

Handbook on Coal, Lignin, Wood and Rosin Processing

Author:- Dr. H. Panda

Format: paperback

Code: NI298

Pages: 512

Price: Rs.1875US\$ 150

Publisher: NIIR PROJECT CONSULTANCY SERVICES

Usually ships within **5** days

Coal is one of the world's most plentiful energy resources. Coal is one of the fastest growing forms of energy after renewable sources and its share in the global primary energy consumption increasing rapidly. Lignin is the most abundant natural raw material available on Earth in terms of solar energy storage. Lignin is a complex chemical compound, cross linked polymer that forms a large molecular structure. Lignin can be used as a green alternative to many petroleum-derived substances, such as fuels, resins, rubber additives, thermoplastic blends and pharmaceuticals. Rosin is a complex mixture of mainly resin acids and small amount of non-acidic components.

Energy markets are evolving with technological advancements supporting rapid growth in renewable energy capacity. The coal market is set to witness great boost in near future because of the rising government initiatives.

Coal is one of the main power generation sources all over the world. The factors that are favoring the market growth include rising electricity demand and rapid industrialization. Presently the global coal industry market is valued at \$9.4 with CAGR of 11.21 % is poised to reach \$22 billion in coming years. Asia Pacific has the larger demand and emerging as a larger supplier of Coal. The present global lignin market demand is estimated at \$ 4,222.1 million and is expected to reach \$6,190.5 million in future.

The Major contents of the book are coal, analysis of coal and coke, cotton, lignin and hemicelluloses, degradation of wood, CCA-treated wood, wood-polymer composites, lignocellulosic-plastic composites from recycled materials, chemical modification of wood fiber, delignification of wood with pernitric acid, rosin and rosin derivatives, polymerizable half esters of rosin. It describes the manufacturing processes and photographs of plant & machinery with supplier's contact details.

It will be a standard reference book for professionals, entrepreneurs, those studying and researching in this important area and others interested in the field of these industries.

Chapter 1

Coal

Ethylene

Fischer –Tropsch Synthesis for Olefins

Direct Conversion of Synthesis Gas to Ethylene

Ethanol from Synthesis Gas
Olefins from Methanol
Methanol Homologation
Methanol to Acetic Acid
Ethylene Glycol
Acetic Anhydride
Vinyl Acetate
Other Chemicals
Coal Pyrolysis Processes
Acetylene
Production of Chemicals by
Coal Liquefaction Processes
Conclusion
Chapter 2
Analysis of Coal and Coke
Methods of Analysis
Sampling
Determination of Constitution and Physical
Properties
Functional Group Analysis
Spectroscopy
Determination of Optical Constants
Electron Microscopy
Density
X-Ray Diffraction
Specification Tests
Proximate Analysis
Ultimate Analysis
Calorific Value
Fusibility of Coal Ash
Behaviour on Heating
Equilibrium Moisture of Coal at 96-97%
Relative Humidity and 39°C
Determination of Hargreaves Grindability
Index of Coal
Special Constituents
Coal Classification
Chapter 3
Cotton
Methods of Analysis
Modified Cottons
Finishing Agents
Separation and Identification
Spectroscopic Methods
Inorganic Constituents
Chemical Methods
Spectroscopic Methods
Chapter 4
Lignin and Hemicellulose
Hemicellulose
Assay systems
Classification
Thermophilic Hemicellulases

Alkaline active xylanases
 β - Xylosidase
Mannanases and galactanases
Accessory enzymes for Hemicellulose utilization
Lignin
Lignin-degrading enzymes
Lignin degradation in whole cell cultures
Degradation by cell-free enzyme systems
Role of glycosides in Lignin degradation
Lignin-carbohydrate complexes
Fractionation of Lignin and
Carbohydrate in wood
Isolation of LCCs
Chemical characteristics of LC bonds
Ferulic and p-coimaric ester side chains
Frequency and stability of LC bonds
Residual lignin in kraft pulp
Biodegradation of LCCs
Residual LC structures after exhaustive
enzymatic digestion
Solubitization of LCC by microbial activity
Enzymatic treatments of pulps
Conclusion
Chapter 5
Degradation of Wood
Introduction
Gross Chemical Composition
Distribution of Wall Components
Component Chemistries
Microstructure and Porosity
Degradation of whole wood
Biodegradation of Lignin
Biodegradation of Cellulose
Biodegradation of Hemicellulose
Applications
Conclusion
Chapter 6
CCA-Treated Wood
Introduction
Materials and methods
Results and Discussion
Conclusion
Chapter 7
Wood-Polymer Composites
Introduction
Materials and Methods
Monomers
Wood specimens
Treatment of specimens with monomers
Volumetric swelling and moisture content
Result
Swelling of wood soaked in monomers
Polymer loading

