

The Complete Technology Book on Synthetic Resins with Formulae & Processes

Author:- NIIR Board of Consultants & Engineers

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Synthetic resin is typically manufactured using a chemical polymerization process. This process then results in the creation of polymers that are more stable and homogeneous than naturally occurring resin. Since they are more stable and are cheaper, various forms of synthetic resin are used in a variety of products such as plastics, paints, varnishes, and textiles. There are various kinds of synthetic resins; silicones resins, polyvinyl pyrrolidone, gum arabic, epoxy resins, guar gum, carrageenan, carboxymethyl cellulose, etc. Resins are polymeric compound which are available in nature and are also manufactured by synthetic routes. Some resins are also manufactured by partial modification of natural precursor polymer by chemical. Silicones are unique among the commercially important polymers both in chemistry and in variety of industrial applications. Silicones can be applied as high temperature insulating varnishes, impregnates to be used with glass, asbestos, mica products and encapsulating agents for electrical components. Water borne dispersions or emulsions, for example emulsions of vinyl or acrylic copolymers are popular in decorative coatings. The applications of synthetic resins are seen in some important industries like paint industry, adhesive industry, the textile industry, paper, paint, agricultural industry, petroleum industry etc. As it can be seen that there is an enormous scope of application of resins hence it is one of the major field to venture.

Some of the fundamentals of the book are electrodepositable pigmented coating compositions based on alkyd resins, phosphorus containing allyl resins, vapour permeation cure technology, characterization of water soluble anodic electrodepositive pigmented coating compositions, protection of concrete substrates, zinc rich coatings, electro deposition primers, developments in thermosetting powder coatings, application of powder coatings, polyethylene glycol, petroleum recovery and processing, industries using polyethylene glycols, silicones resins, preparation & formulation of silicone resin based coatings, pigments and dyes etc.

Synthetic Resins are used by lot of industries. Yet, little emphasis has been placed on the comparative value on functionality of polymeric material as a class. These resins have been classified in separate categories, usually in terms of their Chemistry, sources or end uses. The present book contains formulae, processes and other valuable details for various synthetic resins. This is very useful book for those concerned with development, consultants, research scholars, new entrepreneurs existing units, institutional libraries etc.

1. PHOSPHORUS CONTAINING ALLYL RESINS

Properties of Monomers

Polymerization

2. ELECTRODEPOSITABLE PIGMENTED COATING COMPOSITIONS BASED ON ALKYD RESINS

Introduction

Experimental

Materials

Synthesis of water soluble alkyd resin from phthalic anhydride and maleic anhydride (A1).

Synthesis of water soluble alkyd resin from phthalic anhydride and trimellitic anhydride (A2).

Synthesis of water soluble alkyd resin from phthalic anhydride and maleopimaric acid (A3).

Synthesis of water soluble alkyd resin from maleopimaric acid (A4).

Synthesis of water soluble methylated melamine formaldehyde resin.

Preparation of water soluble anodic electrodepositive pigmented coating compositions.

Characterisation of water soluble alkyd resins

Characterisation of water soluble anodic electrodepositive pigmented coating compositions.

Optimisation of anodic electrodepositive parameters

Testing and evaluation of anodic electrodepositive pigmented coating compositions

Results and Discussions

Solvent (MTO) Resistance

Protection Against Corrosion

3. VAPOUR PERMEATION CURE TECHNOLOGY

Introduction

Vapour Permeation Cure (VPC)

Primary Advantages of VPC Coating

Disadvantages

Limitations

Vapour Injection Cure (VIC) Process

Chemical Composition

Reaction and Mechanism

Advantages of VIC

Conclusion

4. PROTECTION OF CONCRETE SUBSTRATES

Differences Between Concrete and Metallic Substrates

Constructions Influence

Coatings Used on Concrete

Organic coatings Thin film

Modified Epoxies

Furans

Chlorinated Rubbers

Waterborne Coatings

Vinyl Esters

Other Coatings

Organic Coatings Thick Film

Elastomeric Coatings

Polyurethane Coatings

Synthetic Rubber (Elastomers)
Resin Rich System
Polymer Concretes
Plastic Liners
Brick or Tile and Mortar Systems
Machinery Setting Grouts
Inorganic Coatings
New Versus Aged or Deteriorated Substrates
Quality Assurance
Conclusion

