

Linear Low Density Polyethylene Lldpe Plasticseurope

Comprising over 4,500 definitions, this book provides explanation of the often arcane, English-language terminology that denotes the materials and manufacturing processes used in different phases of the packaging industry. It is suitable for those who use packaging technology.

The complete and authoritative guide to modern packaging technologies —updated and expanded From A to Z, *The Wiley Encyclopedia of Packaging Technology*, Third Edition covers all aspects of packaging technologies essential to the food and pharmaceutical industries, among others. This edition has been thoroughly updated and expanded to include important innovations and changes in materials, processes, and technologies that have occurred over the past decade. It is an invaluable resource for packaging technologists, scientists and engineers, students and educators, packaging material suppliers, packaging converters, packaging machinery manufacturers, processors, retailers, and regulatory agencies. In addition to updating and improving articles from the previous edition, new articles are also added to cover the recent advances and developments in packaging. Content new to this edition includes: Advanced packaging materials such as antimicrobial materials, biobased materials, nanocomposite materials, ceramic-coated films, and perforated films Advanced packaging technologies such as active and intelligent packaging, radio

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frequency identification (RFID), controlled release packaging, smart blending, nanotechnology, biosensor technology, and package integrity inspection Various aspects important to packaging such as sustainable packaging, migration, lipid oxidation, light protection, and intellectual property Contributions from experts in all-important aspects of packaging Extensive cross-referencing and easy-to-access information on all subjects Large, double-column format for easy reference

The scope of this study is to investigate the effect of strain rates on the compressive properties of rice husk reinforced linear low density polyethylene composites under static and dynamic loading. Five different compositions of RH/LLDPE composites will be prepared and mixed using twin screw extruder. Then, the specimens will be compacted using hot press machine. The sample will be compressed under three different strain rates loading at both static and dynamic loading, respectively. Besides, the effect of surface treatment and particle sizes of RH/LLDPE composites under both static and dynamic loading also will be investigated. The specimens will be characterized using Fourier Transform Infrared (FTIR) for compound identification and Scanning Electron Microscopy (SEM) for morphology study. At the end of this study, the compressive properties, strain rate sensitivity and thermal activation volume of the composites are analyzed based on the effect of strain rates toward filler contents, surface treatment and particle sizes.

Recent developments in multifunctional and nanoreinforced polymers have provided

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the opportunity to produce high barrier, active and intelligent food packaging which can help ensure, or even enhance, the quality and safety of packaged foods. Multifunctional and nanoreinforced polymers for food packaging provides a comprehensive review of novel polymers and polymer nanocomposites for use in food packaging. After an introductory chapter, Part one discusses nanofillers for plastics in food packaging. Chapters explore the use of passive and active nanoclays and hidrotalcites, cellulose nanofillers and electrospun nanofibers and nanocapsules. Part two investigates high barrier plastics for food packaging. Chapters assess the transport and high barrier properties of food packaging polymers such as ethylene-norbornene copolymers and advanced single-site polyolefins, nylon-MXD6 resins and ethylene-vinyl alcohol copolymers before going on to explore recent advances in various plastic packaging technologies such as modified atmosphere packaging (MAP), nanoscale inorganic coatings and functional barriers against migration. Part three reviews active and bioactive plastics in food packaging. Chapters investigate silver-based antimicrobial polymers, the incorporation of antimicrobial/antioxidant natural extracts into polymeric films, and bioactive food packaging strategies. Part four examines nanotechnology in sustainable plastics with chapters examining the food packaging applications of polylactic acid (PLA) nanocomposites, polyhydroxyalkanoates (PHAs), starch-based polymers, chitosan and carragenan polysaccharides and protein-based resins for packaging gluten (WG)-based materials. The final chapter presents the safety and

