

# Modern Technology of Industrial Chemicals

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Growth in demand for chemicals in developing countries is high leading to substantial cross border investment in the chemical sector. In modern age chemical industries have permeated most extensively in comparison with other industries and are progressing at a very rapid pace. The chemical industry comprises the companies that produce industrial chemicals. The applications of industrial chemical are in various fields like in dyes, chemical explosives and rocket propellants, fertilizers etc. Central to the modern world economy, it converts raw materials into more than 70,000 different products. Chemicals are used to make a wide variety of consumer goods, as well as thousands inputs to agriculture, manufacturing, construction, and service industries. Chemical industries produce chemicals from various products like chemical from milk, fats, coal, oranges, wood etc and utilized in many industries like dye, textile, fertilizers etc. Some of the examples of industrial chemicals are acetophenone, alletrhin, calcium cyanamide, carboxymethylcellulose, hydroquinone etc. The chemical industry itself consumes 26 percent of its own output. Chemical industry is one of the oldest industries in India. It not only plays a crucial role in meeting the daily needs of the common man, but also contributes significantly towards industrial and economic growth of the nation. The chemical industry forms the backbone of the industrial and agricultural development and provides building blocks for downstream industries; it is an important constituent of the Indian economy. Global chemical production is growing and the growth is contributed by the chemical industry of developing countries. The chemical industry in India which generates almost 13% of total national export is growing annually at a growth rate anywhere between 10% and 12%.

This book basically deals with properties, formulae, manufacturing of chemicals, purification of the product and efficiency of the product. The major contents of the book are dye application, granulated fertilizers; purification includes dehydrogenation and further distillation, carotene and chlorophyll: commercial chromatographic production, chemical explosives & rocket propellants, chemicals from acetaldehyde, chemicals from fats, chemicals from milk, chemicals from oranges so on. This book also deals with manufacturing processes with reaction, technical details, equipments involved in processing etc.

This book elucidates chemicals which have good market potential. The book is a valuable resource for new entrepreneurs, industrialists, research scholars, technical libraries, consultants etc.

## 1. Acetophenone

Compound Is Used Extensively In The Preparation Of Perfumes

Three Parts Of Molecule May Be Involved In

## Chemical Reactions

Carbide's Acetophenone Is Intermediate In

Continuous Styrene Process

Oxidation Step Yields Mixture Of Acetophenone  
And Phenylmethylcarbinol

Caustic Neutralizes About 98% Of Acid Formed During  
Oxidation

Ethylbenzene Is Recycled; Acetophenone And Phenylmethylcarbinol Mixture Is Refined  
Purification Includes Dehydrogenation And Further  
Distillation

Freezing Point Determinations Are Important In Process  
Control

Adequate Provision Are Made To Ensure Safety Of  
Workers

## 2. Alcohols By Sodium Reduction

High Pressure Process

Sodium Reduction Process

Description Of Process

Chemical Control

Instrumentation And Control

Safety Provisions

Hot Oil-Circulating System

Materials Of Construction

## 3. Allethrin

Efforts Made To Develop Synthetic Insecticide Having Same Desirable Properties In Pyrethrum  
Allethrin, An Oily Liquid, Consists Of A Mixture Of Eight Optically Active Isomers

First Series Of Chemical Reactions Involves Synthesis Of Allethrolone

Atmospheric Distillation Employed In Purification Of Crude Allyl Acetone

Ethyl-3-Oxo-6-Heptenoate Is Saponified At Room Temperature With Potassium Hydroxide

Vacuum Operation Minimizes The Thermal Breakdown Of Allethrolone

Preparation Of Chrysanthemum Acid Chloride Is Second Major Phase Of Allethrin Synthesis

Nickel Catalyst Aids Hydrogenation Of The 2,5-Dimethylhexyne-2,5-Diol

Ethyl Glycine Hydrochloride Is An Intermediate In The Preparation Of The Ethyl Diazoacetate

Aqueous Phase Extraction With Ether Recovers Ethyl Diazoacetate

Distillation Of Ethyl Chrysanthemumate Is Carried Out At 10-Mm Pressure

Reaction Of Chrysanthemum Acid Chloride And Allethrolone Produces The Final Product

