

The Complete Technology Book on Polymers with Processing & Applications

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Polymers are the most rapidly growing sector of the materials industry. No wonder polymers are found in everything from compact discs to high tech aerospace applications. The Indian plastic and polymer industry has taken great strides. In the last few decades, the industry has grown to the status of a leading sector in the country with a sizable base. The material is gaining notable importance in different spheres of activity and the per capita consumption is increasing at a fast pace. Continuous advancements and developments in polymer technology, processing machineries, expertise and cost effective manufacturing is fast replacing the typical materials in different segments with plastics. Monomers and polymers are of little or no practical use until the raw product from the manufacturing process been transformed by more or less standardized fabrication and processing techniques into useful forms. There are different methods of processing of polymers for solid; molding, extrusion, calendaring, sheet forming, laminating and impregnating and for liquids and melts; coating, expanding or foaming, casting, spinning, laminating and impregnating. Plastics are divided into thermosetting and thermoplastic materials. Compression and transfer molding are the two main methods used to produce molded parts from thermosetting plastics; however, injection molding is under development and may become important in future. Plastic foams are from a wide variety of polymers have a wide range of applications and are made by a variety of methods depending upon the polymer and the application. Elastomers are indispensable to our modern civilization, without them two of largest industries; transportation and electrical, would never have attained their present state of development. The reason why plastics are popular is that they may offer such advantages as transparency, self lubrication, light weight, flexibility, economy in fabricating and decorating. Properties of plastics can be modified through the use of fillers, reinforcing agents and chemical additives. Polymer Energy system is an award winning, innovative, proprietary process to convert waste plastics into renewable energy. On the basis of value added, Indian share of plastic products industry is about 0.5% of national GDP.

Some of the fundamentals of the book are modified natural products, synthetic condensation products, melamine formaldehyde resins, aniline formaldehyde resins, miscellaneous amino plasts, sulfonamide formaldehyde resins, polyesters, saturated polyesters, linear polycarbonates, unsaturated polyesters, polymerized oils, synthetic addition products, aliphatic hydrocarbons and derivatives polyethylene, powder technology for coating of plastics, acrylic and polyurethane dispersions in industrial coatings for plastics, water borne coatings for plastics adhesion of water borne coatings on plastics, fabricating and processing, cold bending, hot bending, stretch forming, plug and ring forming, slip forming, drawing die pressing, roto forming, veneering, post forming, fluid pressure forming, vacuum forming

methods, pressure forming methods, laminating and impregnating etc.

Three factors are essential for any successful processing of polymers, namely materials, machinery and process control. Polymers have importance in manufacturing of various domestic and industrial products. This book is an invaluable resource to new entrepreneurs, technocrats, researchers, professionals etc.