Volumetric swelling of WPC specimens

Moisture content of WPC specimens

Conclusions

Chapter 8

Lignocellulosic-Plastic Composites from Recycled Materials

Municipal Solid Waste as a Source of

Lignocellulosic Fibre and Plastics

Thermoformable composites

as Outlets for Waste Paper, Wood and Plastics

Recent Research on Wood

Fiber-Thermoplastic Composites

Research and Development Needs

Concluding Remarks

Chapter 9

Chemical Modification of Wood Fiber

Introduction

Experimental Procedure

Esterification Procedure

Analyses of Esterification Products

Board Formation

Board Testing

Moisture sorption

Rate and extent of swelling

Results and Discussion

Esterification of Wood Fiber

Moisture Sorption of Esterified Fiberboards

Rate and Extent of Swelling of Fiberboards in Liquid Water

Plasticization of Esterified Fibers

Conclusions

Chapter 10

Delignification of Wood with

Pernitric Acid

Generation of pernitric acid

Decomposition of pernitric acid

Delignification of aspen wood

Conclusions

Experimental

Chapter 11

Rosin and Rosin Derivatives

Composition

Reaction and derivatives

Isomerization

Maleation

Oxidation

Photosensitized oxidation

Hydrogenation

Hydrogenless Hydrogenation

Polymers of vinylesters of hydrogenated rosin

Prehydrogenation

Hydrocracking of Rosin

Dehydrogenation

Polymerisation
Analysis
Compatibility
Solubility
Instrumental analysis
Gas chromatography analysis
Infrared Spectroscope
Nuclear magnetic resonance
Ultraviolet spectroscopy
X-Ray Analysis
Mass Spectroscopy
Phenolic modification
Salt formation
With metals
With unsaturated cyclic and acyclic hydrocarbons
Example-2
Rosin-isoprene condensate (Example-3)
Rosin-isobutene condensate (Example-4)
Example –5
Rosin-styrene condensate (Example-6)
Rosin-cyclopentadiene condensate (Example-7)
Rosin-coumarone-indene condensate (Example-8)
Rosin-divinylbenzene condensate (Example-9)
Example-10
Esterification
With Glycerol
With pentaerythritol and other polyhydric alcohols
With monohydric alcohols
Hydrogenolysis
Polyesterification
Copolyesters
Ammonolysis
Preparations
Dehydroabietylamine acetate
Dehydroabietylamine
Typical Uses
Asphalt additives
Chemical Intermediates
Corrosion Inhibitors
Flotation Reagents
Preservatives
Resolving agent
Chemical and physical properties of
Amine D acetate
Stability to heat and storage
Stability to heat and storage
Surface Activity
Chemical Reactivity
Chemical and Physical Properties of
Amine D acetate
Solubility
Note
Stability to Heat and Storage

Stability to Air and Sunlight
Surface Activity
Styrenation
Decarboxylation
Hydroxymethylation and hydroxylation
Methods of preparations
Nitrogenous intermediates
Methyl levopimarate (i)
Methyl neoabietate (ii)
Methyl photolevopimarate (iii)
Reaction of SSI with Methyl levopimarate (i)
Reaction of Chlorosulphonyl isocyanate with
methyl neoabietate (ii)
Reaction of Chlorosulphonyl isocyanate with
methyl photolevopimarate (iii)
Fumaroniprile Adduct of
levopimaric acid
Tetracyanoethylene Adduct of
levopimaric acid
Acrylonitrile adducts of
levopimaric acid
Polyoxyalkylation

Chapter 12

The Polymerizable Half Esters of Rosin
Experimental
Preparation and properties of monomers
Maleic rosin esters with reactive groups
Polymerization & Copolymerization
Aqueous Polymerization
Suspension Polymerization
Secondary reactions and graft copolymers
Reaction Involving Crosslinking
Applications
Coatings
Inks
Textiles
Conclusions

Chapter 13

Photographs of Plant & Machinery with Supplier's
Contact Details

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 07:53:07 +0000