Either One Of Two Standard Methods May Be Used In Analysis Of Allethrin

Future Market For Allethrin Depends

On Developmental Programs Now In

Progress

## 4. Amyl Compounds From Pentane

Sharples History

Fundamental Chemistry

Production Of Amyl Compounds

Corrosion

Safety

Control

Economics

## Future Prospects

### 5. Anthracene

Introduction

Properties

Uses And Applications

Industrial Prospects

Process Of Manufacture

Apparatus

Thermometer

Procedure

### 6. Barium Potassium Chromate Pigment

Manufacturing Procedure

Proposed Production Plant

Field Performance

Future Of Chromate Pigments

### 7. Calcium Cyanamide

History Of Calcium Cyanamide Process

Chemistry Of Calcium Cyanamide

Coke

Lime

Fluorspar

Briquetting

Calcium Carbide Production

Calcium Cyanamide Production

Calcium Cyanamide Milling

Auxiliary Equipment

Chemical Control

Safety Precautions

Present Markets

Future

### 8. Calcium Magnesium Aconitate

Srri Pioneered Initial Laboratory Studies

Usda Operated First Pilot Plant At New Orleans

Godchaux Plant Processes B Molasses And Blackstrap Molasses

Aconitate Precipitation Includes Dilution, Liming And Crystallization

Solids Separation Is Key Step Of Process

Aconitate Is Dried By Gas Heated Conveyor Belts

There Are Still Unknown Factors In Aconitate Production

Potential Raw Material Supplies Are Practically Unlimited

### 9. Carboxymethylcellulose

Cmc Is Valuable As Thickener, Stabilizer, And Detergency Improver

Solubility Of Cmc Depends On Degree Of Substitution Of Hydroxyl Units

Dry Sodium Monochloroacetate React With Alkali Cellulose In German Batch Process

Continuous Process Uses Monochloroacetic Acid

Other Producers Manufacture Special-Purpose Cmc

Wyandotte Produces Technical Grade Cmc From Bleached Sulfite Pulp

Processing Is Continuous In A Three-Zone Rotary Reactor

Pneumatic Atomizers Disperse Monochloro-Acetic Acid In Reactor  
Complete Reaction Requires About 3 Hours  
Flash Drying Yields Desirable Products  
Performance Tests Check Product Quality  
Versatility Of Cmc Assures Its Future

## 10. Carotene And Chlorophyll: Commercial Chromatographic Production

Preparation  
Adsorption  
Finishing  
Production  
Future Prospects

## 11. Chemical Explosives & Rocket Propellants

Introduction  
Definition  
Chemistry Of Combustion  
Fig 1. The Fire Safety Triangle  
Historical Development  
Classification Of Explosives  
Explosives Manufacturing  
Tnt (2,4,6-Trinitrotoluene)  
Rdx And Hmx  
Hns (2,2',4,4',6,6'-Hexanitrostilbene)  
Tatb (1,3,5-Triamino-2,4,6-Trinitrobenzene)  
Ddnp (2-Diazo-4,6-Dinitrophenol)  
Petr (Pentaerythritol Tetranitrate)  
Ng (Nitroglycerin Or Glycerol Trinitrate)  
Dynamite  
Slurry And Emulsion Explosives  
Rocket Propellants  
Principles Of Rocket Propulsion  
Types Of Propellants  
Solid Propellants  
Single And Double-Base Propellants  
Composite Propellants  
Propellant Use Criteria  
Composite Propellant Manufacture  
Liquid Propellants  
Physical Properties  
Liquid Oxidizers  
Liquid Fuels  
Monopropellants  
Gelled Propellants

## 12. Chemicals From Acetaldehyde

Steps In Development Of Acetaldehyde Process  
The Hoechst Plant  
Outlook  
Acetaldehyde To Acetic Acid  
Acetic Acid Process  
Acetaldehyde To Ethyl Acetate  
Butyl Acetate

