concentrated attack on model systems in which the theorist, experimental scientist and engineer all work together towards designing new materials and controlling their properties.

Continuing the tradition of its previous editions, the third edition of Introduction to Polymer Chemistry provides a well-rounded presentation of the principles and applications of natural, synthetic, inorganic, and organic polymers. With an emphasis on the environment and green chemistry and materials, this third 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, the 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 addresses environmental concerns and green polymeric materials, including biodegradable polymers and microorganisms for

synthesizing materials. Case studies woven within the text illustrate various developments and the societal and scientific contexts in which these changes occurred. Now including new material on environmental science, Introduction to Polymer Chemistry, Third Edition remains the premier book for understanding the behavior of polymers. Building on undergraduate work in foundational courses, the text fulfills the American Chemical Society Committee on Professional Training (ACS CPT) in-depth course requirement.

This volume is part of the Ceramic Engineering and Science Proceeding (CESP) series. This series contains a collection of papers dealing with issues in both traditional ceramics (i.e., glass, whitewares, refractories, and porcelain enamel) and advanced ceramics. Topics covered in the area of advanced ceramic include bioceramics, nanomaterials, composites, solid oxide fuel cells, mechanical properties and structural design, advanced ceramic coatings, ceramic armor, porous ceramics, and more.

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.

Organosilicon Compounds provides readers with the state-of-the-art status of organosilicon chemistry, including its theoretical, synthetic, physico-chemical and applied aspects. By including high quality content in a key strategic signing area, this work is a strong addition to chemistry offerings in organic, main group and organometallic research. Organosilicon chemistry deals with compounds containing carbon–silicon bonds, an essential part of organic and organometallic chemistry. This book presents the many milestone in the field that have been discovered during the last few years, also detailing its usage in commercial products, such as sealants, adhesives and coatings. Features valuable contributions from prominent experts who cover both fundamental (theoretical, synthetic, physico-chemical) and applied

(material science, applications) aspects Covers important breakthroughs in the field, along with historically significant achievements Includes applied information for a wide range of specialists, from junior and senior researchers (from both academia and industry) working in organometallic, organosilicon, main group element, transition metal, industrial silicon chemistry, and more

This textbook is intended to give an understanding of the basic principles that constitute the field of non-conventional polymers containing inorganic and organometalic units as the repeating units. Each chapter will be self-explanatory with a good background so that it can be easily understood at the senior undergraduate level. The principles involved in the preparation of these polymers, their characterisation and their applications will be discussed. Basic inorganic chemistry required for the understanding of each topic is presented so that the content of the chapter is readily understood. All the major inorganic and organometallic polymers such as polyphosphazenes, polysilanes, polysiloxanes, poly-thiazyl, poly-ferrocenes and other polymers containing main group elements will be dealt with.

This book has its origins in courses taught by the author to various und- graduate and graduate students at the Indian Institute of Technology, K- pur, India. The diversity of inorganic chemistry and its impact on polymer chemistry has been profound. This subject matter has grown considerably in the last decade and the need to present it in a coherent manner to young minds is a pedagogic challenge. The aim of this book is to present to the students an introduction to the developments in Inorganic and - ganometallic polymers. This book is divided into eight chapters. Chapter 1 provides a general overview on the challenges of Inorganic polymer synthesis. This is f- lowed by a survey of organic polymers and also includes some

basic f- tures of polymers. Chapters 3-8 deal with prominent families of inorganic and organometallic polymers. Although the target group of this book is the undergraduate and graduate students of chemistry, chemical engineering and materials science it is also hoped that chemists and related scientists in industry would find this book useful. I am extremely thankful to my wife Sudha who not only encouraged me throughout but also drew all the Figures and Schemes of this book. I also thank my children Adithya and Aarathi for their constant concern on the progress of this book. I express my acknowledgment to the editorial team of Springer-Verlag for their cooperation.

This ready reference is the first to collate the interdisciplinary knowledge from materials science, bioengineering and nanotechnology to give an in-depth overview of the topic. As such, it provides broad coverage of combinations between inorganic materials and such key biological structures as proteins, enzymes, DNA, or biopolymers. With its treatment of various application directions, including bioelectronic interfacing, tissue repair, porous membranes, sensors, nanocontainers, and DNA engineering, this is essential reading for materials engineers, medical researchers, catalytic chemists, biologists, and those working in the biotechnological and semiconductor industries.

