

Entrepreneur India

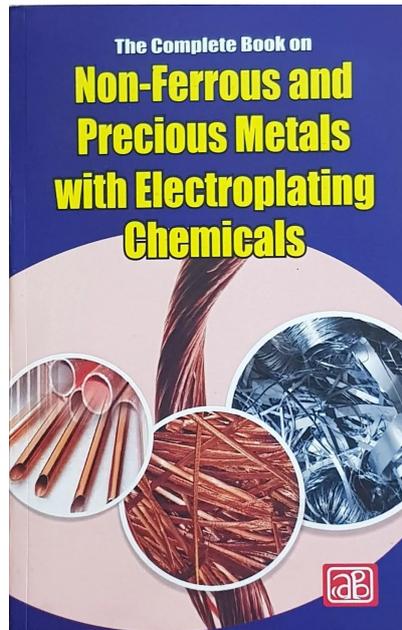
106-E, Kamla Nagar, New Delhi-110007, India.

Tel: 91-11-23843955, +91 9097075054

Mobile: +91-9097075054

Email: npcs.ei@gmail.com, info@entrepreneurindia.co

Website: www.entrepreneurIndia.co



The Complete Book on Non-Ferrous and Precious Metals with Electroplating Chemicals

Code	NI256
Format	paperback
Indian Price	₹1975
US Price	\$200
Pages	558
ISBN	9788178331737
Publisher	Asia Pacific Business Press Inc.

Description

Non-ferrous metals are those which don't have any iron content. These are specified for structural applications requiring reduced weight, higher strength, nonmagnetic properties, higher melting points, or resistance to chemical, atmospheric corrosion and also for electrical and electronic applications.

A precious metal is a rare, naturally occurring metallic chemical element of high economic value. Although they have industrial uses, they are better known for their uses in art, jewellery and coinage. Depending on the end use, metals can be simply cast into the finished part, or cast into an intermediate form, such as an ingot, then worked, or wrought, by rolling, forging, extruding, or other deformation process.

Electroplating is a procedure that uses electrolysis to apply a thin layer of a metal over the surface of another metal. Electroplating chemicals are used to change the surface properties of an object such as abrasion and wear resistance, corrosion protection, lubricity, etc. This chemical is widely demanded in automotive, electronics, telecommunications, aerospace and precision engineering industries. This handbook explains different extraction and production processes with flow diagrams of various non ferrous and precious metals.

Major contents of the book are Silver, Gold, Copper, Complex salts of copper, silver and gold, magnesium, chromium, platinum group of metals, nickel, zinc, lead, aluminium, mercury, cobalt, sodium, sodium chloride, soda ash, sodium sulfate, glauber salt, hydrochloric acid, sodium silicate, sodium sulfides, sodium thiosulfate, sodium bisulfate, anhydrous, sodium hyposulfite, liquid chlorine, hydrides of boron, silicon, sulfuric acid, nitric acid, ammonium nitrate, hydrazine, hydrogen cyanide, melamine, amines, aniline, isocyanates, phosphorus, tin, ferroalloys, manganese, bismuth, cerium, phosphoric acid, tungsten, niobium and tantalum etc.

It will be a standard reference book for professionals, entrepreneurs, engineers, those studying and researching in this important area and others interested in the field of non ferrous, precious metals and electroplating chemicals.