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regulatory aspects of plastics as food packaging materials. With its distinguished editor and international team of expert contributors Multifunctional and nanoreinforced polymers for food packaging proves a valuable resource for researchers in packaging in the food industry and polymer scientists interested in multifunctional and nanoreinforced materials. Provides a comprehensive review of novel polymers and polymer nanocomposites for use in food packaging Discusses nanofillers for plastics in food packaging including the use of passive and active nanoclays and hidrotalcites and electrospun nanofibers Investigates high barrier plastics for food packaging assessing recent advances in various plastic packaging technologies such as modified atmosphere packaging (MAP)

A handbook on polyolefins. This second edition includes new material on the structure, morphology and properties of polyolefin (PO) synthesis. It focuses on synthetic advances, the use of additives, special coverage of PO blends, composites and fibres, and surface treatments. It also addresses the problem of interfacial and superficial phenomena.

All areas of industry are facing increasing pressure from governments and consumers to be more environmentally aware. The food industry is no exception, and an increasing number of companies have made the decision to implement an environmental policy. These organisations will benefit from this book, which has been written to provide a broad but detailed introduction to the topic of environmental issues and their cost

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implications to the food industry. Throughout the text the authors have approached the subject from a practical angle, and have borne in mind the environmental, production or site manager who is grappling with the problem of how to implement such a policy. This book begins by considering the raw materials that are used in the food industry, whether derived from animals, fruit and vegetables, or the products of genetic engineering, as may increasingly be the case in the future. Environmental and cost considerations of food processing operations are then examined, encompassing energy conservation and the control of air, noise and water pollution; all topics that are uppermost in the priorities of the environmental manager. The finished food product also has an impact on its environment, and so the storage, distribution and packaging of foods, post food factory, is discussed in detail. Finally, the principles involved in management accounting for food industry environmental issues are highlighted. All the authors of this book are respected experts in their chosen field, each of whom could have written a complete book on their subject.

This text provides the basic history, molecular structure and intrinsic properties, practical applications and future developments of polyethylene production and marketing - including recycling systems and metallocene technology. It describes commercial processing techniques used to convert raw polyethylene to finished products, emphasizing special properties and end-use applications.

Publisher Description

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Because it is critically important to manufacture quality products, a reasonable balance must be drawn between control requirements and parameters for improved processing method with respect to plastics additives. An important contribution to the commercial polymer industry, *Polymer Blends and Composites* is one of the first books to combine plastics additives, testing, and quality control. The book is a comprehensive treatise on properties that provides detailed guidelines for selecting and using blends and composites for applications. A valuable resource for operators, processors, engineers, chemists, the book serves to stimulate those already active in natural polymer composites.

A comprehensive and accessible textbook, *Food Packaging: Principles and Practice, Second Edition* presents an integrated approach to understanding the principles underlying food packaging and their applications. Integrating concepts from chemistry, microbiology, and engineering, it continues in the fine tradition of its bestselling predecessor - and has been completely updated to include new, updated, and expanded content. The author divides the book's subject matter into five parts for ease-of-use. The first part addresses the manufacture, properties, and forms of packaging materials, placing emphasis on those properties that influence the quality and shelf life of food. The second part then details the various types of deteriorative reactions that foods undergo, examines

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the extrinsic factors controlling their reaction rates, and discusses specific factors influencing shelf life and the methodology used to estimate that shelf life.

Chapters on the aseptic packaging of foods, active and intelligent packaging, modified atmosphere packaging, and microwavable food packaging are explored in the third part, while the fourth part describes packaging requirements of the major food groups. The final section examines the safety and legislative aspects of food packaging. The book also includes over 300 industry abbreviations, acronyms, and symbols, and an expansive index. What's New in the Second Edition: Includes five new chapters and diagrams that explain recent developments in packaging materials and processes Provides the latest information on new and active packaging technologies Presents new, updated, and expanded references Adhering to the highly organized format that made the first edition so straightforward and informative, this latest edition of Food Packaging: Principles and Practice presents students with the most essential and cutting-edge information available. The author maintains a website with more information.