1. INTRODUCTION

VIEWPOINT OF THE CONSUMER

VIEWPOINT OF THE INDUSTRIAL DESIGNER

VIEWPOINT OF THE FABRICATOR

VIEWPOINT OF THE PHYSICAL CHEMIST

VIEWPOINT OF THE ORGANIC CHEMIST

VIEWPOINT OF THE CHEMICAL ENGINEER

VIEWPOINT OF THE ECONOMIST

2. MODIFIED NATURAL PRODUCTS

CUPRAMMONIUM RAYON

VISCOSE RAYON

REGENERATED CELLULOSE FILM

CELLULOSIC DERIVATIVES

Cellulose Esters

Cellulose Nitrate

CELLULOSE ACETATE

CELLULOSE PROPIONATE

HIGHER CELLULOSE ESTERS

MIXED ESTERS OF CELLULOSE

CELLULOSE ETHERS

METHYL CELLULOSE

ETHYL CELLULOSE

CARBOXYMETHYL CELLULOSE

HYDROXYETHYL CELLULOSE

CYANOETHYL CELLULOSE

3. SYNTHETIC CONDENSATION PRODUCTS

PHENOPLASTS

Other Aldehydes

OTHER PHENOLS

FILLERS

OIL-SOLUBLE RESINS

CAST RESINS

MANUFACTURE

APPLICATIONS

Urea-Formaldehyde Resins

MELAMINE-FORMALDEHYDE RESINS

ANILINE-FORMALDEHYDE RESINS

MISCELLANEOUS AMINOPLASTS

SULFONAMIDE-FORMALDEHYDE RESINS

POLYESTERS

Saturated Polyesters

Linear Polycarbonates

Unsaturated Polyesters

Polymerized Oils

Alkyd Resins

Unsaturated Polyester Resins

LINEAR POLYAMIDES

POLYURETHANES

SILICONES

POLYOXYMETHYLENES

POLYOXYETHYLENES

EPOXY RESINS

THIOPLASTS

FURAN RESINS

4. SYNTHETIC ADDITION PRODUCTS

ALIPHATIC HYDROCARBONS AND DERIVATIVES POLYETHYLENE

High-Pressure Process

Low-Pressure Process

Irradiated Polyethylene

Chlorosulfonated Polyethylene

POLYTETRAFLUOROETHYLENE

POLYCHLOROTRIFLUOROETHYLENE

POLYPROPYLENE

POLYBUTENES

Butyl Rubber

POLYSULFONES

POLY(VINYL ACETATE)

POLY(VINYL ALCOHOL)

POLY(VINYL CETALS)

POLY(VINYL AND VINYLIDENE ETHERS)

POLY(VINYL KETONES AND ALDEHYDES)

POLY(VINYLIDENE CHLORIDE)

VINYLIDENE CHLORIDE COPOLYMERS

POLYACRYLONITRILE

Vinylidene Cyanide

ALIPHATIC DIENES

Polyisoprene

POLYCHLOROPRENE

POLYBUTADIENE

Butadiene-Acrylonitril Copolymers

Butadiene-Styrene Copolymers

AROMATIC VINYL COMPOUNDS

Polystyrene

POLY(A-METHYL STYRENE)

POLY(VINYL TOLUENES)

POLY(DIVINYL BENZENES)

HETEROCYCLIC VINYL COMPOUNDS

poly(N-vinyl carbazole)

POLY(N-VINYL PYRROLIDONE)

POLY(VINYL PYRIDINES)

CYCLIC UNSATURATED COMPOUNDS

Coumarone-Indene Resins

POLYCYCLOPENTADIENE

POLYTERPENES

5. POWDER TECHNOLOGY FOR COATING OF PLASTICS

WHY POWDER COAT PLASTICS

EFFECT OF COSMIC RADIATION

RESISTANCE TO MECHANICAL WEAR

ELECTRICAL PROCESSING CHARACTERISTICS

IMPROVING WEATHER RESISTANCE

EXTERNAL POWDER DRAIN TREATMENT

PRETREATMENT OF PLASTICS

ELECTRICAL CHARACTERISTICS

6. ACRYLIC AND POLYURETHANE DISPERSIONS IN INDUSTRIAL COATINGS FOR PLASTICS

INTRODUCTION

PLASTICS NEED COATINGS

PROBLEMS WHEN PAINTING PLASTICS

WATER-BORNE COATINGS FOR PLASTICS

ADHESION OF WATER-BORNE COATINGS ON PLASTICS

HARDNESS

WATER RESISTANCE

CHEMICAL AND SOLVENT RESISTANCES

SELECTION OF PRODUCTS FOR WATER-BASED PLASTIC COATINGS

CONCLUSIONS

7. FABRICATING AND PROCESSING

MOLDING

Cold Compression Molding

Hot Compression Molding

Transfer Molding

Injection Molding

Jet Molding

EXTRUDING

CALENDERING

SKIVING

SHEET FORMING

ATMOSPHERIC PRESSURE FORMING

Cold Bending

Hot Bending

Stretch Forming

Plug-and-Ring Forming

Slip Forming

Drawing

Die Pressing

Rotoforming

Veneering

Postforming

FLUID-PRESSURE FORMING

Vacuum-Forming Methods

Pressure-Forming Methods

LAMINATING AND IMPREGNATING

Cellular Laminates

COATING

Surface Coatings

Strippable Coatings

EXPANDING

CASTING AND EMBEDDING

SPINNING

FINISHING OF PLASTICS

8. APPLICATION

FIBERS

PLASTICS

Constructional Uses
Thermal, Electrical, and Optical Uses
Ion Exchange
Adhesives, Coatings, and Films
ADHESIVES
COATINGS
FILMS
ELASTOMERS

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Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

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