Content

1. SILVER

Extraction by Chloridizing Roasting

Extraction by Cyanidation

Recovery from Base Metal Ores

Parke's Process

Silver Production in India

Silver Nitrate

Industrial Applications

Photography

2. GOLD

Extraction of Gold

Amalgamation Process

Chlorination Process

Cyanidation Process

Gold Extraction in India

Compounds of Gold

3. COPPER

Uses

Harmful Impurities in Copper

Pyrometallurgical Extraction of Copper

Sources of Copper

Extraction of Copper from Sulphide Ores

Concentration

Roasting

Smelting

Converting

Slagging Stage

Blister Formation Stage

Refining

Fire Refining

Electrolytic Refining

Newer Processes for Copper Extraction

Flash Smelting

Continuous Copper Production

WORCRA Process

Noranda Process

Mitsubishi Process

Smelting Furnace

Slag-cleaning Furnace

Converting Furnace

TORCO Segregation Process

Energy Concepts in Copper Smelting

Hydrometallurgy of Copper

Ferric Chloride Leaching

Leaching of Low-Grade Ores

Leaching of Roasted Sulphide Concentrates

Production of Copper in India

Indian Copper Complex

Khetri Copper Complex

Compounds of Copper

4. COMPLEX SALTS OF COPPER, SILVER AND GOLD

Complex Compounds of Silver

Complex Salts of Gold

5. MAGNESIUM

Uses

Nonstructural Uses

Alloying

Deoxidation and Desulphurization

Modifying Structure of Graphite in Cast Irons

Pyrotechnics and Photography

Cathodic Protection

Structural Uses

Magnesium Ores

Methods of Magnesium Extraction

Magnesium from Sea-Water

Pidgeon Process

Equipment and Operation

Reaction Mechanism

Energy Required for the Pidgeon Process

Magnotherm Process

Magnesium Production in India

NML Process

CECRI Process

Magnesium

Dow Process

Electrolysis of Magnesium Chloride

6. CHROMIUM

Uses

Occurrence

Metal Extraction

Electrolytic Chromium

Chrome Alum Process

Chromic Acid Process

7. PLATINUM GROUP OF METALS

Extraction of Platinum Group Metals

Compounds of Platinum

8. NICKEL

Uses

- Extraction of Nickel by Pyrometallurgy
- Extraction from Sulphide ores
- Nickel Sulphide Ore Processing at Sudbury (Canada)
- Smelting of Nickel Concentrate
- Carbonyl Process for Refining Nickel
- Electrolytic Refining of Nickel
- Extraction of Nickel from Oxide Ores
- Pyrometallurgical Processing
- DTA (Differential Thermal Analysis) of Lateritic Ores
- Selective Nickel Reduction
- Reduction Smelting
- Ferronickel Production
- Matte Smelting
- Pyrometallurgical Processing followed by Hydrometallurgy
- Ammoniacal Leaching
- Other Leachants
- Pyrometallurgical Processing followed by Carbonylation
- Hydrometallurgy
- Hydrometallurgy of Nickel Sulphide Concentrates
- Other Metals from Sulphide Ores
- Compounds of Nickel

9. ZINC

Uses

- Extraction of Zinc
- Sources of Zinc
- Pyrometallurgical Extraction of Zinc
- Horizontal Retort Reduction
- Vertical Retort Reduction
- Hydrometallurgical Extraction of Zinc
- Imperial Smelting Process (ISP)
- Production of Other Metals by ISP
- Lead Recovery
- Precious Metals Recovery
- Copper Recovery
- Arsenic, Antimony, and Bismuth Recovery
- Tin Recovery
- Cadmium Recovery
- Zinc from Lead Slags by Slag Fuming
- Production of Zinc in India
- HZL Debari Plant

Treatment of Complex Sulphides of Lead, Copper and Zinc

Gravity Concentration

Differential Flotation

Retort Distillation

Electrolysis

Liquation

Rectification

Lead Blast Furnace Smelting

Selective Roasting

Reverberatory Smelting

Hydrometallurgical Treatment of Complex Sulphides

Solvent Extraction

Compounds of Zinc and Cadmium

10. LEAD

Uses

Extraction of Lead

Occurrence

Treatment of Ore and Production of Metal

Treatment of Base Bullion

Drossing

Parke's Process for Desilverization of Lead

Dezincing

Debismuthizing

Electrolytic Refining

Modern Developments in Lead Smelting

Outokumpu Flash Smelting

Direct Smelting in Converter

Flash Smelting with Oxygen

KIVCET Process

WORCRA Process

Q-S Process

TBRC (Top-Blown Rotary Converter) Smelting

Production of Lead in India

Tundoo Plant

Tundoo Blast Furnace

Lead Refining

Compounds of Lead

1. Lead monoxide or litharge PbO

2. Red lead, Pb_3O_4

3. Lead dioxide, PbO_2

4. Basic Lead Carbonate or White Lead, $Pb(OH)_2 \cdot 2PbCO_3$ —Dutch Process, Carter's

Process, Electrolytic Process

11. ALUMINIUM

Uses

Aluminium Ores

Extraction of Aluminium

Bayer Process for Alumina Production

Factors Affecting Bayer Process

Hall-Heroult Process

Decomposition Potential of Al_2O_3 Dissolved in Cryolite

Influence of Hydrogen or Methane Injection at Anode

Actual Decomposition Potential

Electrolytic Reduction Cell

Cell Operation

Role of Cryolite in Electrolysis

Theory 1

Theory 2

Factors Influencing Electrolysis

Electrolytic Refining of Aluminium

Methods of Treating Low-Grade Ores

Lime Sinter Process

Deville-Pechiney Process

Serpeck Process

Production of Aluminium in India

The Alumina Plant at Hindalco

The Reduction Plant at HINDALCO

Environmental Considerations in Aluminium Production

Newer Processes for Aluminium Production

ALCOA Process

Toth Process

ALCAN Process

Properties of Aluminium: Physical

Compounds of Aluminium

Ceramics Industry

12. MERCURY

Extraction of Mercury

Compounds of Mercury—Experimental evidences to show that mercurous ion is Hg_2^{2+}