No book has been published that gives a detailed description of all the types of plastic materials used in medical devices, the unique requirements that the materials need to comply with and the ways standard plastics can be modified to

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meet such needs. This book will start with an introduction to medical devices, their classification and some of the regulations (both US and global) that affect their design, production and sale. A couple of chapters will focus on all the requirements that plastics need to meet for medical device applications. The subsequent chapters describe the various types of plastic materials, their properties profiles, the advantages and disadvantages for medical device applications, the techniques by which their properties can be enhanced, and real-world examples of their use. Comparative tables will allow readers to find the right classes of materials suitable for their applications or new product development needs.

This report presents a cost analysis of Linear Low Density Polyethylene (LLDPE) production from polymer grade (PG) ethylene and 1-octene using a solution process. The process under analysis is similar to NOVA Chemicals SCLAIRTECH process. This report examines one-time costs associated with the construction of a United States-based plant and the continuing costs associated with the daily operation of such a plant. More specifically, it discusses: * Capital Investment, broken down by: - Total fixed capital required, divided in production unit (ISBL); infrastructure (OSBL) and contingency - Alternative perspective on the total fixed capital, divided in direct costs, indirect costs and contingency -

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Working capital and costs incurred during industrial plant commissioning and start-up * Production cost, broken down by: - Manufacturing variable costs (raw materials, utilities) - Manufacturing fixed costs (maintenance costs, operating charges, plant overhead, local taxes and insurance) - Depreciation and corporate overhead costs * Raw materials consumption, products generation and labor requirements * Process block flow diagram and description of industrial site installations (production unit and infrastructure) This report was developed based essentially on the following reference(s): EP Patent 0527144, issued to DuPont in 1996 Keywords: Ethene, DuPont Canada, Cyclohexane, Stirred-Reactor, Swing Technology, Multi-Reactor

Demystifies the largest volume manmade synthetic polymer by distilling the fundamentals of what polyethylene is, how it's made and processed, and what happens to it after its useful life is over. Endorsement for Introduction to Industrial Polyethylene "I found this to be a straightforward, easy-to-read, and useful introductory text on polyethylene, which will be helpful for chemists, engineers, and students who need to learn more about this complex topic. The author is a senior polyethylene specialist and I believe we can all benefit from his distillation of knowledge and insight to quickly grasp the key learnings." —R.E. King III; Ciba Corporation (part of the BASF group) Jargon used in industrial polyethylene

technology can often be bewildering to newcomers. Introduction to Industrial Polyethylene educates readers on terminology commonly used in the industry and demystifies the chemistry of catalysts and cocatalysts employed in the manufacture of polyethylene. This concise primer reviews the history of polyethylene and introduces basic features and nomenclatures for this versatile polymer. Catalysts and cocatalysts crucial to the production of polyethylene are discussed in the first few chapters. Latter chapters provide an introduction to the processes used to manufacture polyethylene and discuss matters related to downstream applications of polyethylene such as rheology, additives, environmental issues, etc. Providing industrial chemists and engineers a valuable reference tool that covers fundamental features of polyethylene technology, Introduction to Industrial Polyethylene: Identifies the fundamental types of polyethylene and how they differ. Lists markets, key fabrication methods, and the major producers of polyethylene. Provides biodegradable alternatives to polyethylene. Describes the processes used in the manufacture of polyethylene. Includes a thorough glossary, providing definitions of acronyms and abbreviations and also defines terms commonly used in discussions of production and properties of polyethylene. Concludes with the future of industrial polyethylene.

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Polymers are converted into finished products through a series of steps which include mixing in additives and various types of forming. Following an introduction to polymer science and its importance to various fields, the author describes these processes from a practical, application-oriented perspective. Global suppliers of raw materials, machinery and equipment are also given, making this book an invaluable resource for industry practitioners.

Only a few reported studies have involved the uniaxial orientation of LPDE and even less on LLDPE. It is our purpose to report on characteristics of uniaxially oriented films of LLDPE that contribute to property development. The LLDPE has been coextruded at 25 and at 80 C layered as ribbons within longitudinally split billets of HDPE. The LLPDE so drawn were characterized by thermal analysis, birefringence, elastic recovery and wide-angle x-ray measurements. As a result we can conclude that the drawing of LLDPE at the low temperature produces a relatively high content of monoclinic crystals. Originator supplied keywords include: Orientation; birefringence; elastic recovery; wide-angle x-ray; monoclinic; low-density; polyethylene.

