# Electroplating with Manufacture of Electrochemicals

(Electrochemical Cell, Ecm, Electroplating of Aluminium, Chromium, Copper, Gold, Cobalt, Iron, Lead, Nickel, Silver, Alloy, Platinum, Palladium, Rhodium, Zinc, Plastics, Barrel, Tin, Electrodeposition)



## **Introduction**

Electroplating is an electro deposition process for producing a dense, uniform, and adherent coating, usually of metal or alloys, upon a surface by the act of electric current. The term is also used for electrical oxidation of anions onto a solid substrate, as in the formation silver chloride on silver wire to make silver/silver-chloride electrodes. Electroplating is primarily used to change the surface properties of an object (e.g. abrasion and wear resistance, corrosion protection, lubricity, aesthetic qualities, etc.), but may also be used to build up thickness on undersized parts or to form objects by electroforming.

Electrochemical deposition is generally used for the growth of metals and conducting metal oxides because of the following advantages:

- (i) The thickness and morphology of the nanostructure can be precisely controlled by adjusting the electrochemical parameters,
- (ii) relatively uniform and compact deposits can be synthesized in templatebased structures, (iii) higher deposition rates are obtained, and (iv) the equipment is inexpensive due to the non-requirements of either a



high vacuum or a high reaction temperature. An electrochemical process where metal ions are transferred from a solution and are deposited as a thin layer onto surface of a cathode.

In the recent years, developments in electronic and chemical engineering have extended the process of electroplating to a wide range of materials such as platinum, Alloy, Silver, Palladium, Rhodium, etc. The electroplating market is an application driven market, which depends largely on the net output of the manufacturing industry.

The electroplating technology allows electro-deposition of multiple layers as thin as one-millionth of a centimeter which makes it an indispensable part of the semiconductor industry. Rising demand for computing devices is expected to create significant market opportunities for electroplating service providers. Growing net output of manufacturing industry, rising demand for consumer goods which mandates more surface finishing services, growth of the electronics industry are some of the key factors driving the growth of the global electroplating market.

The global electroplating market was valued above US\$ 14,540.5 Mn in



2016 and is expected to expand at a CAGR of 3.7% to cross US\$ 21,160.0 Mn by the end of 2026. The global electroplating market was valued above US\$ 14,540.5 Mn in 2016 and is expected to expand at a CAGR of 3.7% to cross US\$ 21,160.0 Mn by the end of 2026. The Automotive and Electrical & Electronics segments are estimated to collectively hold about 65% of the total value share of the global electroplating market by the end of 2026.

The demand for copper and nickel as raw metals for electroplating is projected to surge at a faster pace, reaching a combined global market value share of more than 60% through 2026. Machinery Parts & Components segment, expanding at a CAGR of 3.8% over the forecast period, is expected to represent 10.2% share of the total incremental opportunity created between 2016 and 2026.

Automotive: Automotive segment was estimated to be valued above US\$ 4,300 Mn by the end of 2016 and is projected to expand at a CAGR of 3.9% over the forecast period to reach beyond US\$ 6,440 Mn by 2026 end. The segment is expected to create a total incremental opportunity of more than US\$ 2,000 Mn between 2016 and 2026.

Electrical and Electronics: Electrical & Electronics segment was estimated



to be valued at over US\$ 5,000 Mn by 2016 end and is projected to expand at a CAGR of 3.9% over the forecast period to reach a value more than US\$ 7,300 Mn by 2026 end.

Aerospace & Defense: The segment is projected to create incremental \$ opportunity of more than US\$ 750.9 Mn during the forecast period. Jewellery: Jewellery segment is expected to reach a market value of more than US\$ 950 Mn by 2026 end.

Machinery Parts & Components: This segment is expected to create total incremental opportunity of less than US\$ 670 Mn between 2016 and 2026.

Others: The segment is expected to expand a CAGR of 3.6% and lose 10 BPS between 2016 and 2026.

The book gives comprehensive coverage of Electroplating Uses, Application Manufacturing, Formulation and Photographs of Plant & Machinery with Supplier's Contact Details. The major contents of the book are Metal Surface Treatments, Electrolytic Machinery



Methods, Electroless Plating, Electroplating Plant, Electroplating of Aluminium, Cadmium, Chromium, Cobalt, Copper, Gold, Iron, Lead, Nickel, Bright Nickel, Silver, Alloy, Platinum, Palladium, Rhodium, Bright Zinc, Tin and Plastics Barrel, Zinc Electroplating Brightener, Colouring of Metals, Metal Treatments, Electrode position of Precious Metals and Stainless Steel, Case Hardening, Electroless Coating of Gold, Silver, Manufacture of phosphorus.

