Read PDF Polyolefins 50 Years After Ziegler And Natta Ii Polyolefins By Metallocenes And Other Single Site Catalysts Advances In Polymer Science

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Catalyst Design for Tailor-Made Polyolefins

Alkenes

Catalytic olefin insertion polymerization has undergone dramatic changes in recent years, from both scientific and commercial points of view. The boundaries originally determined by Karl Ziegler have finally been exceeded and insertion polymerization is now a commercially attractive process and environmentally sound. On September 28 and 29, 2000, BASF AG hosted the Conference on Insertion Polymerization in Ludwigshafen, Germany. Experts from around the world gathered to present and discuss the state-of-the-art in insertion polymerization, with special emphasis on recent scientific breakthroughs, industrial applications and future prospects. This volume of Macromolecular Symposia contains many of the papers presented and provides an overview of the current state and predicted directions of insertion polymerization research and technology.

Papers Presented at the Meeting

Ziegler-Natta Catalysts and Polymerizations reviews the general aspects of Ziegler-Natta catalysts and polymerizations of olefins, dienes, and many other types of monomers. Topics covered include the physical state of the polymer during polymerization; modification of Ziegler-Natta catalysts by third components; and termination of polymer chain growth. The oxidation state of catalysts and active centers is also discussed, along with copolymerizations and block polymerizations. This book is comprised of 23 chapters and begins with an overview of Ziegler-Natta catalysts and polymerizations, their historical origins, scientific and commercial importance, and major advances in polymer science. The next chapter focuses on definitions and stereochemistry of Ziegler-Natta catalysts, together with analytical methods used to identify and quantitatively measure their structures. Some of the polymers produced commercially with Ziegler-Natta catalysts are considered. The discussion then turns to mechanisms for initiating and propagating olefins; mechanisms for stereochemical control of conjugated and nonconjugated dienes; and the basic kinetic parameters that characterize Ziegler-Natta polymerizations. This monograph is written especially for chemistry and engineering graduate students and for industrial chemists, engineers, and managers who may become involved in a Ziegler-Natta problem.

Polyolefin Blends

Polyolefin is one of the most important materials produced in the chemical industry. The research in this area is not only scientifically challenging but also potentially economically...
rewarding. Many research activities, such as developing new catalysts, understanding polymerization mechanisms, modifying the products and improving the physical properties of the material, have been proceeding at a very fast pace, especially in the industrial laboratories in many countries. It is very important and exciting to bring researchers active in this area, from both the academic and industrial sectors, to communicate their new findings. To the best of my knowledge, a symposium covering diverse aspects of polyolefin research has not been held in the USA for many years. With this in mind, a symposium entitled "Recent Advances in Polyolefins" was held at the National ACS Meeting in Washington D.C., August 23-28, 1992. This symposium covered both scientific and technological aspects of polyolefin, which included four sections: Catalyst/Polymerization, Functionalization of Polyolefins, Blends of Polyolefins with Other Polymers, and Applications. More than 50 papers, including 20 foreign contributions, were presented during three and a half days of meetings. It was truly exciting to see key researchers from both academic and industrial laboratories exchange their recent results and to share the important developments in polyolefins. This volume is based on the same spirit and is intended to capture some of the most recent and emerging technical achievements presented at the meeting.
Forty years after Ziegler's discovery of the "Aufbaureaktion" and low-pressure ethene polymerization, transition metal catalyzed olefin and diolefin polymerization continues to represent one of the most active and exciting areas. Since the 1980s, outstanding scientific innovations and process improvements have revolutionized polyolefin technology and greatly simplified polymerization processes. Well-defined catalyst systems are now at hand and facilitate the understanding of basic reaction mechanisms and correlations between catalyst structures, polymer microstructures, and polymer properties. This book reviews some of the modern approaches in organometallic chemistry, Ziegler-Natta catalysis, polymerization processes, design of novel materials, and the modelling in catalyst and process development.

Polypropylene and other Polyolefins

Summarizes the significant experimental results on the functionalization of polyolefins and classifies them into several chemical methods. This book also provides information on the functional polyolefin materials. It covers: chemical approaches in the functionalization of polyolefins, and polyolefin materials and their potential applications.

