AN ISO 9001 : 2015 CERTIFIED COMPANY

The Complete Technology Book on Wood and Its Derivatives

FREE SAMPLE: contents and introduction of the 502-page book
Price: Rs 1,100 | US$ 29.73

Order the full book >

AN ISO 9001 : 2015 CERTIFIED COMPANY

Author: NIIR Board of Consultants & Engineers
Format: paperback
Code: NI146
Pages: 502
Price: Rs 1,100 | US$ 29.73
Publisher: NIIR PROJECT CONSULTANCY SERVICES
Shipping: 5 days

About the Book

Wood has been used for hundreds of thousands of years for both fuel and as a construction material. Wood is an organic material, a natural composite of cellulose fibers (which are strong in tension) embedded in a matrix of lignin which resists compression. In the strict sense wood is produced as secondary xylem in the stems of trees (and other woody plants). Wood is used for millennia for many purposes, primarily as a fuel or as a construction material for making houses, tools, weapons, furniture, packaging, artworks, and paper. Wood is composed of cells, and the cell walls are composed of micro fibrils of cellulose and hemicellulose impregnated with lignin. The derivation of chemicals from wood is carried out wherever technical utility and economic conditions have combined to make it feasible. In a living tree it performs a support function, enabling woody plants to grow large or to stand up for themselves. It also mediates the transfer of water and nutrients to the leaves and other growing tissues. Wood may also refer to other plant materials with comparable properties, and to material engineered from wood, or wood chips or fiber. Wood and man have coexisted on this planet from the beginning and wood, as a renewable resource, has provided man with tools, weapons and shelter. Wood, when dry, has unique physical properties in that its tensile strength, bending strength, compression strength, impact resistance and hardness per unit weight are the highest of all construction materials. Wood polymer composites (WPC) are materials in which wood is impregnated with monomers that are then polymerized in the wood to tailor the material for special applications. The resulting properties of these materials, from lightness and enhanced mechanical properties to greater sustainability, has meant a growing number of applications in such areas as building, construction and automotive engineering. Other uses of wood in furniture, buildings, bridges, and as a source of energy are widely known. Wood is perhaps the most used component in our daily life, from home building and furnishings to everything from the tables to the doors are made of wood, and for the people living in colder climates, wood holds even greater importance.
Some of the fundamentals of the book are wood structure and chemical composition, chemical change in wood associated with wood fiberboard manufacture, chemical changes in wood effected by furnish preparation processes, bark extracts as bonding agent for particle board , wood polymer composites and their industrial applications , chemical reactions of preservatives with wood, activation of wood surface and nonconventional bonding , chemistry of weathering and protection , weathering of chemically modified woods, energy and chemicals from wood, charcoal and other chemicals, etc.
The developments in wood industry in the country are mainly attributed to the pioneering work carried in the field of wooden products. There are lots of chemicals and other products extracted from wood. This book contains processes of various wooden products and its derivatives. This is the first book of its kind which is invaluable resource to research scholars, entrepreneurs, technocrats, institutes, libraries and existing one.

Contents

1. Wood: Structure and Chemical Composition
Gross Anatomical Features
Softwood Anatomy
Hardwood Anatomy
Cell Wall Structure
Chemical Composition of Cell Wall
2. Chemical Change in Wood Associated with Wood Fiberboard Manufacture
Furnish Preparation Processes
Wet Form Process Using Pressurized Refining.
Chemical Changes in Wood Effected by Furnish Preparation Processes
Board Conversion Processes
Wet Strength Properties of Hot Pressed Boards
Mechanism of Wet Strength Properties
Chemical Changes in Wood Effected by Board Conversion
3. Review of Particleboard Manufacture and Processing
Definition
Materials
Manufacturing
Particle Drying
Blending
Mat Formation
Finishing
Conclusion
4. Bark Extracts as Bonding Agent for Particle board
Material and Preparation
Bark Extracts
Three Layer Particleboard
Testing
5. Composition Boards Containing Bark
Amounts of Bark Available
Review of Efforts to Use Bark in Composition Boards
6. Polyurethane Foams from the Reaction of Bark and Diisocyanate
7. Wood Polymer Composites and their Industrial Applications
Chemistry of the Process
Impregnation Process
Monomers For Wood Polymer Composites
Physical Properties
Commercial Applications
Radiation Process.
World Wide Production
8. Interaction of Preservatives with Wood
Major Use Wood Preservatives
Minor Use Wood Preservatives
Copper Naphthenate.
Copper 8 Quinolinolate (Copper 8)
Tributyltin Oxide.
New Wood Preservatives

Preservative Distribution in Wood
Macrodistribution
Chemical Reactions of Preservatives with Wood
Inorganic Salt Preservatives.
Organic Preservatives
9. Chemistry of Adhesion
Thermoplastic and Thermosetting Polymers
Molecular Forces Between Adherend and Adhesive
Adhesives for Wood
Phenolic Resin Adhesives
Resoles
Novolak
Resorcinol Resins
Durability and Fracture Toughness
Urea Formaldehyde and Melamine Formaldehyde Resins
Isocyanate Based Adhesives
Thermoplastic Adhesives
Hot Melt Adhesives
Acidity of Wood
10. Activation of Wood Surface and Nonconventional Bonding
Conditions and Methods of Wood Surface Formation.
Direct Covalent Wood to Wood Bonding
Bonding Through Intermediacy of Bifunctional Molecules
Bonding by Intermediacy of a Covalently Attached Polymer
Use of Oxidants
Fundamental Studies
Surface Activation.
Hydrogen Peroxide Activation
Plasma Activation
Other Oxidizing Activators
Nonconventional Bonding
Direct Bonding
Bifunctional Amines
Bifungtional Acids
Bifunctional Isocyanates
Polymers
Conclusions
Addenda
Wood Surface Studies
Nonconventional Bonding with Acid Activation