It is a very useful book that covers all important topics of Electroplating. It will be also a standard reference book for professionals, entrepreneurs, those who are interested in this field can find the complete of Electroplating. It will be very helpful to consultants, new entrepreneurs, technocrats, research scholars, libraries and existing units.



## Table of Contents

## 1. Electrochemical Processing

INTRODUCTION

THE ELECTROCHEMICAL CELL

**INORGANIC** 

**Hardware for Electrochemical Processing** 

#### PRODUCTION CONDITIONS

**Electrolysis of Chloride Solutions Organic** 

#### HARDWARE FOR ELECTRO-ORGANIC PROCESSING

Cells Electrodes Electrolytes



Diaphragms
Cell Designs
Scale-Up-Consideration

### 2. Metal Surface Treatments

CLEANING, PICKLING, AND RELATED PROCESSES

Cleaning
Solvent Cleaning
Wiping
Emulsifiable Solvents
Emulsion Cleaning
Diphasic Chlorinated Solvents
Vapour Degreasing
Ultrasonic
Alkaline
Immersion
Spray
Ultrasonic Alkaline



**Steam** 

**Electrocleaning** 

**Pickling** 

**Chemical for Pickling** 

Sulphuric Acid:

**Hydrochloric Acid:** 

**Nitric Acid:** 

**Phosphoric Acid:** 

**Chromic Acid:** 

**Hydrofluoric Acid:** 

Other Pickling Acid:

The practice of Electrolytic Pickling:

#### CHEMICAL AND ELECTROLYTIC PICKLING COMPARED

**Anodic Cathodic Pickling Compared:** 

**Tin and Lead Additions:** 

Regeneration of Pickling Solutions

**Pickling Before Electroplating** 



## 3. Electrolytic Machinery Methods

#### PRINCIPLES OF THE ECM PROCESS

The Solution Gap Electrolytes Temperature Effects Corrosion products Pressure Effects

#### **TYPES OF ECM OPERATIONS**

#### MODERN DEVELOPMENT OF THE ECM PROCESS

Electrolyte Development
Fundamental Investigation
Innovations in ECM Operation
Static Fixture Finishing and Sizing
Embossing
Broaching
Uses



## 4. Electroless Plating

#### **THEORY**

#### **EQUIPMENT**

**Plating Tanks Rack Design and Loading Factors Safety and Waste Disposal Plating on Metals Preparation of the Substrate Plating on Nonconductors Plating of Plastics Process Details Printed Circuits Printed-Circuit Etchants Emerging Printed-Circuit Technologies** Plating on Glass **Architectural Glass** Ceramic Plating **Composite Plating** 



## ELECTROLESS COMPOSITE COATINGS USES AND APPLICATIONS:

Nonelectrolytic Plating Processes Immersion Plating Autocatalytic Plating

#### **POSTPLATING TREATMENTS**

#### **SPECIFICATION AND TESTS**

Thickness Corrosion Resistance Adhesion

#### **APPLICATIONS**

Decorative Plating
Plating for Protection
Special Surface Effects
Engineering Applications
Electroforming



## 5. Electroplating

#### THE SUBSTRATE IN ELECTROPLATING

#### PREPARATION OF THE SUBSTRATE

Cleaning

Rinsing

**Acid Dipping** 

**Drag-Out and Drag-In** 

**Special Preparation Cycles** 

**Aluminium and Magnesium** 

**Zinc-Base Die Castings** 

**Refractory Metals** 

Other Metals

**Nonconductors** 

The Electroplating Process

**Continuous Plating** 

**Materials of Construction** 

**Economics** 

**Safety** 

Waste Disposal and Metal Recovery



#### **PLATING SOLUTIONS**

Current Density Range
Throwing Power
Acidity
Anodes
Temperature
Purity
Bright Plating
Maintenance of Plating Baths

#### INDIVIDUAL PLATING BATHS

## **6. Electroplating Plant**

#### PLANT REQUIREMENTS

Buildings Supporting the Work to be Plated Tanks Filtration



Air Agitation
Water Supply
Heaters
Maintenance of the Solution
Effluent

#### **ELECTROPLATING PLANT**

## 7. Electroplating of Aluminium

Surface Roughening
Anodising
Zincating
Note:
Alstan Process
Plating Process
Silver-Tin Plating
Alstan Process