Proceedings of the NATO Advanced Research Workshop, Cap d'Agde, France, September 9-14, 1990

Research on metal-containing polymers began in the early 1960's when several workers found that vinyl ferrocene and other vinylic transition metal TI -complexes would undergo polymerization under the same conditions as conventional organic monomers to form high polymers which incorporated a potentially reactive metal as an integral part of the polymer

structures. Some of these materials could act as semi conductors and possessed one or two dimensional conductivity. Thus applications in electronics could be visualized immediately. Other workers found that reactions used to make simple metal chelates could be used to prepare polymers if the ligands were designed properly. As interest in homogeneous catalysts developed in the late 60's and early 70's, several investigators began binding homogeneous catalysts onto polymers, where the advantage of homogeneous catalysis - known reaction mechanisms and the advantage of heterogeneous catalysis - simplicity and ease of recovery of catalysts could both be obtained. Indeed the polymer matrix itself often enhanced the selectivity of the catalyst. The first symposium on Organometallic Polymers, held at the National Meeting of the American Chemical Society in September 1977, attracted a large number of scientists interested in this field, both established investigators and newcomers. Subsequent symposia in 1977, 1979, 1983, and 1987 have seen the field mature. Hundreds of papers and patents have been published.

This book is not going to be an exhaustive survey covering all aspects of rational drug design. Instead, it is going to provide critical know-how through real-world examples. Relevant case studies will be presented and analyzed to illustrate the following: how to optimize a lead compound whether one has high or low levels of structural information; how to derive hits from competitors' active compounds or from natural ligands of the targets; how to springboard from competitors' SAR knowledge in lead optimization; how to design a ligand to interfere with protein-protein interactions by correctly examining the PPI interface; how to circumvent IP blockage using data mining; how to construct and fully utilize a knowledge-based molecular descriptor system; how to build a reliable QSAR model by focusing on data quality and proper

selection of molecular descriptors and statistical approaches. A Practical Guide to Rational Drug Design focuses on computational drug design, with only basic coverage of biology and chemistry issues, such as assay design, target validation and synthetic routes. Discusses various tactics applicable to daily drug design Readers can download the materials used in the book, including structures, scripts, raw data, protocols, and codes, making this book suitable resource for short courses or workshops Offers a unique viewpoint on drug discovery research due to the author's cross-discipline education background Explores the author's rich experiences in both pharmaceutical and academic settings

The Polymeric Materials Encyclopedia presents state-of-the-art research and development on the synthesis, properties, and applications of polymeric materials. This groundbreaking work includes the largest number of contributors in the world for a reference publication in polymer science, and examines many fields not covered in any other reference. With multiple articles on many subjects, the encyclopedia offers you a broad-based perspective on a multitude of topics, as well as detailed research information, figures, tables, illustrations, and references. Updates published as new research unfolds will continue to provide you with the latest advances in polymer science, and will keep the encyclopedia at the forefront of the field well into the future. From novices to experienced researchers in the field, anyone and everyone working in polymer science today needs this complete assessment of the state of the art. The entire 12-volume set will be available in your choice of printed or CD-ROM format. This widely-acclaimed serial contains authoritative reviews that address all aspects of

organometallic chemistry, a field which has expanded enormously since the publication of Volume 1 in 1964. Almost all branches of chemistry and material science now interface with organometallic chemistry--the study of compounds containing carbon-metal bonds. Organometallic compounds range from species which are so reactive that they only have a transient existence at ambient temperatures to species which are thermally very stable. Organometallics are used extensively in the synthesis of useful compounds on both large and small scales. Industrial processes involving plastics, polymers, electronic materials, and pharmaceuticals all depend on advancements in organometallic chemistry. In basic research, organometallics have contributed inter alia to: * Metal cluster chemistry * Surface chemistry * The stabilization of highly reactive species by metal coordination * Chiral synthesis * The formulation of multiple bonds between carbon and the other elements and between the elements themselves This book is an essential reference work for the academic and industrial chemist and will provide up-to-date material at the cutting edge of chemistry research. In basic research, organometallics have contributed inter alia to: Metal cluster chemistry Surface chemistry The stabilization of highly reactive species by metal coordination Chiral synthesis The formulation of multiple bonds between carbon and the other elements and between the elements themselves

New materials are required to solve global challenges such as the growing energy demand and reducing the threat of new and re-emerging diseases and infections.

Metallopolymers is an exciting and promising area of research and this book focuses on the strategy of incorporating transition metals into macromolecules to design functional materials for addressing such problems. The book starts with an introduction to current global challenges and the role of materials science in tackling these, it then discusses the fundamentals of metallopolymers and their synthesis. The final chapters look at specific applications of the materials from photovoltaics and light-emitting diodes for energy conservation, to biological sensors and drug delivery platforms. Written by leading experts in the field, this book is an ideal reference for students and researchers working in polymer chemistry, organometallic chemistry and materials science interested in both the polymers and its applications in energy and health.

The IUPAC 8th International Symposium on Macromolecule-Metal Complexes (MMC-8 Tokyo) was held at the International Conference Center of Waseda University, Tokyo in September 1999. Topic areas presented included several basic and applied topics in the field of advanced MMC such as preparation, characterization and fundamental aspects, macromolecules for advanced technologies including the sub-topics of electron- and ion conductors, separation, adsorption, transport of gas molecules, electronic-, magnetic-, photonic properties, catalysis and photocatalysis, liquid crystals, and biological-, medical- and environmental use.