Encyclopedia of Catalysis

This handbook provides an exhaustive description of polyethylene. The 50+ chapters are written by some of the most experienced and prominent authors in the field, providing a truly unique view of polyethylene. The book starts with a historical discussion on how low density polyethylene was discovered and how it provided unique opportunities in the early days. New catalysts are presented and show how they created an expansion in available products including linear low density polyethylene, high density polyethylene, copolymers, and polyethylene produced from metallocene catalysts. With these different catalyst systems a wide range of structures are possible with an equally wide range of physical properties. Numerous types of additives are presented that include additives for the protection of the resin from the environment and processing, fillers, processing aids, anti-fogging agents, pigments, and flame retardants. Common processing methods including extrusion, blown film, cast film, injection molding, and thermoforming are presented along with some of the more specialized processing techniques such as rotational molding, fiber processing, pipe extrusion, reactive extrusion, wire and cable, and foaming processes. The business of polyethylene including markets, world capacity, and future prospects are detailed. This handbook provides the most current and complete technology assessments and business practices for polyethylene resins.
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...continue...
Catalysts are required for a variety of applications and researchers are increasingly challenged to find cost effective and environmentally benign catalysts to use. This volume looks at modern approaches to catalysis and reviews the extensive literature including direct methane conversion, nanocomposite catalysts for transformation of biofuels into syngas and hydrogen, and catalytic wet air oxidation technology for industrial wastewater treatment. Appealing broadly to researchers in academia and industry, it will be of great benefit to any researcher wanting a succinct reference on developments in this area now and looking to the future.

Polyolefins: 50 years after Ziegler and Natta II

The discoveries of organometallic catalysts for olefin polymerization by Karl Ziegler and that of stereoregular olefin polymers by Giulio Natta are probably the two most important achievements in the areas of catalysis and polymer chemistry in the second half of this century. They led to the development of a new branch of chemical industry, and to a large volume production of high-density and linear low-density polyethylene, isotactic polypropylene, ethylene-propylene rubbers, isotactic poly 1-butene, and poly-4-methyl-l-pentene. These discoveries merited the Nobel prize, which was awarded to K. Ziegler and G. Natta in 1963. The initial works of Ziegler and Natta were followed by an "explosion" of scientific papers and patents covering all aspects of polymerization chemistry, catalyst synthesis, and polymerization kinetics as well as the structural, chemical, physical, and technological characteristics of stereo regular polyolefins, polydienes, and olefin copolymers. It is sufficient to say that in the twenty-five years after the first publications more than 15,000 papers and patents appeared on subjects related to the area. The development brought about the establishment of several prominent groups of scientists occupied with the study of olefin polymerization. The most important of these were scientific schools in Italy, Germany, England, the United States, Japan, the Soviet Union, Czechoslovakia, and Venezuela. In addition, many major chemical and petrochemical corporations throughout the world established laboratories devoted to the development of the technology of catalyst synthesis and olefin polymerization.

Applications of EPR and NMR Spectroscopy in Homogeneous Catalysis

This is the fascinating, first-hand story of the groundbreaking invention by Nobel prizewinner Karl Ziegler and the patent fights between his research team at the Max Planck Institute of Carbon Research in Germany and the "giants" of the petrochemicals industry, such as Du Pont and Esso. The author joined Ziegler's group throughout the entire period, providing an entertaining case study of an innovative chemical discovery, presenting interesting historical as well as scientific information. An impressive example of the fights between academia and industry concerning patent rights and the economic utilization of academic research innovations.

Catalysis

Advances in Polymer Science enjoys a longstanding tradition and good reputation in its community. Each volume is dedicated to a current topic, and each review critically surveys one aspect of that topic, to place it within the context of the volume. The volumes typically summarize the significant developments of the last 5 to 10 years and discuss them critically, presenting selected examples, explaining and illustrating the important principles, and bringing together many important references of primary literature.
Recent development of olefin polymerization catalysts has caused marked changes in both industrial and academic research. Industrial use of homogeneous metallocene catalysts has already begun in the fields of high density polyethylene and syndiotactic polypropylene. Moreover, important data have been obtained from academic investigations which have proved useful for understanding conventional heterogeneous Ziegler-Natta catalysts. From the industrial viewpoint, however, heterogeneous high-yield catalysts seem to be more important. The present volume contains invited lectures and contributed papers. The following topics are covered: (1) Heterogeneous Catalysts, (2) Metallocene Catalysts and (3) New Trends in the Polyolefin Industry.