## 8. Electroplating of Cadmium

The Solution
Additions to the Solution
Anodes
Thickness of Deposit
Operating Conditions
Anti-Corrosion Properties of Cadmium
Nickel on Cadmium
Heat Treatment of Cadmium Deposits
Cadmium and Food Stuffs
Bright Cadmium Plating
Applications of the Cadmium-Plating

## 9. Electroplating of Chromium

The Electrolyte
Chromium Plating Process
Regeneration of Chrome Plating Solutions
Coloured Chromium Plating
Chromium Plating on Aluminium



### 10. Electroplating of Cobalt

Principles
Functions of Constituents of Bath
Operating Conditions
Maintenance and Controls

PREPARATION OF BASIS METALS AND FINISHING OF DEPOSITS
Tests of Deposits

## 11. Electroplating of Copper

**COPPER SULPHATE PLATING BATH Operating Condition** 

**BRIGHT PLATING** 

**CYANIDE BATH Composition** 



#### **SODIUM FORMULATION**

**Operating Condition** 

#### POTASSIUM FORMULATIONS

## 12. Electroplating of Gold

**STRIPPING GOLD** 

#### **GOLD BATHS**

Bath for Gold Gilding Current-Density, 0.15 Ampere

#### **GOLD BATHS FOR HOT GILDING**

Tanks for Gold Baths Execution of Gold-Plating

## FOR GOLD-PLATING IN THE COLD BATH THE PROCESS IS AS FOLLOWS:

**Re-Gilding Application of Gold-Deposition** 



### **GOLD THREAD**

**Process** 

#### GOLD PLATING OF STAINLESS STEEL ORNAMENT

Metods of Plating Stainless Steel Plating Procedhures

### 13. Electroplating of Iron

**Principles** 

THE IRON CHLORIDE BATH

THE IRON SULPHATE BATH

THE FLUOBORATE BATH

### 14. Electroplating of Lead

**ANALYSIS OF LEAD SOLUTION** 

Free Acid



#### APPLICATIONS OF LEAD PLATING

## 15. Electroplating of Nickel

#### **TYPES OF NI SOLUTIONS**

**Engineering Application** 

#### NI AND UR PLATING BUTTERWORTHS

Electroplating Baths used
Watts Nickel Bath
Hard Watts Bath
Nickel Sulphate Bath
Nickel Sulphonate Bath
Nickel Fluoborate Bath
Barrel Nickel Plating
Black Nickel:

Black Ni Plating Processes

TYPES OF NICKEL PLATING SOLUTIONS USED



## 16. Electroplating of Bright Nickel

**CARRIERS** 

NICKEL ELECTROPLATING BRIGHTENERS

### 17. Electroplating of Silver

Silver (Atomic weight=107.88) and Its Properties: Silver Bath for a Heavy Deposit of Silver (Silvering by Weight):

PREPARATION OF BATH I, WITH SILVER CHLORIDE

PREPARATION OF BATH II WITH SILVER CYANIDE

**SILVER BATH FOR ORDINARY ELECTROPLATING**Tanks for Silver Baths

**EXECUTION OF SILVER-PLATING**Silver Plating by Weight



#### BRIGHT SILVER PLATING

Source of Brightening in Carbon Disulphide Electrolytes

## 18. Electroplating of Alloy

Electrodeposition of Zinc-Iron Alloy Lead-Tin Plating Speculum Plating Gold Alloy Plating Bright Alloy Plating Ni-Alloy Plating Bronze Plating Copper Solution

## 19. Electroplating of Platinum

- (1) KEITAL AND ZSCHIEGNER PROCESS
- (2) POWELL AND SCOTT PROCESS



#### **CONDITIONS OF OPERATION**

#### MAINTENANCE OF ELECTROLYTE

## 20. Electroplating of Palladium

(A) SOLUBLE ANODE PROCESS

Condition of Operation Properties of the Deposit

(B) DIAPHRAGM PROCESS

**Condition of Operation** 

## 21. Electroplating of Rhodium

**PREDEPOSITION** 

**Palladium Plating** 



#### SOLUTION AGITATION

Raw material used for Palladium Plating Equipment

#### RHODIUM PLATING

Tank Installation
Solution Heating
Rectifier
Rectifier Control
Current Control
Temperature Control
Making of Rhodium Plating Bath