This important work is based on the editors' symposium at the 2005 ACS meeting in Washington, DC. The contents include an emphasis on main-group polymers, including

boron. The chapters are not simply journal articles, but have real added value as the editors have reviewed the general area by placing the work into a larger perspective. This book will be required reading for scientists in a number of disciplines including chemical engineers and physics researchers.

Keynote and lectures from invited speakers given at the Se- cond Pacific Polymer Conference in Otsu, Japan, are collec- ted in this book. Eminent Polymer Scientists from both aca- demic and industrial fields around the Pacific Basin contri- buted on the following topics: - Polymer Synthesisand Ractions - Polymer Characterization - Structure-Property-Relationships - High Performance Polymers - Bio-Related Polymers With contributions by H.R. Allcock, R.G. Davidson, T. Inoue, Y.H. Kim, E.A. McCullough, J.E. McGrath, G.F. Meijs, T. Nishi, Y.Nishida, I. Noda, R.M. Nowak, M. Okamoto, R.E. Prud'homme, J.P. Riggs, D.N. Schulz, D.H. Solomon, J. Sunamoto, M. Takayanagi, a.o.

Engineered Nanoparticles: Structure, Properties and Mechanisms of Toxicity is an indispensable introduction to engineered nanomaterials (ENM) and their potential adverse effects on human health and the environment. Although research in the area of pharmacology and toxicology of ENM is rapidly advancing, a possible correlation between their physicochemical properties and biomedical properties or toxicity is not yet fully understood. This understanding is essential to develop strategies for the safe applications and handling of ENM. The book comprehensively defines the current

understanding of ENM toxicity, first describing these materials and their physicochemical properties, and then discussing the toxicological theory and methodology before finally demonstrating the potential impact of ENM on the environment and human health. It represents an essential reference for students and investigators in toxicology, pharmacology, chemistry, material sciences, medicine, and those in related disciplines who require an introduction to ENM and their potential toxicological effects. Provides state-of-the-art physicochemical descriptions and methodologies for the characterization of engineered nanomaterials (ENM) Describes the potential toxicological effects of ENM and the nanotoxicological mechanisms of action Presents how to apply theory to practice in a public health and risk assessment setting

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The main aim of this book is to provide a complete picture of current research on phosphazene compounds carried out around the world. The book opens with a general introduction, then moves on to cover synthetic aspects of phosphazene polymers, their characterization in solution and from the theoretical, thermal, and mechanical points of view; application aspects of poly(organophosphazenes); and the synthesis, characterization, and practical utilization of cyclophosphazenes. There is particular focus on the use of cyclophosphazenes as hydraulic fluids and additives, as cores for

star polymers or dendrimers, and as starting substrates for supramolecular chemistry and nanostructured materials. The spectroscopic characterization of these compounds by NMR and Raman techniques is also discussed. Annotation : 2004 Book News, Inc., Portland, OR (booknews.com).

Introduction to Polymer Chemistry provides undergraduate students with a much-needed, well-rounded presentation of the principles and applications of natural, synthetic, inorganic, and organic polymers. With an emphasis on the environment and green chemistry and materials, this fourth edition continues to provide detailed coverage of natural and synthetic giant molecules, inorganic and organic polymers, elastomers, adhesives, coatings, fibers, plastics, blends, caulks, composites, and ceramics. Building on undergraduate work in foundational courses, the text fulfills the American Chemical Society Committee on Professional Training (ACS CPT) in-depth course requirement

The series Advances in Dendritic Macromolecules aims to cover the synthesis and supramolecular chemistry of dendritic or cascade super-molecules as well as their less perfect hyperbranched cousins. In Volume 3, Chapter 1 describes the synthesis and characterization of dendrimers and hyperbranched polyesters, both based on 2,2-bis(hydroxymethyl)propionic acid, as the AB2-monomer. Chapter 2, discusses the advantages and drawbacks of dendritic molecular architectures necessary to create polymeric organic magnetic materials. In Chapter 3, Balzani and colleagues delineate

their contributions to the field of polynuclear transition metal complexes in the design and construction of dendritic nanostructures; these luminesence and redox-active complexes suggest their role as photochemical molecular devices operating by photoinduced energy and electron transfer processes. Chapter 4, reviews the overall progress on redox-active dendrimers, especially as redox catalysts, organic conductors, modified electrodes, and models for electron transfer proteins. Chapter 5, summarizes the pioneering research in organometallic dendritic macromolecules and then delineates the redox properties of a series of silicon-based ferrocenyl-containing dendrimers.

The first book to provide a broad overview of all the major facets of coordination polymer research in one place.