Epoxy Resins Technology Handbook (Manufacturing Process, Synthesis, Epoxy Resin Adhesives and Epoxy Coatings) 2nd Revised Edition

Author: Dr. H. Panda
Format: Paperback
ISBN: 9788178331829
Code: NI305
Pages: 576
Price: Rs. 1,895.00 **US$** 150.00
Publisher: Asia Pacific Business Press Inc.
Usually ships within **5** days

Epoxy is a term used to denote both the basic components and the cured end products of epoxy resins, as well as a colloquial name for the epoxide functional group. Epoxy resin are a class of thermoset materials used extensively in structural and specialty composite applications because they offer a unique combination of properties that are unattainable with other thermoset resins.

Epoxies are monomers or prepolymers that further reacts with curing agents to yield high performance thermosetting plastics. They have gained wide acceptance in protecting coatings, electrical and structural applications because of their exceptional combination of properties such as toughness, adhesion, chemical resistance and superior electrical properties. Epoxy resins are characterized by the presence of a three membered cycle ether group commonly referred to as an epoxy group 1,2-epoxide, or oxirane. The most widely used epoxy resins are diglycidyl ethers of bisphenol-A derived from bisphenol-A and epichlorohydrin.

The market of epoxy resins are growing day by day. Today the total business of this product is more than 100 crores. Epoxy resins are used for about 75% of wind blades currently produced worldwide, while polyester resins account for the remaining 25%. A standard 1.5-MW (megawatt) wind turbine has approximately 10 tonnes of epoxy in its blades. Traditionally, the markets for epoxy resins have been driven by demand generated primarily in areas of adhesives, building and civil construction, electrical insulation, printed circuit boards, and protective coatings for consumer durables, amongst others.

The major contents of the book are synthesis and characteristics of epoxy resin, manufacture of epoxy resins, epoxide curing reactions, the dynamic mechanical properties of epoxy resins, physical and chemical properties of epoxy resins, epoxy resin adhesives, epoxy resin coatings, epoxy coating give into water, electrical and electronic applications, analysis of epoxides and epoxy resins and the toxicology of epoxy resins.

It will be a standard reference book for professionals and entrepreneurs. Those who are interested in this field can find the complete information from manufacture to final uses of epoxy resin. This presentation will be very helpful to new entrepreneurs, technocrats, research scholars, libraries and existing units.

Contents

Polyisocyanates
Polymercaptans
Polyhydric Alcohols
Polyphenols
Polycarboxylic Acids
Polybasic Acid Anhydrides
Silanes and Silanols
Others
Polymerization
Anionic Catalysts
Cationic Catalysts

4. The Dynamic Mechanical Properties of Epoxy Resins
Basic Parameters
The Glassy Transition and Dynamic Mechanical Dispersion
Temperature and Frequency Interdependence
Experimental
Results and Discussion
Standard Measurements
Dynamic Measurements
Comparison of Results
Treatment by Reduced Variables
Conclusions

5. Physical and Chemical Properties of Epoxy Resins
Solubility and Surface Properties
Network Structure and Physical Properties
Aging and Chemorheology
Bisphenol a Epoxy Homopolymers and Copolymers
Thermal Transition Effects
Dynamic Mechanical Response
Relaxation and Fracture Properties
Properties Compared with Elastomers and Thermoplastics

6. Epoxy Resin Adhesives
Introduction
Theories of Adhesion and Aohesive-joint Strength
Wetting and Spreading Phenomena
Boundary-Layer Theory
Surface-Attachment Theory of Adhesive-Joint Strengths
Stress Distribution in Adhesive Joints
Rheological Aspects of Adhesives
Unified Interpretation of Adhesive-Joint Strengths
Physical and Mechanical Aspects of Epoxy-Resin Adhesives
Dynamic Mechanical Techniques
Mechanical Behavior of Epoxy Adhesives During Joint Formation
Strength of Adhesive Materials
Chemical Aspects of Epoxy-based Adhesives
Curing Agents for Bisphenol A Epoxy Adhesives
Modifiers for Bisphenol A Epoxy Adhesives
Adhesives Based on Other Epoxy Materials
Technological Properties of Epoxy-adhesive Systems
Cure and Thermal Softening Behavior of Epoxy Adhesives