#### **RHODIUM**

Method A—Colorimetric
Discussion of the Method
Method B
Discussion of the Method
Method C—Hydrazine Reduction



## Discussion of the Method Sulphate

#### APPLICATIONS OF THE PRECIOUS METALS

## 22. Electroplating of Bright Zinc

BRIGHT ZINC-PLATING PROCESSES
Chemical Control
Electrolytic Impurities
Anodes

**ADVANTAGES OF BRIGHT ZINC PLATING** 

## 23. Electroplating of Tin

INTRODUCTION



## 24. Electroplating of Plastics

## THE PLATING OF PLASTICS AND NON-METALLIC MATERIALS

- 1. Polishing with Plumbago
- 2. Metalizing with Copper Bronze Powder
- 3. Metallization by Molten Metal Spraying
- 4. Metal Surfacing of Ceramics by "Firing"
- 5. Vacuum Evaporation and Electrical Sputtering
- 6. Silver Mirror Process as Applied to Plastics Removal of Glaze

Cleaning

**Silvering** 

**Coppering** 

**Silver Recovery** 

## 25. Electroplating of Barrel

**BARREL NICKEL-PLATING** 

Barrel Coppering Brass Barrelling



Barrel Cadmium
Barrel Zinc
Barrel Silver
Electro-Galvanising Tray
Barrel Polishing
Barrel Tin

#### **APPLICATIONS**

## 26. Zinc Electroplating Brightener

**USES AND APPLICATIONS** 

PROPERTIES OF THE BRIGHTENER

**FORMULATIONS** 

**OPERATING CONDITIONS** 

Temperature Current Efficiencies



## Throwing Power Conductivity and polarization

#### **MANUFACTURING PROCESS**

#### **FORMULATION**

## **27. Colouring of Metals**

- 1. Direct Coloration of Iron and Steel by Cupric Selenite .
- 2. Coloration of Copper and Brass with Cupric Selenite:

#### METAL BROWNING BY OXIDATION

#### **COPPER COLOURING**

- (a) Blacking Copper
- (b) Red Colour to Copper

#### **COLORING OF BRASS**

**Brass Colouring** 



#### **Coloring Brass**

#### **BRONZING**

Art Bronzes:
Antique Bronzes
Vert Antique
Brass Bronzing
Copper Bronzing

#### **BRONZING OF CAST IRON**

Liquid for Bronze Powder Bronzing of Cannon Green Bronzing

**BRONZING OF STEEL** 

**TIN BRONZING** 

**ZINC BRONZING** 



### 28. Metal Treatments

#### **MECHANICAL TREATMENTS**

Workability Testing
Plastic Deformation
Hot Working
Cold working
Primary Forming Processes
Secondary Forming Processes

#### THERMAL TREATMENTS

Annealing
Heat Treatment of Steel
Homogenization
Thermo mechanical Processing

#### RECENT DEVELOPMENT AND OUTLOOK

**Powder Metallurgy of Superalloys** 



## **29. Electrodeposition of Precious Metals** Physical Properties

## **30. Electropolishing of Stainless Steel** Application

#### **BATHS**

#### **EXPERIMENTAL**

Bath Composition
Hull Cell Studies
Rates of Dissolution
Effect of Polishing Time
Life of the Bath

#### PRACTICE OF ELECTROPOLISHING

- (i) Sequence of Operations
- (ii) Electropolishing
- (iii) Treatments After Electropolishing



- (iv) Equipment for Electropolishing
- (v) Technical and Economic Aspects

#### APPLICATIONS OF ELECTROPOLISHING

- 1. Decorative Finishing
- 2. Polishing of Parts Exposed to Friction
- 3. Electropolishing Cutting Tools

**Drills and Taps** 

**Wood Working Tools** 

**Solutions Employed** 

4. Polishing of Measuring Instruments

## 31. Case Hardening

#### **PROCESSES**

Carburizing

Gas

Liquid

**Pack** 

Carbonitriding



Gas **Cyaniding Nitriding** Gas Liquid **Microcasing Ionitriding Siliconizing Boronizing Tufftriding Triniding Applied Energy Induction Hardening** Flame Hardening Other Hardening

