

Modern Technology of Synthetic Resins & Their Applications (2nd Revised Edition)

Author:- NIIR Board of Consultants & Engineers

Format: paperback

Code: NI71

Pages: 592

Price: Rs.1575US\$ 150

Publisher: NIIR PROJECT CONSULTANCY SERVICES

Usually ships within **5** days

Modern Technology of Synthetic Resins & Their Applications

(Acetal, Acrylonitrile, Alkyd, Amino, Casein, Cashewnut Shell Liquid, Epoxy, Phenolic, Polyamide, Polyurethane, Rubber, Silicon, Polyvinyl Acetate, Shellac, Sucrose, Terpene Resins)

(2nd Revised Edition)

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; acetal resins, amino resins, casein resins, epoxy resins, hydrocarbon resins, polyamide resins, etc. The classic variety is epoxy resin, manufactured through polymerization, used as a thermoset polymer for adhesives and composites. Epoxy resin is two times stronger than concrete, seamless and waterproof. Polyamide resin is another example of synthetic resins. Polyamide resins are products of polymerization of an amino acid or the condensation of a diamine with a dicarboxylic acid. They are used for fibers, bristles, bearings, gears, molded objects, coatings, and adhesives. The term nylon formerly referred specifically to synthetic polyamides as a class. Because of many applications in mechanical engineering, nylons are considered engineering plastics. Resins are valued for their chemical properties and associated uses, such as the production of varnishes, adhesives, lacquers, paints, rubber and pharmaceutical uses. The applications of synthetic resins are seen in some important industries like paint industry, adhesive industry, the printing ink industry, the textile industry, the leather industry, the floor polish, paper, agricultural 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.

Synthetic Resins are materials with properties similar to natural plant resins. They are viscous liquids capable of hardening permanently. Chemically they are very different from resinous compounds secreted by plants. Synthetic resins are of several classes.

The growth of the synthetic resins market can be attributed to the high demand from the packaging sector due to favorable properties, including lightweight and ability to act as an excellent barrier, which allows for their usage in applications such as barrier packaging, shrink wraps, and pharmaceutical packaging.

The major contents of the book are properties, manufacturing process, formulae of synthetic resins and applications of synthetic resins, derivatives of resins, use of resins in polymer field, alkyd resin technology, epoxy resins, manufacture of polystyrene based ion-exchange, phenol formaldehyde reactions, polycarbonates resins, polyester coating compositions, synthetic rubbers, modification with synthetic resins, water-soluble polymers, cross-linking of water-soluble coatings etc. This book also contains the list of manufacturers and dealers of raw materials, list of Chemical Plant, Photographs of Machinery with Suppliers Contact Details, Sample Plant Layout and Process Flow Chart.

The book will be very useful for new entrepreneurs, manufacturers of synthetic resins who can easily extract the relevant formulation and manufacturing process from the book.

1. ACETAL RESINS

Properties of Formaldehyde and Trioxane

Preparation of Polymers

New Polymers of Formaldehyde

Polymerization of Trioxane

Higher Aldehydes

Other Aldehydes

Properties of Aldehyde Polymers

Polymers of Other Aldehydes

Processing of Formaldehyde Polymers

Uses of Polymers of Formaldehyde

2. ACRYLIC SOLUTION RESINS

Terminology

Backbone Monomers

Thermoplastic Acrylics

Thermosetting Acrylics

Processing Industries

Aqueous Solution Acrylics

Non-Aqueous Dispersions (NAD)

Machinery & Equipments

3. ACRYLONITRILE RESINS

Manufacture of Acrylonitrile

From Acetylene

Acrylonitrile : styrene Copolymers

Acrylonitrile : butadiene-styrene

Uses and Economic Aspects

4. ALKYD RESIN TECHNOLOGY

The Nature of Alkyd Resins

Raw Materials

Modifiers for Alkyd Resins

Formulation of Alkyd Resins

Formula Development

Calculation of Alkyd Formulations

Typical Formulations

Manufacture of Alkyd Resins

Alcoholysis

- Acidolysis
- Fatty Acid Process
- Estrification
- Raw Materials Handling
- Alkyd Manufacturing Plant
- Corrective Measures During Processing
- Applications of Alkyd Resins

5. AMINO RESINS

- Formation of Amino Resins
- Urea Formaldehyde Resins
- Melamine Formaldehyde Resins
- Other Amino Resins
- Production of Amino Resins
- Uses of Amino Resins
- Machinery And Equipments
- Economics of the Melamine-Formaldehyde Resin/Urea-formaldehyde resin

6. BHILAWAN NUT SHELL LIQUID RESINS

7. CASEIN RESINS

- Manufacture
- Properties
- Casein Adhesives for Bonding Paper
- Casein Adhesive for a Binding Dissimilar Materials
- Lime-Free Glue Formulations
- Methods of Application

8. CASHEWNUT SHELL LIQUID RESINS

- Chemistry of Cashew nut shell Liquid
- Utilisation of Cashewnut Shell Liquid
- Chemically Modified Cardanol Polymer

9. EPOXY RESINS

- Introduction
- Epoxy Resin Manufacture and Characterization
- Curing Agents For Epoxy Resins
- Principles in Formulating with Epoxy Resins
- Solventless coating for application by heated two component air less spray equipment
- Water Dispersible Epoxy Coatings
- Epoxy Baking Enamels
- Water-Dispersible Epoxy Resin Coatings for Electrodeposition
- Epoxy Aqueous powder Suspensions (APS)

