

2 Basic Types of PP

PP, a semi-crystalline thermoplastic, is made in its homopolymer form by polymerising propylene monomer using stereospecific Ziegler-Natta catalysts. The catalyst system is termed stereospecific because it controls the position of the side (methyl) group in each propylene unit in the polymeric chain. A typical catalyst system may be prepared by combining titanium trichloride with tributyl aluminium or its variants. Most commercial PP is isotactic.

The physical properties and processing characteristics of PP are mainly determined by the molecular weight (average number of propylene units in a chain), the molecular weight distribution (variation in average length of chains) and the type and amount of copolymerising monomer. The selection of the right grade of PP for a specific application involves

- choosing between homopolymer and copolymer,
- choosing a reactor or controlled rheology grade,
- defining the melt flow rate required and the appropriate additive system.

However, with changes in manufacturing technology, operating conditions and catalyst systems, the traditional differences between the properties of homopolymers and copolymers have blurred [4-6]. Hence, an open mind is necessary to select a proper grade for a particular application.

2.1 Homopolymer

Homopolymer PP is made by polymerising propylene in the presence of a stereospecific catalyst. Homopolymers are more rigid and have better resistance to high temperatures than copolymers but their impact strength at temperatures below zero is limited (Section 4.3.2).

Typical applications for homopolymer polypropylene include windshield washer tanks, shrouds for fans and steering columns, housings for domestic appliances such as hair dryers, sterilisers, irons, coffee makers, toasters, etc., extrusion of fibres and filaments for carpet backing, upholstery fabrics, clothing, geotextiles, disposable diapers, medical fabric and automotive interior fabrics.

2.2 Copolymer

The properties of PP depend on the type and amount of comonomer. There are two basic types: random copolymer and heterophasic or block copolymer. The random polymers contain 1.5% to 6% by weight of ethylene or higher alkenes (such as butene-1) in random distribution and in a single chemical phase. The essential difference between a random and a block copolymer is that the block copolymer contains

Practical Guide To Polypropylene

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Practical Guide to Polypropylene Devesh Tripathi, 2002 Polypropylene is now the third largest consumed plastic material after polyethylene and polyvinyl chloride This book discusses the advantages and disadvantages of working with polypropylene offering practical comment on the available types of polypropylene its mechanical properties and in service performance and processing Comparisons with other common plastics are also provided which highlight the advantages of this polyolefin

Practical Guide to Polyethylene Cornelia Vasile, Mihaela Pascu, 2005 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

Handbook of Molded Part Shrinkage and Warpage Jerry Fischer, 2003-12-31 The handbook explains in plain terms why moldings shrink and warp shows how additives and reinforcements change the picture sets out the effect of molding process conditions and tells why you never can have a single correct shrinkage value But that is not all The handbook shows how to alleviate the problem by careful design of the molded part and the mold and by proper material selection It also examines computer aided methods of forecasting shrinkage and warpage And most important of all the handbook gives you the data you need to work with This is the most complete collection of shrinkage data ever made and includes an extensive compilation of hard to find multi point information on how processing part design mold design material and post mold treatment affect the part's final dimensions Manufacturers figures for thousands of grades along with an exhaustive search of magazines journals conference papers books web sites and brochures combine to make this a powerful resource A lot depends on a dimensionally correct molding Quality speed to market profit margins for the molder and toolmaker the efficiency of secondary and assembly operations reputation all these are on the line The Mold Shrinkage and Warpage Handbook is the book for people who have to live with shrinkage and warpage It is the only book for people who have to commit themselves