13. COBALT

Compounds of Cobalt

14. SODIUM

Production of Sodium

Downs's Process

15. SODIUM CHLORIDE

16. SODA ASH

Soda Ash, The Commercial Sodium Carbonate

Solvay Process

Soda Ash from Other Sources

Soda Ash Related Products

17. SODIUM SULFATE

Salt Cake

18. GLAUBER SALT

19. HYDROCHLORIC ACID

20. SODIUM SILICATE

Bormine and Bromides

21. SODIUM SULFIDES

22. SODIUM THIOSULFATE

23. SODIUM BISULFITE, ANHYDROUS

24. SODIUM HYPOSULFITE (HYDROSULFITE)

Caustic Soda and Chlorine

Electrolysis of Brine

The Electrolytic Cell

Purification of the Salt Solution

Diaphragm Cells

Concentration of the Caustic Liquor

The Mercury Cell

Hydrogen Disposal

Other Processes for the Production of Chlorine

25. LIQUID CHLORINE

Bleaches

26. HYDRIDES OF BORON

Historical

Methods of Preparation

Properties

Chemical

Oxyacids of Boron

Orthoboric Acid, H_3BO_3

Properties

Borax, $Na_2B_4O_7 \cdot 10H_2O$ Preparation

Properties

Perboric Acid and Perborates

Preparation

Properties

Structure

Industrial Applications

27. SILICON

Hydrides of Silicon

Silicon Tetrahydride, Silicane, or Monosilane, SiH_4

Preparation

Properties

Silicoethane, Disilicane, or Disilane, Si_2H_6

Properties

Silicopropane, Trisilicane or Trisilane, Si_3H_8

Preparation

Properties

Silicobutane, Tetrasilicane or Tetrasilane, Si_4H_{10}

Silicopentane, Si_5H_{12} and Silicohexane, Si_6H_{14}

Silico-acetylene, $(\text{Si}_2\text{H}_2)_n$

Structural Considerations

Short Note on Silicones

Structure of Silicates

Simplest Silicates

Mixed Silicates

Three Dimensional Networks—Felspar and Zeolites

Water Softening

Regeneration

Ultramarine

Halogen Compounds of Silicon

Silicon Tetrafluoride SiF_4

Hydrofluosilicic Acid, H_2SiF_6

Silicon Tetrachloride

Active silica

28. SULFURIC ACID

Uses of Sulfuric Acid

Kinds of Acid

The Manufacture of Sulfuric Acid

Development of the Sulfuric Acid Industry

The Chamber Process for Making Sulfuric Acid

The Contact Process

29. NITRIC ACID

Processes

Uses of Nitric Acid

30. AMMONIUM NITRATE

31. HEXAMETHYLENETETRAMINE

32. HYDRAZINE

Manufacture

Stabilization

33. UREA

Uses of Urea

34. HYDROGEN CYANIDE

35. ACRYLONITRILE

36. MELAMINE

37. AMINES

38. ANILINE

39. ISOCYANATES

Other Nitrogen Compounds

40. PHOSPHORUS

Manufacture of Phosphorus

Modern Electric Process

Manufacture in India

Purification

Smithel's Cold Flame

Luminescence

Manufacture of Red Phosphorus

Hydrides of Phosphorus

Phosphorus Trihydride, or Phosphine PH_3

Properties

Phosponium Iodide, $\text{PH}_4 \text{I}$

Hydrogen Hemiphosphide, P_2H_4

Hydrogen Diphosphide, P_12H_6

Other Hydrides of Phosphorus

Oxides of Phosphorus

Phosphorus Tetritoxide, P_4O

Properties

Phosphorus Hemtoxicide, P_2O

Phosphorus Trioxide, P_4O_6

Properties

Structure

Phosphorus Tetroxide, P_2O_4

Preparation

Properties

Phosphorus Pentoxide, P_2O_5

Modes of formation

Preparation

Manufacture

Properties

Chemical
Industrial Applications
Structure
Oxyacids of Phosphorus
Hypophosphorous Acid, H_3PO_2
Properties
Detection
Evaluation
Phosphorous Acid, H_3PO_3
Preparation
Properties
Constitution
Pyrophosphorus Acid, $\text{H}_4\text{P}_2\text{O}_5$
Preparation
Properties
Constitution
Metaphosphorous Acid, $(\text{HPO}_2)_n$
Preparation
Properties
Hypophosphoric Acid, $\text{H}_4\text{P}_2\text{O}_6$
Preparation
Structure
Orthophosphoric Acid, H_3PO_4
Manufacture
Thermal Process
Volatilization Process
Properties
Constitution
Orthosphates
Preparation
Detection
Evaluation
Pyrophosphoric Acid, $\text{H}_4\text{P}_2\text{O}_7$