Methoxybutylacetate

### 13. Chemicals From Fats

Chemical Nature Of Fats And Fatty Acids

Chemistry Of Fat And Fatty Acid Processing

Developments By Armour

Processing Of Fatty Acids

Auxiliary Installations

Chemical Control

Products And Their Uses

### 14. Chemicals From Milk

Raw Material

Processing

Casein

Milk Protein Powder

Caseinates

Whey Proteins

Milk Sugar

Casein Hydrolyzates

Tyrosin Production

Packaging

Materials Of Construction

### 15. Chemicals From Oranges

Juice Products Require Top Grade Fruit

Three Types Of Extractors Remove The Juice

Frozen Concentrate Represents An Increasing Outlet For Orange Growers

Oil-Bearing Liquors Pressed From Orange Peel Yield Orange Oil

Meal And Molasses Are Produced From Peel Not Used In Pectin Production After Oil Extraction

Several Types Of Pectin May Be Hydrolyzed From Orange Peel 306

Citrus Peel Is Source Of Bioflavonoids Or "Vitamin P" Material 308

Proper Design Of Processing Plant And Equipment Limits Juice Spoilage And Product Contamination

Plant Waste Waters Operate Disposal Farm

Seasonal Nature Of Operations Is Important Factor In Citrus Processing

### 16. Chemicals From Wood

History Of Marathon Process

Chemistry Of Marathon's Lignosulfonates

Spent Liquor From 50,000 Tons Of Pulp

Fate Of Calcium Lignosulfonate (Organic Precipitate)

Vanillin Process Effluent

Vanillin Effluent A

Vanillin Effluent B

Salts Of Organic Acids

Operating Technology

### 17. Chloroquine Manufacture

Process Development

Plant Process  
Product Handling  
Control

## 18. Dye Application, Manufacture Of Dye Intermediates & Dye

Introduction

Textile Fibers

Natural Fibers

Regenerated Fibers

Synthetic Fibres

Dye Classification

Acid Dyes

Basic Or Cationic Dyes

Direct Dyes

Disperse Dyes

Reactive Dyes

Sulfur Dyes

Vat Dyes

Combinations

The Application Of Dyes

Fiber Preparation

Dye-Bath Preparation

Finishing

Dyeing Methods/Batch

Printing

Pigment Dyeing And Printing

Nontextile Uses Of Dyes

Dye Intermediates

Nitration

Reduction

The Manufacture Of Dyes

Nitro Dyes

Azo Dyes

Manufacturing Processes For Azo Dyes

Triphenylmethane Dyes

Xanthene Dyes

Anthraquinone And Related Dyes

Sulfur Dyes

Phthalocyanines

New Development In Dyes

## 19. Fine Chemicals From Coal

Chattanooga Plant Of Tennessee Products And Chemical Corporation

Benzoic Acid And Sodium Benzoate

Benzene Hexachloride

Toluene-Acid Recovery System

Utilities And Instrumentation

Future Prospects

## 20. Formaldehyde From Methanol

Manufacturing Processes

Commercial Processes Using Methanol

Other Processes  
Methanol  
Air Supply  
Reaction  
Catalyst  
Absorption  
Distillation  
Start-Up  
Instrumentation  
Analytical Control

## 21. Granulated Fertilizers By Continuous Ammoniation

Chemistry Enters The Field  
From Batch To Continuous Operation  
Many Variables Affect Granulation  
The Ball Starts Rolling  
Gravimetric Feeders Control Solids  
Ammoniation And Granulation In One Step  
Design Changes Have Been Recommended  
Technology Is Changing

## 22. Granulated Triple Superphosphate

Large Deposits Of Phosphate Rock In Florida  
Chemistry Of The Process  
Phosphoric Acid And Rock React  
Waste Disposal  
Phosphate Rock Reacts With Sulfuric Acid.  
Utilities  
Fume And Dust Control  
Analytical And Quality Control  
Maintenance And Repair  
Materials And Labor Required  
Typical Analyses Of Rock  
Typical Product Analyses  
Corrosion

## 23. Hydroquinone Manufacture

Preparation Of Quinone  
Quinone Separation  
Reduction To Hydroquinone  
Purification Of Hydroquinone  
Safety Precautions  
Laboratory Tests  
Uses Of Hydroquinone  
Hydroquinone Derivatives And The Future

## 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.

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