## 32. Electroless Coating of Gold, Silver

**Methods for Mirroring** 



#### **ELECTROLESS PROCESS**

**Equipment** 

#### SILVER COLOURING FOR MIRROR (SILVER COATING)

Formulation-1 Preparation Formulation-2 Preparation

#### PROCESS OF MANUFACTURE

- 1. Selection of glass sheet
- 2. Cleaning of glass sheet
- 3. Sensitizing
- 4. Silvering on glass

#### PLATING PROCEDURE

#### **SILVERING OF GLASS**

Chemical Silvering
To prepare the bath
Cleaning



**GOLD COLOURING FOR MIRROR (GOLD COATING)** 

FORMULATIONS FOR ELECTROLESS GOLD BATH

MANUFACTURING PROCESS FOR GOLD PLATING

**BLUE SILVERING ON GLASS WITH COPPER COATING** 

FORMULATION OF BLUE SILVERING ON MIRROR

**MANUFACTURING PROCESS** 

**COPPER COATING** 

PLATING BATH FORMULATION

**Bath Constituents** 

#### THE OPERATION OF ELECTROLESS COPPER BATHS

Red Mirror by Electroless Dipping Method Electroless Copper Plating of Plain Glass to Manufacture Red Mirror



#### MANUFACTURE PROCESS OF RED MIRROR

#### TEST FOR ELECTROLESS PLATED RED MIRROR ADHESION

Baking Test Burnishing Test

#### **TEST FOR CONTINUITY**

**Ferroxy Test** 

#### **MARKING**

## 33. Buffing and Industrial Metal Polishing Compounds

#### **Abrasives for Buffing**

- 1. Tripoli
- 2. Vienna Lime
- 3. Aluminium Oxide (Sophire)
- 4. Rouge
- 5. Amorphous Crystalline Silica



6. Emery Buffing & Polishing Compositions

MANUFACTURING METHOD OF BUFFING COMPOUNDS CARBORUNDUM FOR POLISHING

### 34. Tin and its compounds

Discovery
Mineralogy
Extraction
Metallurgy
Refining of Crude Tin
Properties of Tin
General Account of Tin and its Compounds

### 35. Lead and its compounds

**Discovery** 

#### **MINERALOGY**

Smelting in a Blast Furnace Purification of Lead



Properties of Lead Chemical Technology White Lead, Pb(OH)2.2PbCO3 Super-sublimed White Lead

### 36. Manufacture of phosphorus

Modern Electric Process
Manufacture in India
Purification
Smithel's Cold Flame
Luminescence
Manufacture of Red Phosophorous

### 37. Hydrides of phosphorus

Phosphorous Trihydride, or Phosphine PH3
Properties
Phosphonium Iodide, PH4I



Hydrogen Hemiphosphide, P2H4 Hydrogen Diphosphide, P12H6 Other Hydrides of Phosphorous

### 38. Chemistry of sodium

Mineralogy
Metallurgy
Down's Process—Electrolysis of Sodium Chloride
Castner's Process (From fused sodium hydroxide)
Properties
Technology
Caustic Soda Industry in India

### 39. Copper and its compounds

Mineralogy
Extraction
Extraction from sulphide ores
Concentration
Metallurgy furnace for Smelting Copper
Extraction from Non-Sulphide Ores



Properties Chemical Technology Cupric Sulphate, CuSO4 5H2O Properties

### 40. Silver and its compounds

Mineralogy
Metallurgy
Purification
Properties
Chemical
Technology
Silver Nitrate
Industrial Applications
Photography

### 41. Gold and its compounds

Mineralogy



Metallurgy
Cyanide Process
Purification
Properties
Chemical
Technology
Electroplating

### 42. Complex salts of copper, silver and gold

Complex compounds of Silver Complex Salts of Gold

### 43. Aluminium and its compounds

Mineralogy

**Extraction** 

Metallurgy

**Properties** 

Chemical

**Technology** 



Aluminium Chloride, AlCl3
Properties
Potash Alum, K2SO4.Al2(SO4)3. 24H2O
Amalgam Metallurgy

### 44. Hydrides of silicon

Silicon Tetrahydride, Silicane, or Monosilane, SiH4
Preparation
Properties
Silicoethane, Disilicane, Disilane, Si2H6
Properties
Silicopropane, Trisilicane or Trisilane, Si3H3
Preparation
Properties
Silicobutane, Tetrasilicane or Tetrasilane, Si4H10
Silicopentane, Si5H12 and Silicohexane, Si6H14
Silico-acetylene, (Si2H2)n