The definitive reference on the properties and applications of polyolefin blends Polyolefins account for more than half of total plastics consumption in the world. In recent years, usage of and research on polyolefin blends have increased

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significantly due to new applications in medicine, packaging, and other fields and the development of novel polyolefins. With a special emphasis on nano- and micro-structures of crystals and phase morphology, Polyolefin Blends condenses and consolidates current information on polyolefins so that the reader can compare, select, and integrate a material solution. Focusing exclusively on the fundamental aspects as well as applications of polyolefin blends, this authoritative reference:

- * Features an introductory chapter that serves as a guide to polyolefin blends
- * Includes chapters covering formulation design, processing, characterization, modeling and simulation, engineering performance properties, and applications
- * Covers polyolefin/polyolefin blends and polyolefin/non-polyolefin blends
- * Discusses miscibility, phase behavior, functionalization, compatibilization, microstructure, crystallization, hierarchical morphology, and physical and mechanical properties
- * Covers new research trends including in-situ reactor blending and reactive processing, such as compatibilization/functionalization in the melt
- * Contains practical examples from open literature sources and commercial products

With chapters contributed by leading experts from several countries, this is a must-have reference for scientists and engineers conducting research on polyolefin blends and for professionals in medical, packaging, and other commodity fields. It is also an

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excellent text for graduate students studying polymer science and polymer processing.

This report reviews the current use of plastics for packaging both by technology and market covering the world in consumption and growth terms as well as material and process developments.

This practical guide begins with general background to the polyethylene family, with price, production and market share information. It describes the basic types of polyethylene including virgin and filled polyethylene, copolymers, block and graft polymers and composites, and reviews the types of additives used in polyethylene. It gives the low down on the properties, including, amongst others, rheological, mechanical, chemical, thermal, and electrical properties. It goes on to describe the processing issues and conditions for the wide range of techniques used for polyethylene, and also considers post-processing and assembly issues. It offers guidance on product design and development issues, including materials selection. It is an indispensable resource for everyone working with this material. The Science and Technology of Flexible Packaging: Multilayer Films from Resin and Process to End Use provides a comprehensive guide to the use of plastic films in flexible packaging, covering scientific principles, properties, processes, and end use considerations. The book brings the science of multilayer films to

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the practitioner in a concise and impactful way, presenting the fundamental understanding required to improve product design, material selection, and processes, and includes information on why one material is favored over another for a particular application, or how the film or coating affects material properties. Detailed descriptions and analysis of the key properties of packaging films are provided from both an engineering and scientific perspective. End-use effects are also covered in detail, providing key insights into the way the products being packaged influence film properties and design. The book bridges the gap between key scientific literature and the practical challenges faced by the flexible packaging industry, providing essential scientific insights, best practice techniques, environmental sustainability information, and key principles of structure design to enable engineers and scientists to deliver superior products with reduced development time and cost. Provides essential information on all aspects of multilayer films in flexible packaging Aids in material selection and processing, shortening development times and delivering stronger products Bridges the gap between scientific principles and key challenges in the packaging industry, with practical explanations to assist practitioners in overcoming those challenges

Chemical Resistance of Thermoplastics is a unique reference work, providing a

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comprehensive cross-referenced compilation of chemical resistance data that explains the effect of thousands of exposure media on the properties and characteristics of commodity thermoplastics. The two volumes cover thermoplastics grouped within the following parts: - Acrylic Polymers and Copolymers - Acrylonitrile Polymers - Cellulosics Polymers - Ionomers - Olefinic Polymers - Polyacetals - Polyacetals - Polyamides - Polycarbonates - Polyesters - Polyurethanes - Polycarbonates - Styrene Copolymers - Styrene Copolymers - Vinyl Chloride Polymers - Vinyl Polymers The single most comprehensive data source covering the chemical resistance properties of high consumption volume commercial thermoplastics A rating number is provided for each test, summarizing the effect of the exposure medium on the given thermoplastic The data covered in the two volumes is also provided as an online publication offering extended navigation and search features