5. ZINC RICH COATINGS

Inhibitive Primers
Organic Zinc Rich Coatings
Inorganic Zinc Rich Coatings
Surface Preparation
White Metal Blasting
Galvanising
Galvanising and Zinc Rich Coating Comparison
Beach Front Exposure
Tidal Exposure
5% Salt Spray Test
Inorganic Zinc Rich Coating Advantages and Limitations
Application of Inorganic Zinc Rich Coatings
Cost Aspects

6. ELECTRO DEPOSITION PRIMERS

Electrodeposition Primers
Mechanism of Electrodeposition
Electro osmosis
Advantages of Electrodeposition
Types of Electrodeposition Primers
Shift to Cathodic E.D. Primer
Cathodic Electrodeposition Paint
Comparison of AED and CED
Properties of Dry Film
Latest Development in C.E.D.
Comparative Features of Different Types of CED
Plant Design and Process Control
Trends in Top Coats
Upgradation of Appearance & Performance of Top Coats
Solid Colours
Metallic Colours
Developments in Top Coat Application
Developments in Thermosetting Powder Coatings
Powder Manufacture
Types of Powder
Powder Coatings Method of Application
Electrostatic Spray Corona Charging
Faraday Cage
Back Ionization
Electrostatic Spray Tribo Charging
Advantages of Powder Coatings

- Dis Advantages of Powder
- Economic Advantages of Powder Coatings
- Application of Powder Coatings
- General Metal Coatings
- Industrial Machinery
- Conclusion

7. WATERBORNE DISPERSIONS

- Formulating Principles
- Pigments
- Additives
- Binders
- Acrylics/Vinyls/Vinyl Acrylic Emulsions
- Polyurethane Dispersions
- Cross Linking
- Epoxy Dispersions
- Miscellaneous Systems
- Conclusion

8. ALGINATE

- Chemical Structure
- Chemical Derivatives
- Manufacture
- Physical Properties
- Powdered Alginates
- Solution Properties
- Rheological Properties
- Commercial Uses
- Food Applications
- Industrial Applications
- Formulations
- Stabilizing Frozen Foods
- Fruit pie Filling
- Frozen Gel
- Frozen Fruit
- Cream Sauce
- Barbecue Sauce
- Frozen Shortcake Berry Filling
- Tomato Sauce (Pizza and Spaghetti)
- Macaroni and Cheese
- Chopsuey
- Food Gels
- Dessert Gel
- Cold Water Gel
- Cold Milk Gel
- Instant Chiffon Pie Filling
- Instant Chesse Cake Mix
- Instant Limitation Bakery Jelly
- Banana Gel Base
- Meringue Powder with Dried Egg Whites
- Dessert Souffles
- Vanilla Souffle
- Chocolate Souffle

Lemon Souffle
Dressings
Fabricated fruit
Pie fillings
Cooked Fillings
Cold mix Fillings
Industrial Applications
Corrugating Adhesives
Single Starch System
Two Starch System
Fiber Reactive dyes
Pad Dyeing
Laboratory Techniques
Viscosity Measurement
Moisture Determination
Powder Color Determination
Alginates in Mixtures (Detection)
Alginates in Mixtures (Determination)
Spectrophotometric

9. CARBOXYMETHYL CELLULOSE

Chemical Nature
Physical Properties
Equilibrium Moisture Content
Molecular Weights
Solubility
Film Properties
Manufacture
Biological Properties
Toxicological Properties
Six month Oral Toxicity
One year Studies
Chronic Oral Toxicity
Reproduction
Gastrointestinal Absorption
Clinical Study
Skin Irritation and Sensitization
Getting Information
Rheology
Storage and Handling
Packaging
In Plant Handling
Bulk Handling
Bag Handling and Storage
Shipping
Applications
Detergents
Petroleum
Paper
Textiles
BOD and Desizing Wastes
Coatings
Cosmetics and Pharmaceuticals