Manufacturing Instructions
Application Instructions
Thermoplastic-Epoxy-Resin Crosslinked Systems
Water-Reducible Epoxy Resin Coatings
Water-Reducible Epoxy-Ester Baking Finishes
Manufacturing Instructions
Application Instructions
Water-Reducible Polyamide-Cured Epoxy-Resin Coatings
Manufacturing Instructions
Manufacturing Instructions
Water-Reducible Epoxy-Resin Coatings for Electrodeposition
General Remarks
Maleinization Step After Complete Esterification of the Epoxy Resin with Organic Acids
Cooking Procedure
Application Instructions

8. Epoxy Coating Give into Water

9. Electrical and Electronic Applications : Sealants and Foams
Electronic and Electrical Applications
Introduction
Casting
Potting
Encapsulation
Coatings
Sealing
Molding
Formulation of the Resin System
Internal Stresses
Rapid Cures
Flexibilizing Epoxy Resins
Fillers
Reactive Diluents
Cycloaliphatic Epoxides
High-Temperature Epoxy-Resin Systems
Flame-Retardant Epoxy Resins
Colorless Epoxy Resins
Epoxy Formulations
Molding
Molding Compounds
Molding Technology
Liquid-Injection Molding
Pellets and Preforms
Epoxy Sealants
Epoxy Foams
Gas-Blown Foams
Syntactic Foams
One-Package Foams
Epoxy-Foam Applications
Epoxy Strippers
Handling of Epoxy Casting Systems

10. Analysis of Epoxides and Epoxy Resins

Uncured Epoxy Resins
Qualitative Tests
Detection of Free Epoxy Groups
Determination of Epoxy Group—Lithium-Chloride Test
Reagents
Procedure
Determination of Epoxy Group—Periodic Acid Test
Reagents
Procedure
Determination of Epoxy Group—Pyrolysis Test
Reagents
Procedure
Determination of Epoxy Group—Lepidine Test
Reagents
Procedure
Detection of the Bisphenol A Skeleton
Determination of Bisphenol A Epoxy Resins—Mercuric Oxide and Nitric Acid Tests
Reagents
Procedure
Determination of Bisphenol A Epoxy Resins in Coatings—Nitric Acid Test Reagents
Reagent
Procedure
Determination of Bisphenol A Epoxy Resins—Filter-Paper Test
Reagents
Procedure
Determination of Bisphenol A Epoxy Resin—Formaldehyde Test
Reagents
Procedure
Determination of Bisphenol A Epoxy Resins—Phenylenediamine Test
Reagent
Procedure
Detection of Epoxy Resins Based on 4,4-'-Diamino-diphenylmethane
Determination of Epoxy Resins Based on 4,4'-Diaminodiphenylmethane
Reagents
Procedure
Detection of Other Epoxy Resins
Quantitative Tests of the Epoxy Group
Hydrohalogenation Methods
Estimation of Epoxy Group—Hydrochloric Acid in Dioxane, Methyl Ethyl Ketone, or Dimethylformamide
Reagents
Procedure
Calculations
Estimation of the Epoxy Group—Pyridinium Chloride in Pyridine
Reagents
Procedure
Hydrohalogenation by Direct Titration
Estimation of Epoxy Group
Reagents
Procedure
Calculations
Other Chemical Methods
Estimation of Other Functional Groups
Hydroxyl Group

ï•¡-Glycol Group
Estimation of a-Glycol Group
Reagents
Procedure
Calculation
Chlorine
Esterification Equivalent Weight
Estimation of Esterification Equivalent Weight
Reagents
Procedure
Calculation
Infrared Spectroscopy
Technique
Epoxide Absorption Bands
Epoxy Resins
Quantitative Estimation
Following the Degree of Cure
Other Physical Methods
Ultraviolet Spectroscopy
Electron Spin and Nuclear Magnetic Resonance Methods
Gas Chromatography
Paper Chromatography
Thin-Layer and Gel-Permeation Chromatography
Handling Properties
Molecular Weight
Softening Point
Viscosity
Color
Blends and Compounds
Hardeners and Accelerators
Organic Acid Anhydrides
Determination of Acid and Anhydride Content
Reagents
Procedure
Calculations
Amines
Determination of Amine Number
Reagents
Procedure
Calculation
The Curing Process
Curing Characteristics of Epoxy Resin-Hardener Systems
Determining the Degree of Cure
Analysis of Cured Epoxy Resins

11. The Toxicology of Epoxy Resins
Introduction
Experimental Method
Materials
Acute Toxicity
Chronic Toxicity
Irritation
Sensitization

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 varies 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.

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

Fri, 26 Apr 2019 09:32:19 +0530