Polymers, Patents, Profits

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Recent years have witnessed the growth of macromolecular concepts and nanotechnology-based innovations in polymer science. Processing and Characterization of Multicomponent Polymer Systems is a collection of contributions from materials science experts across the globe. The fabrication and characterization of polymeric systems are still important in the study of materials science, and the quality measurements of newly designed polymeric stuffs demand systematic and new characterization protocols. The volume highlights some of the latest innovations and principles of nanostructured polymeric materials and polymer nanocomposites. It is devoted to novel architectures at the nano-level with an emphasis on new synthesis and characterization methods.

Organized into several sections, the chapters cover a selection of topics on:

1. Biocomposites and nanocomposites
2. Interpenetrating polymeric networks and nanostructured materials
3. Theoretical protocols for polymers and clusters
4. Special topics in polymer processing and polymer coating

This survey will be an important resource for those involved in the field of polymer materials design for advanced technologies, including scientists, engineers, and budding researchers working in the area of polymer science and nanotechnology.

Olefin Upgrading Catalysis by Nitrogen-based Metal Complexes II: State-of-the-art and Perspectives provides a critical review of the state-of-the-art developments in industrially relevant processes connected to efficient and selective olefin upgrading. Specific attention is devoted to catalysts containing imine- and amine-based ligands. All the chapters in this book have been designed to provide a systematic account of the vast amount of information available for this type of catalyst as well as to highlight the factors that ultimately control the catalyst's performance and productivity. A comprehensive panorama of catalyst precursors is presented, spanning from group 10 α-diimine complexes and iron and cobalt 2,6-bis(imino)pyridine derivatives, to vanadium, chromium, titanium, zirconium and lanthanide complexes supported by nitrogen-containing ligands. The authors of this collective work are currently involved in the development of imine-based catalysts for efficient and selective olefin upgrading and the majority of them have dedicated most of their scientific career to this important field. In writing this book, their major goal is to transfer as many ideas and experiences as possible to the global audience of scientists engaged in this area of research.

Polypropylene Handbook

This book presents emerging economical and environmentally friendly polymer composites that are free of the side effects observed in traditional composites. It focuses on eco-friendly composite materials using granulated cork, a by-product of the cork industry; cellulose pulp from the recycling of paper residues; hemp fibers; and a range of other environmentally friendly materials procured from various sources. The book presents the manufacturing methods, properties and characterization techniques of these eco-friendly composites. The respective chapters address classical and recent aspects of eco-friendly polymer composites and their chemistry, along with practical applications in the biomedical, pharmaceutical, automotive and other sectors. Topics addressed include...
Ziegler Catalysts

This first comprehensive handbook on this exciting field provides readers with a clear understanding of the current state of the art, ingenious solutions and opportunities. Researchers from academia and industry present such emerging topics as multi-component systems and computational chemistry, as well as the latest developments in competing and complementary technologies. The result is a well-balanced and up-to-date overview.

New Advances in Polyolefins

This book deals with polyolefins prepared via Ziegler-Natta catalysis, from a polymer chemist’s viewpoint, i.e. with emphasis on their preparation and on their basic composition and properties. In addition to chapters on catalysts, polymerization behaviour and polymer properties such as tacticity, crystallinity, morphology etc., a chapter is also devoted to characterization methods. The main part of this work is reserved for an introduction to the Ziegler-Natta process and its historical development.

About the Editors

Prof. Michele Aresta, Chair of the Scientific Committee of CIRCC in Italy and holds the IMM Chair at the Department of Chemical and Biomolecular Engineering at NUS, Singapore. He is author of over 200 papers and Author or Editor of nine books. Prof. Angela Dibenedetto, Associate Professor at the Department of Chemistry of the University of Bari (Italy) focused on carbon dioxide utilization by applying biorefinery concepts; and Director of the Interuniversity Consortium on Chemical Reactivity and Catalysis-CIRCC. Prof. Franck Dumeignil, Deputy Director of the CNRS joint Unit of Catalysis and Chemistry of Solid (UCCS) of Lille University (France); project coordinator of several projects on chemistry, including the EuroBioRef Project for designing next generation biorefineries.