Preparation
Properties
Constitution
Metaphosphoric Acid, (HPO_3)
Preparation
Permonophosphoric Acid, H_3PO_5
Perdiphosphoric Acid, $\text{H}_4\text{P}_2\text{O}_8$
Halogen Compounds of Phosphorus

Phosphorus Trichloride

Phosphorus Pentachloride, PCl_5

Phosphoryl Chloride, $POCl_3$

41. TIN

Uses

Concentration of Tin Ores

Smelting of Tin Concentrate

Reverberatory Furnace Smelting

Rotary Furnace Smelting

Refining of Tin

Pyrometallurgical Refining of Tin

Electrolytic Refining of Tin

Compounds of Tin

42. FERROALLOYS

General Methods of Producing Ferroalloys

Beneficiation

Carbon Reduction

Aluminothermic Reduction

Analysis of Aluminothermic Reduction of Manganese Ores

Aluminothermic Process Versus Carbothermic Process

Refining of Ferroalloys

Production of Individual Ferroalloys

Ferromanganese

Ferrosilicon

Ferrochromium (Ferrochrome)

Charge Chrome

Ferrotitanium

Ferrotungsten

Ferromolybdenum

Ferrovandium

Compounds of Iron

43. MANGANESE

Uses

Electrolytic Manganese

Compounds of Manganese

44. ANTIMONY

Extraction of Antimony

45. BISMUTH

Extraction of Bismuth

46. CADMIUM

Production of Byproduct Cadmium

47. CERIUM

Compounds of Cerium

48. PHOSPHORIC ACID

Production of Elemental Phosphorus and Phosphoric Acid

Industrial Phosphates

Wet-Process Phosphoric Acid

49. INDIUM

Properties

Methods of Manufacture

Commercial Grades

Indium Compounds

Oxides

Chlorides

Bromides

Iodides

Fluorides

Sulfides

Sulfates

Nitride

Other Salts

Indium Alkyls

Other Organic Indium Compounds

Methods of Analysis

Procedure

50. TUNGSTEN

Uses

Occurrence and Extraction

51. VANADIUM

Uses

52. NIOBIUM AND TANTALUM

Sources of Niobium and Tantalum

Extraction of Niobium and Tantalum

Niobium and Tantalum in India

53. MOLYBDENUM

Molybdenite Roasting

54. TITANIUM

Sources of Titanium

Treatment of Ilmenite for Upgradation

Electric Smelting of Ilmenite

Acid Leaching of Ilmenite

Halogenation of Ilmenite

Upgradation Processes

Smelting of Ilmenite: Sorel Process

Direct Acid Leaching of Ilmenite

Hydrochloric Acid Digestion of Ilmenite

Sulphuric Acid Digestion of Ilmenite

Solid-State Reduction of Ilmenite Followed by Iron Removal

Preferential Chlorination of Ilmenite

Chlorination of TiO₂

Production of Metallic Titanium by Reduction of Titanium Tetrachloride

Kroll's Process

Production of Ductile Titanium

Theory of Titanium Chloride Reduction by Sodium (Hunter's Process) and Magnesium (Kroll's Process)

Sodium Reaction

Magnesium Reduction

About Niir

NIIR Project Consultancy Services (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. Its various services are: Pre-feasibility study, New Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Preparation of Project Profiles and Pre-Investment and Pre-Feasibility Studies, Market Surveys and Studies, Preparation of Techno-Economic Feasibility Reports, Identification and Selection of Plant and Machinery, Manufacturing Process and/or Equipment required, General Guidance, Technical and Commercial Counseling for setting up new industrial projects and industry. NPCS also publishes various technology books, directories, databases, detailed project reports, market survey reports on various industries and profit making business. Besides being used by manufacturers, industrialists, and entrepreneurs, our publications are also used by Indian and overseas professionals including project engineers, information services bureaus, consultants and consultancy firms as one of the inputs in their research.