Miscellaneous Applications
Specialties
Future Developments
World Production

10. CARRAGEENAN

Chemical Nature
Structure
Molecular Weight
Reactivities
Physical Properties
Appearance
Particle Size
Density
Solubilities
Manufacture
Biological/Toxicological Properties
Gastrointestinal Ulceration
Teratogenicity
Carcinogenicity
Rheological Properties
Gelation
Milk Gels
Additives/Extenders
Handling
Applications
By Result
By End Product
By Industry
By Process
Application Procedures
Dispersion
Stability
Specialties
Future Developments
Commercial Uses: Compounding and Formulating
Milk Applications
Uses in Dry Mixes
Uses in Manufactured Products
Water Applications
Uses in Dry Mixes
Uses in Manufactured Products
Nonfood Applications
Pharmaceuticals and Toilet Goods
Other Applications
Commercial Uses: Processing Aids
Beverage Clarification
Abrasive Suspensions
Ceramic Glazes and Core Washes
Industries Using Carrageenans
Food
Dairy
Dairy Substitutes

- Packaged Desserts
- Other Food Uses
- Pharmaceuticals and Toilet Goods
- Metal Fabrication
- Ceramics
- Coatings
- Agriculture
- Household Products
- Formulations
- Chocolate Milk
- Canned Water Dessert Gel
- Air Treatment Gel
- Toothpaste
- Milk Puddings
- Creamy Type (Cold Set)
- Cooked Custard Type (Dessert and pie filling)
- Cooked Custard or Flan
- Antacid Gel
- Laboratory Techniques
- Water Viscosity Measurement
- Water Gel Strength Measurement
- Milk Gel Strength measurement

11. GUAR GUM

- Manufacture
- Seed Structure
- Purification
- Grades
- Chemical and Physical Properties
- Structure
- Solubility in Water
- Rheology
- Viscosity
- Shear Response
- Handling
- Dry Storage
- Solution Preparation
- Applications
- Oil and Gas
- Explosives
- Textile
- Food
- Ice Cream
- Canned Pet Food
- Cheese
- Sauces and Salad Dressings
- Paper
- Mining
- Commercial Applications: Compounding and Formulating
- Food
- Explosives
- Commercial Uses: Processing Aids
- Oil and Gas

Textile
Carpets
Paper
Kraft Papers
Kraft Liner board
Recycled Liner board
Corrugating Medium
Boxboard
Offset News Stock
White Papers
Mining
Industries Using Guar Gum
Oil and Gas
Explosives
Food
Paper
Textile
Mining
Formulations

12. GUM ARABIC

Chemical Nature
Physical Properties
Manufacture
Biological/Toxicological Properties
Rheological Properties
Additives/ Extenders
Additives
Extenders
Handling
Applications
Emulsification
Colloid Stabilization
Encapsulation
Suspension
Application Procedures
Compatibility
Commercial Uses
Food Applications
Confectioneries
Dairy Products
Bakery Products
Flavor Fixation
Flavor Emulsification
Beverages
Pharmaceuticals
Suspending Agent
Demulcent Agent
Emulsification
Antiseptic Preparations
Miscellaneous Applications
Medicines
Cosmetics

Adhesives
Paints
Inks
Record Ink
Soluble Inks
Watercolor Inks
Quick Drying Inks
Fabric and Laundry Marking Inks
Pigmented Inks
Emulsion or Typographic Inks
Hectographic Inks
Electrically Conductive Inks
Lithography
Textiles
Miscellaneous Uses
Industries Using Gum Arabic
Food Industry
Pharmaceutical Industry
Other Industries
Formulations
Confectioneries
Dietetic or Sugarless Candies
Marshmallows
Food Emulsions
Pickle Oil Emulsion
Pickle Juice
Beverages
Stabilized Fruit Drink
Dry Mix Imitation Orange Drink
Beverage Stabilizers
Nut Coating
Inks
Gloss Finish Inks
Wood Grain Inks
Laboratory Techniques
30% Viscosity Method
Insoluble Residue
Sediment and Color
Peroxidase Content

13. HYDROXY ETHYL CELLULOSE

Chemical Nature
Physical Properties
Solubility in water
Solubility in Organic Solvents
Dissolving Methods
Viscosity Properties
Compatibilities
Interactions
Film Formation
Manufacture
Biological/Toxicological Properties
Rheological Properties of Solutions