Sustainable Polymer Composites and Nanocomposites

Biorefineries compiles the basic science and technologies used to convert terrestrial and aquatic biomass into essential molecular compounds and polymeric materials. The book provides in depth insights into this fairly recent concept of industrial chemistry that aims to achieve optimal economic profits while minimizing the environmental impact. Chapters written by renowned experts cover, amongst others, the application of catalysis, downstream processing, biomass sourced olefins, lignin biorefinery techniques and biogas. The authors thoroughly examine and explain the value chain for biomass conversion into platform molecules and their transformation into final products. A comprehensive thematic overview on the topic giving beginners access to fundamental concepts is presented. Supplemented by numerous full color figures and tables, the contents impart knowledge about the involved techniques. Advanced students and experts in the field will find the summary of state-of-the-art research and current literature of valuable interest. Explores the enormous potential of biomass conversion as a future source for fuels and chemicals Focuses on both general scientific background and current innovations in the field of biorefinery Targets students and researchers in Chemistry, Chemical Engineering, Biotechnology, and Materials Science About the Editors Prof. Michele Aresta, Chair of the Scientific Committee of CIRCC in Italy and holds the IMM Chair at the Department of Chemical and Biomolecular Engineering at NUS, Singapore. He is author of over 200 papers and Author or Editor of nine books. Prof. Angela Dibenedetto, Associate Professor at the Department of Chemistry of the University of Bari (Italy) focused on carbon dioxide utilization by applying biorefinery concepts; and Director of the Interuniversity Consortium on Chemical Reactivity and Catalysis-CIRCC. Prof. Franck Dumeignil, Deputy Director of the CNRS joint Unit of Catalysis and Chemistry of Solid (UCCS) of Lille University (France); project coordinator of several projects on chemistry, including the EuroBioRef Project for designing next generation biorefineries.

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The completely revised third edition of this four-volume classic is fully updated and now includes such topics as CH-activation and multicomponent reactions. It describes the most important reaction types, new methods and recent developments in catalysis. The internationally renowned editors and a plethora of international authors (including Nobel laureate R. Noyori) guarantee high quality content throughout the book. A "must read" for everyone in academia and industry working in this field.

Introduction to Polymer Chemistry

This book reviews advances in important and practically relevant homogeneous catalytic transformations, such as single-site olefin polymerizations and chemo- and stereo-selective oxidations. Close attention is paid to the experimental investigation of the active sites of catalytic oxidation systems and their mechanisms. Major subjects include the applications of NMR and EPR spectroscopic techniques and data obtained by other physical methods. The book addresses a broad readership and focus on widespread techniques available in labs with NMR and EPR spectrometers.

Encyclopedia of Polymer Science and Technology: , v. 5. Acoustic properties to cyclopentadiene and dicyclopentadiene

This book provides an unparalleled contemporary assessment of hydrocarbon chemistry – presenting basic concepts, current research, and future applications. • Comprehensive and updated review and discussion of the field of hydrocarbon chemistry • Includes literature coverage since the publication of the previous edition • Expands or adds coverage of: carboxylation, sustainable hydrocarbons, extraterrestrial hydrocarbons • Addresses a topic of special relevance in contemporary science, since hydrocarbons play a role as a possible replacement for coal, petroleum oil, and natural gas as well as their environmentally safe use • Reviews of prior edition: "literature coverage is comprehensive and ideal for quickly reviewing specific topics of most value to industrial chemists" (Angewandte Chemie) and "useful for chemical engineers as well as engineers in the chemical and petrochemical industries." (Petroleum Science and Technology)

Long-Term Properties of Polyolefins

Catalysis, the speeding up of a chemical reaction by a substance which itself does not react, is vital not only to the chemical process industry but also to life itself. The six volume Encyclopedia of Catalysis is the definitive A-to-Z reference work covering the most significant aspects of homogenous, heterogeneous, asymmetric, biomimetic, and

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