Nonconventional Bonding with Oxidant Activation
Isocyanates
Nonpolar Nonconventional Binders
Other Methods
Patents
11. Chemistry of Weathering and Protection
Backgrounds
General Aspects of Wood Weathering
Anatomic Structure of Wood and Its Weatherability
Weathering Factors

Other Factors
Penetration of Light and Wood Surface Deterioration
Property Changes During Weathering
Chemical Changes
Colour Changes
Physical Changes
Microscopic Changes
Transverse Section
Radial Section
Tangential Section
Weathering of Wood Based Materials
Plywood
Reconstituted Panel Products
Weathering of Chemically Modified Woods
Free Radical Reactions in Lignin
Free Radical Characteristics and Reactions in Weathered
Participation of Singlet Oxygen in the Weathering Process
Protection Against Weathering
Film Forming Finishes
Varnishes
Natural Wood Finishes
Film Forming
Penetrating
Transparent
Semitransparent
Protection of Wood Based Materials
Wood Coating Interactions
Summary and Future Considerations
12. Biological Decomposition of Solid Wood
Susceptibility and Resistance
Types of Wood Deterioration
Deterioration without Decomposition.
Deterioration with Decomposition
Mecha nobiochemical Decomposition
Biochemical Decomposition: The Wood Decays
Types of Decay
Progressive Changes in Chemical Composition
Progressive Changes in Strength Properties
Cellulose Decomposition
Hemicellulose Decomposition
Lignin Decomposition
Control and Uses of Wood Decomposing Organisms
Uses and Potential Uses
13. The Chemistry of Pyrolysis and Combustion
Formation of Volatile Products from Cellulose
First Patbway

Second Pathway
Dehydration Reactions
Formation and Properties of Char
Char Formation

Char Reactivity
Combustion
Combustibility
14. Chemistry of Fire Retardancy
Early Studies
Protection of Wood with Fire Retardants
Thermogravimetric Analysis (TG).
Differential Thermal Analysis and Differential Scanning Calorimetry
Tunnel Flame Spread Tests
Critical Oxygen Index Test
Test Methods for Related Properties
Smoke Production.
Heat Release Rate
Toxicity
Meehanisms of Fire Retardancy
Chemistry of Burning
Vapor phase Combusttion
Smoldering And Glowing
Theories of Fire Retardancy
Barrier Theories
Thermal Ttheories
Dilution or Noncombustible Gases Theories
Free Radical Trap Theories
Increased Char/Reduced Volatiles Theories
Reduced Heat Content of Volatiles Theories
Phosphorus Nitrogen Synergism Theories
Smoldering Inhibition Theories
Fire Retardant Formulations
Major Chemicals
Aluminum Trihydrate
Miscellaneous Chemicals
Leach resistant Chemicals
Amino resins
Future Research
Leach Resistant Compounds
Improved Fire Retardant Treatments for Panel Products
Effective Coating Systems
Reduced Smoke and Toxicity
Basic Mechanisms. Finally, further work
Summary
Mechanism.
Formulations
Future Research
15. ENERGY AND CHEMICALS FROM WOOD
Alternate Energy Sources
Avaiilable Forest Residues
Energy and Fuels from Wood
Direct Combustion
Sacchari fication Fermentation
Ethanol from wood
Thermal Decomposition

AN ISO 9001 : 2015 CERTIFIED COMPANY

Charcoal and other Chemicals
Thermochemical Liquefaction
Furfural from Wood
Fiberboaard, particleboard, and flskeboard
Plywood
Laminated Lumber
Industrial Use of Energy
Energy Plantations

Get the full book

This sample shows only the contents and introduction. The full book has every chapter.
Price: Rs 1,100 | US$ 29.73
Delivery: Shipped within 5 working days of payment
Order online: niir.org/books/wood-derivatives-technology-book/ **WhatsApp:** +91 9097-075-054

Planning a unit? NPCS project reports:

- Hot Melt Adhesives project report
- Phenolic Formaldehyde Resin project report
- Composite Materials project report
- Hydrogen Peroxide project report

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, Market Research, Manufacturing Process, Machinery, Raw Materials, Project Feasibility, Investment Opportunities, Technical Consultancy and Startup Help.

NPCS also publishes process technology books, technical books, startup books, directory, business database, detailed project reports and market research reports.

Our Detailed Project Report aims at providing all the critical data required by entrepreneurs for starting new business ventures.

NIIR PROJECT CONSULTANCY SERVICES
106-E, Kamla Nagar, New Delhi-110007, India

Email: npcs.india@gmail.com **Website:** https://www.niir.org/

Scan to order the full book on niir.org