Additives/Extenders
Handling
Applications
Application Procedures
Specialties
Future Developments
Commercial Uses: Compounding and Formulating
Protective Colloid in Latex
Thickener for Latex Compositions
Latex Paints
Color Coats for Paper
Textile Binders and Adhesives
Building Specialties
Cosmetics and Pharmaceuticals
Paper Sizes and Coatings
Carpet and Textile Dye Pastes
Special Applications
Commercial Uses: Processing Aids
Crude Oil Drilling and Recovery
Electroplating and Electrowinning
Miscellaneous Binders
Other Specialty Uses
Industries Using Hydroxyethylcellulose
Adhesives
Agricultural Products
Building Products
Cosmetics
Oil and Gas Extraction
Paints and Coatings
Paper and Allied Products
Synthetic Resins
Textile Mill Products
Formulations
`Copolymer Latex
Latex Interior Flat Wall Paint
Textile Printing
Oil Well Workover Fluid
Roll on Antiperspirant
Liquid Shampoo

14. HYDROXY PROPYL CELLULOSE

Chemical Nature
Stability
Chemical Stability
Biological Stability
Insolubilization
Physical Properties
Moisture Content
Solutions
Rheology
Organic Solutions
Hot Melts and Waxes

Compatibility
Film Properties
Thermoplasticity
Manufacture
Toxicological Properties
Additives
Preservatives
Defoamers
Plasticizers
Handling
Applications
Application Procedures
Water Temperature
Compatibility with Salts
Molding Powder Preparation
Specialties
Commercial Uses: Compounding and Formulating
Commercial Uses: Processing Aids
Industries Using Hydroxypropyl Cellulose
Formulations
Cosmetics
Antiperspirant (Roll On)
Hair Grooming Aid
Shampoo (Gel)
Paint Removers
Nonflammable Solvent Type Remover
Acid Type Remover
Pharmaceuticals
Thermoplastics
Injection Molding Formulation (Unfilled)
Laboratory Techniques

15. POLYETHYLENE GLYCOL

Chemical Nature
Physical Properties
Viscosity
Solubility in Water
Solubility in Organic Solvents
Solvency and Compatibility
Hygroscopicity
Surface Tension
Volatility
Thermal Stability
Biological/Toxicological Properties
Manufacture
Handling
Applications
Functions
End Products
Industries
Processes
Application Procedures

Additives/Extenders
Specialties
Future Developments
Commercial Uses: Compounding and Formulating
Chemical Intermediates
Adhesives
Agricultural Formulations
Cellophane Film Humectants
Cosmetics and Toiletries
Detergents and Cleaners
Inks
Paints and Coatings
Pharmaceutical Products
Rubber Compounds
Miscellaneous Products
Cork Products
Food Products
Lubricants and Hydraulic Fluids
Paper Products
Photographic Developers
Sponges
Wood swelling agent
Commercial Uses: for Processing Aids
Ceramics
Dialysis Operations
Electroplating
Heat Transfer Baths
Leather Treatment
Metal Working Operations
Paper Products
Petroleum Recovery and Processing
Plastic Compounding
Rubber Products
Textile Products
Wood Products
Industries Using Polyethylene Glycols
Adhesives
Agricultural Products
Ceramics Products
Chemical Specialties
Cosmetics and Toiletries
Electronic and Electrowinning
Food Products
Inks and Printing
Leather Processing
Lubricants and Hydraulic Fluids
Medical Sundries
Metal Fabricating
Packaging Materials
Paints and Coatings
Paper Products
Petroleum Recovery and Processing
Pharmaceuticals

Photographic Products
Plastics Products
Rubber and Elastomers
Textile Products
Wood Processing
Formulations
Fatty Acid Esters
Water Dispersible Alkyd Resin for Paints
Suppository Bases
Ointment Bases
Cosmetic Cream
Hand Lotion
Brushless Shaving Cream
Cream Rouge (Vanishing)
Perfume Stick
Clay Starch Paper Coating
Metal Working Lubricant
Ball point Pen Ink
Laboratory Techniques
Identification of PEGs
Determination of PEGs in Other Materials