10. FURAN RESINS

11. HYDROCARBON RESINS

- Petroleum Resins
- Terpene Resins
- Resins from Pure Monomers

12. ION-EXCHANGE RESINS

Theory and Mechanism

Types of Ion-Exchange Resins

Types of Ion-Exchange Resins

Properties

Applications

Manufacture

Manufacture of Polystyrene Based Ion-Exchange

Resins Polymerisation

Alternative Method of Synthesis of an Ion-Exchange Resin

Process of Manufacture

Methods of Analysis

Determination of Physical Properties:

Chemical Properties

13. INDENE-COUMARONE RESINS

Raw Material and Source

Method of Preparation

Mechanism of Polymerization

Physical Chemical Properties and Type

Hydrogenated Resins

Applications

Application in Adhesives

Coumarone-indene Resin Adhesives

Health and Hygiene Factors

Test Methods

Economics for Coumarone-indene Resin Plant

14. PHENOLIC RESINS

Raw Materials

Phenol Formaldehyde Reactions

Catalysts

Modified Phenolic Resins

Baking Phenolics

Dispersion Resins

Novolak Resins

Resols

Fillers for Phenolic Moulding Powders

Thermal degradation

Modified and Thermal - Resistance Resins

Oil Soluble Phenolic Resin

Heat and Sound Insulation Materials

Foundry Resins

15. BISPHENOL-FURFURAL RESIN

16. PARA-TOLUENE SULFONAMIDE RESINS

17. POLYCARBONATES RESINS

Properties

Methods of Manufacture

18. POLYAMIDE RESINS

Properties

Methods of Manufacture

19. POLYIMIDE RESINS

Polymide Adhesives

Adhesive and Bonding Technology

20. POLYURETHANE RESINS

Raw Materials

Hazards of Isocyanates

Classification of Polyurethanes

21. POLYVINYL ALCOHOL RESINS

Introduction

Chemical Nature

Physical Properties

Modifiers

Commercial uses : Compounding and Formulating

Commercial uses : Processing Aids

Formulations

Preparation Process

Adhesives

Economics for Polyvinyl alcohol

22. POLYVINYL ACETATE SOLID RESINS

Manufacture

Vinyl Acetate Copolymers

Polyvinyl Acetate Emulsions

Manufacture

Laboratory Preparation of Polyvinyl Acetate

Commercial Preparation

Special Formulation Acetate Adhesive

As Adhesives In the Building Industry

Economics for Polyvinyl acetate

23. RUBBER RESINS

Introduction

Natural Rubber

Synthetic Rubbers

Chlorinated Rubber Resins

Cyclized Rubber Resins

Application And Formulations

High Styrene-Butadiene Rubber Resins

Styrene-Butadiene Rubber Adhesives

Chlorinated Biphenyls

Chlorinated Paraffins

Synthetic Rubber Resin Latexes

Nitrile rubber Adhesives

Butyl Rubber And Polysobutylene Adhesives

Processing for Butyl Polymers

Carboxylic Resin Polymers in Adhesives

Carboxylic elastomers in PSA

24. SILICONE RESINS

Preparation of Silicones

Silicone Resins

Preparation and Formulation of Silicone-Resin based Coatings

Application Guides

Other Silicone Resin Application

Other Silicones for Surface Coatings

25. SHELLAC RESINS

Commercial Forms of Lac

Chemical Composition

Modification with Synthetic Resins

26. SUCROSE RESINS

Transesterification

Sucrose modified resins

Sucrose acetate isobutyrate (SAIB)

27. ROSIN & ROSIN DERIVATIVES

Composition, Reaction and Derivatives, Isomerization

Maleation

Oxidation, Photosensitized Oxidation

Hydrogenation

Hydrogenless Hydrogenation

Hydrocracking of Rosin

Phenolic Modification

Salt Formation

Hydrogenolysis

Polyesterification

Preparations, Typical Uses

Chemical and Physical Properties of Amine D Acetate

Decarboxylation

Hydroxymethylation and Hydroxylation

Poly-Oxyalkylation

Oxonation

28. TERPENE RESINS

Hot Melt Adhesives (HMA) and coatings

Terpene-phenolic Resin (TPR)

29. WATER-SOLUBLE POLYMERS

Classification

Applications of Starches

The textile industry

Adhesive Applications

Liquid Adhesives

Miscellaneous Uses

Properties of Cellulose Ethers

Emulsion Polymerization

30. ALKYL AND HYDROXYALKYL CELLULOSE

Cellulosic Ethers, General Information

Manufacture

Powder and Film properties

Physical and chemical properties

Commercial Uses : Compounding and Formulating

Commercial Uses

31. WATER-REDUCIBLE RESINS

Water Soluble Polymers

Cross-Linking of Water-Soluble Coatings

Additives For Coatings, Pigments

Formulation of water-soluble coatings

Trouble Shooting with water-soluble polymers

32. PHOTOGRAPHS OF MACHINERY WITH SUPPLIERS

CONTACT DETAILS

Reactor

Condenser

Thermic Fluid Heating System

Octagonal Blender

Industrial Storage Vessels

Ribbon Blender

Filter Press

Filter Tank

Moulding Machine

Ball Mill

Blender

Dryer

Roller Mill

Conveyor Dryer

Resin Plant

Blender Machine

Air Compressor

Heat Exchanger

Storage Tank

33. SAMPLE PLANT LAYOUT AND PROCESS FLOW CHART

Alkyd Resin Manufacturing

Resin Production Equipment

Process Flow Chart for Toner Resins

Polyester Resin Production

Factory Layout for production of Alkyd Resin Production Plant

About NIIR

NIIR PROJECT CONSULTANCY SERVICES (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-

up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

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.

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

Fri, 09 May 2025 05:18:58 +0000