This report presents a cost analysis of Linear Low Density Polyethylene (LLDPE) production from polymer grade (PG) ethylene and 1-hexene using a gas phase process The process examined is similar to Univation UNIPOL and INEOS Innovene G processes. This report was developed based essentially on the following reference(s): (1) US Patent 8957167, issued to Univation in 2015 (2) US Patent 20030171512, issued to Univation in 2003 Keywords: Ethene, PE,

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Gas Reactor, Copolymer

This report presents a cost analysis of Linear Low Density Polyethylene (LLDPE) production from polymer grade (PG) ethylene and 1-butene using a gas phase process. The process examined is similar to Univation UNIPOL and INEOS Innovene G processes. This report examines one-time costs associated with the construction of a United States-based plant and the continuing costs associated with the daily operation of such a plant. More specifically, it discusses: * Capital Investment, broken down by: - Total fixed capital required, divided in production unit (ISBL); infrastructure (OSBL) and contingency - Alternative perspective on the total fixed capital, divided in direct costs, indirect costs and contingency - Working capital and costs incurred during industrial plant commissioning and start-up * Production cost, broken down by: - Manufacturing variable costs (raw materials, utilities) - Manufacturing fixed costs (maintenance costs, operating charges, plant overhead, local taxes and insurance) - Depreciation and corporate overhead costs * Raw materials consumption, products generation and labor requirements * Process block flow diagram and description of industrial site installations (production unit and infrastructure) This report was developed based essentially on the following reference(s): (1) US Patent 8957167, issued to Univation in 2015; (2) US Patent 20030171512, issued to Univation in 2003 Keywords: Ethene, PE, Gas Reactor, Copolymer

This new volume focuses on different aspects of composite systems that are

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associated with research and development, helping to bridge the gap between classical analysis and modern real-life applications. The chapters look at the experimental and theoretical aspects of composite materials, regarding preparation, processing, design, properties, and practical implications. It also presents recent advancements, research, and development prospects of advanced composite materials that provide new solutions for advanced technologies.

This report presents a cost analysis of Linear Low Density Polyethylene (LLDPE) production from polymer grade (PG) ethylene and 1-octene using a solution process. The process under analysis is similar to NOVA Chemicals Advanced SCLAIRTECH process. This report examines one-time costs associated with the construction of a United States-based plant and the continuing costs associated with the daily operation of such a plant. More specifically, it discusses:

- * Capital Investment, broken down by:
 - Total fixed capital required, divided in production unit (ISBL); infrastructure (OSBL) and contingency
 - Alternative perspective on the total fixed capital, divided in direct costs, indirect costs and contingency
 - Working capital and costs incurred during industrial plant commissioning and start-up
- * Production cost, broken down by:
 - Manufacturing variable costs (raw materials, utilities)
 - Manufacturing fixed costs (maintenance costs, operating charges, plant overhead, local taxes and insurance)
 - Depreciation and corporate overhead costs
- * Raw materials consumption, products generation and labor requirements
- * Process block flow diagram and description of industrial site installations

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(production unit and infrastructure) This report was developed based essentially on the following reference(s): US Patent 6319996, issued to Nova Chemical in 2001

Keywords: Ethene, PE, Methypentane, Stirred-Reactor, Dual-Reactor

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 catalysts 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

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business practices for polyethylene resins.

This book is the definitive reference source for professionals involved in the conception, design and specification stages of a construction project. The theory and practical aspects of each material is covered, with an emphasis being placed on properties and appropriate use, enabling broader, deeper understanding of each material leading to greater confidence in their application. Containing fifty chapters written by subject specialists, Construction Materials Reference Book covers the wide range of materials that are encountered in the construction process, from traditional materials such as stone through masonry and steel to advanced plastics and composites. With increased significance being placed on broader environmental issues, issues of whole life cost and sustainability are covered, along with health and safety aspects of both use and installation.