16. ALGINATE POLY ETHYLENE OXIDE

Chemical Nature
Narrow Molecular Weight Distribution Grades
Hydrogels
Thermoplastic Compound
Hydrodynamic Drag Reduction Slurry
Oxidative Degradation
Association Complexes
Physical Properties
Bulk Properties
Manufacture
Biological/Toxicological Properties
Toxicological Studies
Biodegradability
Rheological properties
Viscosity
Additives/Extenders
Applications
Application procedures
Boiling Water Dispersion
Nonsolvent Dispersion
Commercial Uses: Compounding and Formulating
Adhesives
Water Soluble Paper Adhesives
Adhesives from Association Complexes
Industrial Supplies
Thickened Cleaning Solutions
Construction Products
Paving Composition
Water Soluble Purge Dam
Paints and Paint Removers

Latex Paints
Spatter Finish
Thickener for Paint and Varnish Remover
Pharmaceuticals
Dispersant for Calamine Lotion
Rubbing Alcohol
Printing Products
Microencapsulated Inks

Lithographic Press Dampening Fluid
Soap, Detergents, and Personal Care Products
Detergents
Toothpastes
Denture Fixative
Shaving Stick
Ophthalmic Solution
Absorbent Pads
Water Soluble Films
Seed Tape
Water Soluble Packaging
Commercial Uses: Processing Aids
Binder
Ceramics
Battery Electrodes
Fluorescent Lamps
Soil Stabilization
Other Binder Applications
Coatings and Sizes
Tablet Coatings
Glass Fiber Size
Dispersant
Vinyl Polymerization
Glass Fiber Reinforced Concrete
Flocculation
Clays
Coal
Silica
Fiber Retention Drainage Aid (Paper Making)
Hydrodynamic Drag Reduction
Fire fighting Additive
Fluid jet Cutting
Additive to Prevent Sewer Surcharges
Other Drag Reduction Applications
Thermoplastics Manufacture
Textile Antistat
Fugitive Textile Weft
Thickening / Rheology Control
Antimist Additive
Drift Control Additive
Oil Recovery Fluids
Water Retention
Asbestos Cement Extrusion Aid
Soil Amendment

Industries Using Poly (Ethylene Oxide)
Formulations
Aluminum and Metal Cleaner
Calamine Lotion
Denture Fixative, Powder
Detergent Bars
Detergent Liquid
Lithographic Press Dampening Fluid
Microencapsulation
Paint and Varnish Remover
Thickened Acetic Acid
Thickened Hydrochloric Acid (Muriatic Acid)
Thickened Sulfuric Acid
Rubber Lubricant (for Mounting of Tires)
Toothpastes

17. POLYVINYLPYRROLIDONE

General Information
Chemical Nature
Physical Properties
Manufacture
Rheological Properties
Intrinsic Viscosity
Toxicological Properties
General
Acute Toxicology
National Cancer Institute
Subacute and Chronic
PVP Films
Compatibilities
Future Developments
Applications of PVP
Pharmacy
Medicine
Beverages
Cosmetics and Toiletries
Textiles
Paper
Adhesives
Detergents and Soaps
Polymers and Polymerization
Agricultural
Photography and Lithography

18. SILICONES RESINS

Chlorosilanes
Commercial Production of Monomeric Intermediates
Silicone Fluids
Manufacture
Properties and Uses
Thermal Stability
Rheological Characteristics
Surface Activity

Lubricating Properties
Electrical Properties
Other Characteristics
Identification
Silicone Elastomers
Manufacture of Base Polymers
Fillers
Processing
Vulcanization
Properties and Uses
High and Low Temperature Applications
Electrical Applications
Molding and Mold Release Applications
Thermal Insulation and Ablative Applications
Construction Products
Medical Applications
Convenience Uses and Miscellaneous Applications
Silicone Resins
Manufacture
Cure
Properties and Uses
Greases and Compounds
Surfactants
Primers and Adhesion Promoters
Preparation & Formulation of Silicone Resin Based Coatings
Cure Catalyst Driers
Pigments and Dyes
Thinners
Formulations
Application Guides
Surface Preparation
Priming
Applying the Coating
Curing
Surfactants and Specialties
Methods of Manufacture
Properties
Emulsions

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NIIR PROJECT CONSULTANCY SERVICES, 106-E, Kamla Nagar, New Delhi-110007, India.
Email: npcs.india@gmail.com **Website:** NIIR.org

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