The Complete Technology Book on Industrial Polymers, Additives, Colourants and Fillers

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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. Numerous plastics and fibers are produced from synthetic polymers; containers from propylene, coating materials from PVC, packaging film from polyethylene, experimental apparatus from Teflon, stockings from nylon fiber, there are too many to mention them all. 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. Silicones are by far the most important industrial polymers and are based on silicon, an element abundantly available on our planet. Polymers are classified in three broad groups; addition polymers, condensation polymers and special polymers. It is well known that the major consumption of additives is in PVC compounds. Approximately 80% of additives are being used in PVC; however the left over 20% is consumed in compounding of other thermoplastics. Plastic master batches and fillers have their own importance in plastic processing industries. Colorants are the materials that give colour and opacity to plastics are chemically characterized as either pigments or dyes. Pigments are finely pulverized natural or synthetic particles which may be of inorganic or organic origin and insoluble in the matrix in which they are dispersed. Permanent red 2B is a mono azo pigment that is widely used in thermoplastics because it is inexpensive and has high tinting strength and good bleed resistance. Fillers are commonly employed in opaque PVC compounds to reduce cost and to improve electrical insulation properties, to improve deformation resistance of cables, to increase the hardness of a flooring compound and to reduce tackiness of highly plasticized compounds. Various calcium carbonate are used for general purpose work, china clay is commonly employed for electrical insulation, and asbestos for flooring applications. Also employed occasionally are the silicas and silicates, talc, light magnesium carbonate and barites (barium sulfate). Polymer Energy system is an award winning, innovative, proprietary process to convert waste plastics into renewable energy. 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. On the basis of value added, Indian share of plastic products industry is about 0.5% of national GDP.

Some of the astonishing fundamentals of the book are industrial polymers, addition polymers polyolefins, polyethylene, chlorinated polyethylene, cross linked polyethylene, linear low density polyethylene (LLDPE), high molecular weight polyethylene, high density polyethylene, ultrahigh

molecular weight polyethylene, polypropylene, poly(vinyl chloride), stabilizers, plasticizers, extenders, mineral filled or glass bead/milled glass grades, antistatic/electro conductive grades, electroplatable grades, etc.

The present book enlightens the processing of industrial polymers, additives, colourant and fillers. This book is an invaluable resource to new entrepreneurs, technocrats, researchers, professionals etc.

Ionomers
ACRYLICS
Polyacrylonitrile
Polyacrylates
Polymethacrylates
Polyacrylamide
Poly(acrylic acid) and Poly(methacrylic acid)
Acrylic Adhesives
VINYL POLYMERS
Poly (Vinyl Acetate)
Poly(Vinyl Alcohol)
Poly(Vinyl Acetals)
Poly(Vinyl Cinnamate)
Poly(Vinyl Ethers)
Poly(Vinyl Pyrrolidone)
Poly(Vinyl Carbazole)
PART II: CONDENSATION POLYMERS
POLYESTERS
Poly(Ethylene Terephthalate)
Poly(Butylene Terephthalate)
Poly(Dihydroxymethylcyclohexyl Terephthalate)
Unsaturated Polyesters
Polyester-Glass-Fiber Laminates (GRP, FRP)
Polyester Molding Compositions
Aromatic Polyesters
Wholly Aromatic Copolyester
Polycarbonates
POLYAMIDES
Aliphatic Polyamides
Properties
Applications
Aromatic Polyamides
Polyimides
Modified Polyimides
FORMALDEHYDE RESINS
Phenol-Formaldehyde Resins
Resols
Novolac
Urea-Formaldehyde Resins
Molding Powder
Processing
Properties and Applications
Melamine-Formaldehyde Resins
POLYURETHANES
Polyesters
Polyethers
Polycaprolactone
Polyurethane Rubbers and Spandex Fibers
Cross-Linked Polyurethane Rubbers
(a) Prepolymer formation
(b) Chain extension of prepolymer
(c) Cross linking of chain-extended polyurethane
Thermoplastic Polyurethane Rubbers

8. POLYBUTYLENE (PB)
STRUCTURE
CATEGORY
HISTORY
POLYMERIZATION
PROPERTIES
APPLICATIONS
ADVANTAGES AND DISADVANTAGES
PROCESSING TECHNIQUES
RESIN FORMS
SPECIFICATION OF PROPERTIES
PROCESSING REQUIREMENTS
PROCESSING-SENSITIVE END PROPERTIES
SHRINKAGE
9. POLYCARBONATE (PC)
POLYCARONATE
CATEGORY
HISTORY
POLYMERIZATION
DESCRIPTION OF PROPERTIES
APPLICATIONS
ADVANTAGES/DISADVANTAGES
PROCESSING TECHNIQUES
RESIN FORMS
SPECIFICATION OF PROPERTIES
PROCESSING REQUIREMENTS
PROCESSING-SENSITIVE END PROPERTIES
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10. POLYETHYLENE LINEAR LOW
DENSITY (LLDPE)
INTRODUCTION LLDP
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HISTORY
POLYMERIZATION
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PROCESSING TECHNIQUES
RESIN FORMS
SPECIFICATION OF PROPERTIES
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11. FLEXIBLE POLY (VINYL CHLORIDE) (FPVC)
INTRODUCTION
CATEGORY
Vinyl Additives
HISTORY
POLYMERIZATION
DESCRIPTION OF PROPERTIES
Physical Properties
Thermal Properties
Mechanical Properties
Optical Properties

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