Structural Considerations
Short Note on Silicones

## **45. Chemical and Electrochemical Conversion Treatments**

#### **PHOSPHATING**

Coating Formation Process Parameters Uses

**ANODIZING** 

METAL COLOURING

**ENERGY CONSIDERATIONS** 

46. Electrostatic Sealing



**THEORY** 

THE TECHNIQUE

**SEAL PROPERTIES** 

**USE** 

## 47. Photographs of Plant & Machinery with Supplier's Contact Details



### **Tags**

How o Start Electroplating Industry In India, Electrochemicals Manufacturing Industry In India, Most Profitable Electrochemicals Manufacturing Business Ideas, , Electroplating Based Profitable Projects, Electroplating Processing Projects, How to Start An Electrochemicals Production Business, Electroplating Based Small Scale Industries Projects, New Small Scale Ideas In Electroplating Processing Industry, NPCS, Niir, Process Technology Books, Business Consultancy, Business Consultant, Project Identification And Selection, Preparation Of Project Profiles, Startup Business Guidance, Startup Project For Electrochemicals Manufacturing Industry, Business Plan For A Startup Business, Start-up Business Plan For Electroplating Industry, Start Up India, Stand Up India, Electrochemicals Making Small Business Manufacturing, Small Scale, Electrochemicals Making Machine, Electrochemicals Making Machine Factory, Modern Small And Cottage Scale Industries, Profitable Small And Cottage Scale Industries, Setting Up And Opening Your Electrochemicals Manufacturing Business, Electroplating Business,



How To Start A Successful Electroplating Business, Small Scale Commercial Electrochemicals Manufacturing And Electroplating Industries, Electrochemicals Manufacturing And Electroplating Business, Profitable Small Scale Manufacturing, Electrochemical Processing, The Electrochemical Cell, Electrodes, Electrolytes, Metal Surface Treatments, Cleaning, Pickling, And Related Processes, Chemical And Electrolytic Pickling, Electrolytic Machinery Methods, Principles Of The Ecm Process, Types Of Ecm Operations, Electroless Plating, Electroless Composite Coatings Uses And Applications, Postplating Treatments, Electroplating, Electroplating Plant Requirements, Electroplating Of Aluminium, Electroplating Of Cadmium, Applications Of The Cadmium-plating, Electroplating Of Chromium, Electroplating Of Cobalt, Electroplating Of Copper, Electroplating Of Gold, Electroplating Of Iron, Electroplating Of Lead, Electroplating Of Nickel, Electroplating Of Bright Nickel, Electroplating Of Silver, Electroplating Of Alloy, Electroplating Of Platinum, Electroplating Of Palladium, Electroplating Of Rhodium, Applications Of The Precious Metals, Electroplating Of Bright Zinc, Advantages Of Bright Zinc Plating, Electroplating Of Tin, Electroplating Of Plastics, Electroplating Of Barrel, Zinc Electroplating Brightener, Uses And Applications Of Zinc Electroplating, Colouring Of Metals, Metal Browning By Oxidation, Metal Treatments, Electrodeposition Of Precious Metals, Electropolishing Of Stainless Steel,



Applications of Electropolishing, Electroless Coating ff Gold, Silver, Electroless Process, Buffing And Industrial Metal Polishing Compounds, Manufacturing Method Of Buffing Compounds, Tin And Its Compounds, Lead And Its Compounds, Discovery, Manufacture Of Phosphorus, Hydrides Of Phosphorus, Chemistry Of Sodium, Copper And Its Compounds, Silver And Its Compounds, Gold And Its Compounds, Complex Salts Of Copper, Silver And Gold, Aluminium And Its Compounds, Hydrides Of Silicon, Chemical And Electrochemical Conversion Treatments, Metal Colouring, Electrostatic Sealing, Photographs Of Plant & Machinery With Supplier's Contact Details, Nickel And Copper Electroplating Method, Uses Of Electroplating, Electroplating - Definition, Process & Uses, How Electroplating Works, High Quality Copper Plating, Exploring Fabrication – Electroplating, Electrochemical Manufacturing In The Chemical Industry, Electro Chemical Engineering, Electrochemical Machining (ECM), Metal Finishing Techniques, DIY Stainless Steel Weld Cleaning, Recovery Of Precious Metals By An Electrochemical Deposition Method, Precious Metal Plating Services, Chrome Plating, Nickel Chrome Plating