Plastics are the most important class of packaging materials. This successful handbook, now in its second edition, covers all important aspects of plastic packaging and the interdisciplinary knowledge needed by food chemists, pharmaceutical chemists, food technologists, materials scientists, process engineers, and product developers alike. This is an indispensable resource in the search for the optimal plastic packaging. Materials characteristics, additives and their effects, mass transport phenomena, quality assurance, and recent regulatory requirements from FDA and European Commission are covered in detail with ample data.

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Tensile Properties of Linear Low Density Polyethylene (LLDPE) Blown Films
Comparison Between Linear Low Density Polyethylene (LLDPE)/natural Rubber (NR) and Linear Low Density Polyethylene (LLDPE) Ethylene Octene Copolymer (POE) Blends
Mechanical and Morphology Properties
LLDPE Production via Solution Process - Cost Analysis - LLDPE E12A
Intratec Solutions

Food engineering has become increasingly important in the food industry over the years, as food engineers play a key role in developing new food products and improved manufacturing processes. While other textbooks have covered some aspects of this emerging field, this is the first applications-oriented handbook to cover food engineering processes and manufacturing techniques. A major portion of Handbook of Food Engineering Practice is devoted to defining and explaining essential food operations such as pumping systems, food preservation, and sterilization, as well as freezing and drying. Membranes and evaporator systems and packaging materials and their properties are examined as well. The handbook provides information on how to design accelerated storage studies and determine the temperature tolerance of foods, both of which are important in predicting shelf life. The book also examines the importance of physical and rheological properties of foods, with a special look at the rheology of dough and the design of processing systems for the manufacture of dough. The final third of

the book provides useful supporting material that applies to all of the previously discussed unit operations, including cost/profit analysis methods, simulation procedures, sanitary guidelines, and process controller design. The book also includes a survey of food chemistry, a critical area of science for food engineers. Previous studies have not verified the relationship between creep and defects in geomembranes. Thus, a series of creep tests using the Stepped Isothermal Method (SIM) was conducted to evaluate the synergism between creep and defects in Linear Low Density Polyethylene (LLDPE) geomembranes. Specifically, three different sizes of defects were used in this research: no defects, 1.6 mm in diameter, and 3.2 mm in diameter. In addition, two different load levels were applied to each sample: 18 %, and 27 % of the Ultimate Tensile Strength (UTS). We found that the creep behavior of LLDPE geomembranes is not significantly affected by the existence of defects. However, the axis of defects in geomembranes elongated during the creep test. These results imply that a leakage rate through a defect increases as time increases if geomembranes containing defects undergo creep condition. Future research is needed to verify the creep behavior of different types of geomembranes with various sizes and shapes of defects.

It is known that linear low-density polyethylene (LLDPE) can be synthesized by

copolymerization of ethylene and 1-olefins using metallocene catalysts. However, the properties of LLDPE can be improved by adding organic or inorganic fillers. It should be mentioned that by adding nanoscale fillers into LLDPE, LLDPE-nanocomposites can be achieved. Among methods to produce polymer nanocomposites such as solution blending, melt mixing process and in situ polymerization, the in situ polymerization is perhaps the most promising method to produce the LLDPE-nanocomposite with an exceptional dispersion of nanoparticles inside the polymer matrix. This is due to the direct linkage of active centers to the surface of nanoparticles. Therefore, it is necessary to immobilize the active centers onto nanoparticle surface or fillers. In this present study, LLDPE/ Al_2O_3 - nanocomposites were synthesized by the in situ polymerization with dried-modified methylaluminoxane (d-MMAO)/zirconocene catalyst. The nano- Al_2O_3 was commercially obtained from Aldrich. The amounts of nanomaterials filled were also varied. Yields, activities, and polymer morphologies were discussed. It was found that the polymerization activity strongly depended on the $[\text{Al}]/[\text{Zr}]$ ratios. The samples were further characterized using SEM/EDX, DSC, ^{13}C NMR, and GPC.

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