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Patents Act 1988 for easy reference Discusses a wide range of topics related to patents **Handbook of Plastics Joining** Michael J. Troughton, 2008-10-17 The new edition of this bestselling reference provides fully updated and detailed descriptions of plastics joining processes plus an extensive compilation of data on joining specific materials The volume is divided into two main parts processes and materials The processing section has 18 chapters each explaining a different joining technique The materials section has joining information for 25 generic polymer families Both sections contain data organized according to the joining methods used for that material A significant and extensive update from experts at The Welding Institute A systematic approach to discussing each joining method including process advantages and disadvantages applications materials equipment joint design and welding parameters Includes international suppliers directory and glossary of key joining terms Includes new techniques such as flash free welding and friction stir welding Covers thermoplastics thermosets elastomers and rubbers *Materials and Technologies for Energy Efficiency* A. Mendez-Vilas, 2015-10-15 *Materials and Technologies for Energy Efficiency* is a compilation of research papers whose main aim is to provide an opportunity to gather knowledge about the latest developments and advances in materials and processes involving energy This volume consists of a series of works which were presented at The Energy solar energy fuel cells energy storage etc The book is recommended for researchers from a broad range of academic disciplines related to energy and materials We hope that this set of papers would be useful to stimulate further discussion on energy and materials research **Plastics Additives** Geoffrey Pritchard, 1997-11-30 Although plastics are extremely successful commercially they would never reach acceptable performance standards either in properties or processing without the incorporation of additives With the inclusion of additives plastics can be used in a variety of areas competing directly with other materials but there are still many challenges to overcome Some additives are severely restricted by legislation others interfere with each other in short their effectiveness varies with circumstances *Plastics Additives* explains these issues in an alphabetical format making them easily accessible to readers enabling them to find specific information on a specific topic Each additive is the subject of one or more articles providing a succinct account of each given topic An international group of experts in additive and polymer science from many world class companies and institutes explain the recent rapid changes in additive technology They cover novel additives scorch inhibitors compatibilizers surface modified particulates etc the established varieties antioxidants biocides antistatic agents nucleating agents fillers fibres impact modifiers plasticizers and many others the articles also consider environmental concerns interactions between additives and legislative change With a quick reference guide and introductory articles that provide the non specialist and newcomer with relevant information this reference book is essential reading for anyone concerned with plastics and additives *Ignition of Polymers* Peter Rantuch, 2022-09-22 This book provides an overview of the initiation of combustion processes of polymeric materials It presents physicochemical processes associated with heating as well as numerical methods for initiation parameter calculation In addition the book describes

thermal degradation of polymers and the effect of an incident heat flux on initiation time It then highlights the most commonly used devices for measuring the time to ignition using external heat sources The target group of this book are scientists and researchers dealing with materials combustion and also graduates and practitioners focused on fire protection

Emergency Items Catalogue, 3rd edition, Volume3 , *A Practical Guide to Supramolecular Chemistry* Peter J. Cragg, 2005-11-04 A Practical Guide to Supramolecular Chemistry is an introductory manual of practical experiments for chemists with little or no prior experience of supramolecular chemistry Syntheses are clearly presented to facilitate the preparation of acyclic and macrocyclic compounds frequently encountered in supramolecular chemistry using straightforward experimental procedures Many of the compounds can be used to illustrate classic supramolecular phenomena for which clear directions are given or may be developed further as part of the reader's own research The book also describes techniques commonly used in the analysis of supramolecular behaviour including computational methods with many detailed examples An invaluable reference for students and researchers in the field embarking on supramolecular chemistry projects and looking for a tried and tested route into the chemistry of key compounds An introductory guide to practical syntheses focusing on supramolecular chemistry Fully referenced introductions explain the historical and contemporary importance of each compound Supplementary website including 3D molecular structures FAQ's about syntheses and suggestions for further experiments Textile Technology Digest ,2001 **Materials World** ,2002 *The Kline Guide to the Chemical Industry* Patricia Noble,1974 **Handbook of Water Purification** Walter Lorch,1981 *A Practical Guide to Hospital Dental Practice* ,1990 **British Plastics and Moulded Products Trader** ,1964 **Annual Book of ASTM Standards** ASTM International,American Society for Testing and Materials,2003 *The Textile Industry* J. Thomas Vogel,Barbara W. Lowry,1989 **Annual Book of ASTM Standards** American Society for Testing and Materials,1990 An Introductory Guide to EC Competition Law and Practice Valentine Korah,1994

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