### Niir Project Consultancy Services (NPCS) can provide

# Electroplating with Manufacture of Electrochemicals

(Electrochemical Cell, Ecm, Electroplating of Aluminium, Chromium, Copper, Gold, Cobalt, Iron, Lead, Nickel, Silver, Alloy, Platinum, Palladium, Rhodium, Zinc, Plastics, Barrel, Tin, Electrodeposition)

### See more

https://goo.gl/01VBvx https://goo.gl/eK8rPr



# VISIT US AT

www.entrepreneurindia.co



# Take a look at Niir Project Consultancy Services on #Street View

https://goo.gl/VstWkd

Locate us on

Google Maps

https://goo.gl/maps/BKkUtq9gevT2



#### **OUR CLIENTS**

Our inexhaustible Client list includes publicsector companies, Corporate Houses, Government undertaking, individual entrepreneurs, NRI, Foreign investors, non-profit organizations and educational institutions from all parts of the World. The list is just a glimpse of our esteemed & satisfied Clients.

Click here to take a look https://goo.gl/G3ICjV



# Free Instant Online Project Identification & Selection Search Facility

Selection process starts with the generation of a product idea. In order to select the most promising project, the entrepreneur needs to generate a few ideas about the possible projects.

Here's we offer a best and easiest way for every entrepreneur to searching criteria of projects on our website <a href="https://www.entrepreneurindia.co">www.entrepreneurindia.co</a> that is "Instant Online Project

**Identification and Selection**"



NPCS Team has simplified the process for you by providing a "Free Instant Online Project Identification & Selection" search facility to identify projects based on multiple search parameters related to project costs namely: Plant & Machinery Cost, Total Capital Investment, Cost of the project, Rate of Return% (ROR) and Break Even Point % (BEP). You can sort the projects on the basis of mentioned pointers and identify a suitable project matching your investment requisites.

Click here to go

http://www.entrepreneurindia.co/project-identification



#### Contact us

**Niir Project Consultancy Services** 

106-E, Kamla Nagar, Opp. Spark Mall,

New Delhi-110007, India.

Email: <u>npcs.ei@gmail.com</u>, <u>info@entrepreneurindia.co</u>

Tel: +91-11-23843955, 23845654, 23845886, 8800733955

Mobile: +91-9811043595

Fax: +91-11-23845886

Website: <u>www.entrepreneurindia.co</u>, <u>www.niir.org</u>

Take a look at NIIR PROJECT CONSULTANCY SERVICES on

**#StreetView** 

https://goo.gl/VstWkd



# NIR PROJECT CONSULTANCY SERVICES

AN ISO 9001:2008 COMPANY



### Who are we?

- One of the leading reliable names in industrial world for providing the most comprehensive technical consulting services
- We adopt a systematic approach to provide the strong fundamental support needed for the effective delivery of services to our Clients' in India & abroad



We at NPCS want to grow with you by providing solutions scale to suit your new operations and help you reduce risk and give a high return on application investments. We have successfully achieved top-notch quality standards with a high level of customer appreciation resulting in long lasting relation and large amount of referral work through technological breakthrough and innovative concepts. A large number of our Indian, Overseas and NRI Clients have appreciated our expertise for excellence which speaks volumes about our commitment and dedication to every client's success.



We bring deep, functional expertise, but are known for our holistic perspective: we capture value across boundaries and between the silos of any organization. We have proven a multiplier effect from optimizing the sum of the parts, not just the individual pieces. We actively encourage a culture of innovation, which facilitates the development of new technologies and ensures a high quality product.



### What do we offer?

- Project Identification
- Detailed Project Reports/Pre-feasibility Reports
- Business Plan
- Industry Trends
- Market Research Reports
- Technology Books and Directory
- Databases on CD-ROM
- Laboratory Testing Services
- Turnkey Project Consultancy/Solutions
- Entrepreneur India (An Industrial Monthly Journal)



### How are we different?

- We have two decades long experience in project consultancy and market research field
- We empower our customers with the prerequisite know-how to take sound business decisions
- We help catalyze business growth by providing distinctive and profound market analysis
- We serve a wide array of customers, from individual entrepreneurs to Corporations and Foreign Investors
- We use authentic & reliable sources to ensure business precision



### Our Approach

Requirement collection

Thorough analysis of the project

Economic feasibility study of the Project

Market potential survey/research

**Report Compilation** 



### Who do we serve?

- Public-sector Companies
- Corporates
- Government Undertakings
- Individual Entrepreneurs
- O NRI's
- Foreign Investors
- Non-profit Organizations, NBFC's
- Educational Institutions
- Embassies & Consulates
- Consultancies
- Industry / trade associations



### **Sectors We Cover**

- O Ayurvedic And Herbal Medicines, Herbal Cosmetics
- O Alcoholic And Non Alcoholic Beverages, Drinks
- O Adhesives, Industrial Adhesive, Sealants, Glues, Gum & Resin
- Activated Carbon & Activated Charcoal
- Aluminium And Aluminium Extrusion Profiles & Sections,
- Bio-fertilizers And Biotechnology
- Breakfast Snacks And Cereal Food
- O Bicycle Tyres & Tubes, Bicycle Parts, Bicycle Assembling



- Bamboo And Cane Based Projects
- Building Materials And Construction Projects
- Biodegradable & Bioplastic Based Projects
- Chemicals (Organic And Inorganic)
- Confectionery, Bakery/Baking And Other Food
- Cereal Processing
- Coconut And Coconut Based Products
- Cold Storage For Fruits & Vegetables
- Coal & Coal Byproduct



- Copper & Copper Based Projects
- Dairy/Milk Processing
- O Disinfectants, Pesticides, Insecticides, Mosquito Repellents,
- Electrical, Electronic And Computer based Projects
- O Essential Oils, Oils & Fats And Allied
- Engineering Goods
- O Fibre Glass & Float Glass
- Fast Moving Consumer Goods
- Food, Bakery, Agro Processing



- Fruits & Vegetables Processing
- Ferro Alloys Based Projects
- Fertilizers & Biofertilizers
- Ginger & Ginger Based Projects
- Herbs And Medicinal Cultivation And Jatropha (Biofuel)
- Hotel & Hospitability Projects
- Hospital Based Projects
- Herbal Based Projects
- Inks, Stationery And Export Industries



- Infrastructure Projects
- Jute & Jute Based Products
- Leather And Leather Based Projects
- Leisure & Entertainment Based Projects
- Livestock Farming Of Birds & Animals
- Minerals And Minerals
- Maize Processing(Wet Milling) & Maize Based Projects
- Medical Plastics, Disposables Plastic Syringe, Blood Bags
- O Organic Farming, Neem Products Etc.



- O Paints, Pigments, Varnish & Lacquer
- O Paper And Paper Board, Paper Recycling Projects
- O Printing Inks
- Packaging Based Projects
- O Perfumes, Cosmetics And Flavours
- O Power Generation Based Projects & Renewable Energy Based Projects
- Pharmaceuticals And Drugs
- O Plantations, Farming And Cultivations
- O Plastic Film, Plastic Waste And Plastic Compounds
- O Plastic, PVC, PET, HDPE, LDPE Etc.



- Potato And Potato Based Projects
- Printing And Packaging
- Real Estate, Leisure And Hospitality
- O Rubber And Rubber Products
- Soaps And Detergents
- Stationary Products
- O Spices And Snacks Food
- Steel & Steel Products
- Textile Auxiliary And Chemicals



- Township & Residential Complex
- Textiles And Readymade Garments
- Waste Management & Recycling
- Wood & Wood Products
- Water Industry(Packaged Drinking Water & Mineral

Water)

Wire & Cable



#### Contact us

**Niir Project Consultancy Services** 

106-E, Kamla Nagar, Opp. Spark Mall,

New Delhi-110007, India.

Email: <u>npcs.ei@gmail.com</u>, <u>info@entrepreneurindia.co</u>

Tel: +91-11-23843955, 23845654, 23845886, 8800733955

Mobile: +91-9811043595

Fax: +91-11-2385886

Website: <u>www.entrepreneurindia.co</u>, <u>www.niir.org</u>

Take a look at NIIR PROJECT CONSULTANCY SERVICES on

**#StreetView** 

https://goo.gl/VstWkd



### Follow Us



> https://www.linkedin.com/company/niir-project-consultancy-services



<u>https://www.facebook.com/NIIR.ORG</u>



>https://www.youtube.com/user/NIIRproject



>https://plus.google.com/+EntrepreneurIndiaNewDelhi



>https://twitter.com/npcs\_in



https://www.pinterest.com/npcsindia/





## THANK YOU!!!

For more information, visit us at:

www.entrepreneurindia.co

