SCERT Kerala · Class 10 · Chemistry

Chemistry Part 2

PADIKAM
CHEMISTRY
PART II
Complete Study Notes | Standard X | English Medium
SCERT Kerala 2025 syllabus coverage
Original explanations, revision tools, exam focus and practice

PADIKAM | CLASS 10 CHEMISTRY - PART II
Contents
Three applied chapters explain chemical electricity, metal production and important industrial compounds.
Chapter 5 | Electrochemistry
Chapter 6 | Metals
Chapter 7 | Some Compounds of Industrial Importance
How to use this book
• Read the chapter mission first to understand the learning target.
• Study the core notes and pause at every table, formula or process map.
• Use the exam focus list for last-minute revision.
• Answer the practice questions without looking back, then revise weak areas.
Official textbook links
SCERT Kerala Class 10 PART II
SCERT Kerala Standard 10 textbook catalogue

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CHAPTER 5
Electrochemistry
Chapter mission: explain redox reactions, electrochemical cells, electrolysis and their practical applications.
Redox foundation
• Oxidation is loss of electrons and reduction is gain of electrons. They always occur together.
• An oxidising agent accepts electrons and is reduced; a reducing agent gives electrons and is oxidised.
• Write oxidation and reduction half-equations to track electron transfer and charge balance.
Galvanic cells
• A spontaneous redox reaction can convert chemical energy into electrical energy when its half-reactions are separated.
• Oxidation occurs at the anode and reduction at the cathode. Electrons flow through the outer circuit from anode to cathode.
• A salt bridge completes the circuit and maintains electrical neutrality by ion movement.
• Cell voltage depends on the tendency of the two electrodes to undergo oxidation and reduction.
Electrolysis
• An electrolytic cell uses electrical energy to drive a non-spontaneous chemical change.
• Cations move to the cathode and gain electrons; anions move to the anode and lose electrons.
• Products depend on the ions present, their discharge tendency, electrode material and whether the electrolyte is molten or aqueous.
Applications
Process Purpose Key idea
Electroplating coat an object object is cathode; coating metal supplies ions
Electrorefining purify a metal impure anode dissolves; pure metal

deposits
Electrolysis of brine industrial chemicals products form at separate electrodes
Rechargeable cell store energy again external current reverses cell reaction
Corrosion and protection
• Corrosion is an electrochemical oxidation of a metal by its surroundings. Moisture and dissolved ions often accelerate it.
• Painting, oiling, alloying, galvanising, electroplating and sacrificial protection interrupt one part of the corrosion cell.
Exam focus
• Label anode, cathode, electron flow and ion movement in every cell diagram.

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• Remember: oxidation at anode in both cell types; electrode signs differ between galvanic and electrolytic cells.
• Explain applications through the electrode reactions.
Practice
1. Differentiate a galvanic cell and an electrolytic cell.
2. Why is the object to be electroplated made the cathode?
3. Describe two ways to prevent rusting and explain how they work.

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CHAPTER 6
Metals
Chapter mission: relate metal reactivity to extraction, refining, corrosion and everyday selection of materials.
Occurrence and minerals
• Very unreactive metals may occur native; reactive metals mainly occur as compounds in ores.
• A mineral is a naturally occurring substance containing a metal or its compound. An ore can be used for economical extraction.
• Ore concentration removes much of the unwanted gangue before chemical extraction.
Reactivity series
• A more reactive metal can displace a less reactive metal from many of its salt solutions.
• Metals above hydrogen commonly release hydrogen from dilute acids; metals below hydrogen usually do not.
• The extraction method depends on the metal's position in the reactivity series.
From ore to metal
Metal reactivity Main route Reason
high electrolysis of molten compound chemical reducing agents are insufficient
medium convert ore to oxide, then reduce carbon/CO or another reducer can work
low heating or simple reduction compounds decompose or reduce readily
Roasting, calcination and reduction
• Roasting heats a sulphide ore strongly in excess air, commonly forming an oxide and sulphur dioxide.
• Calcination heats a carbonate or hydrated ore with little or no air, commonly producing an oxide.
• Reduction removes oxygen from the metal oxide. The reducing agent is itself oxidised.
• Flux reacts with gangue to form a removable slag during smelting.
Refining and alloys
• Electrolytic refining deposits pure metal at the cathode while the impure anode dissolves; some impurities collect as anode mud.
• An alloy combines a metal with other elements to obtain useful properties such as hardness, corrosion resistance or lower melting point.
• Material selection considers strength, density, conductivity, reactivity, cost and environmental impact.
Exam focus
• Choose extraction steps from reactivity, not by memorising isolated ores.
• Distinguish mineral, ore, gangue, flux and slag.

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• Write displacement predictions with a reactivity series.

Practice

1. Why is aluminium extracted electrolytically while iron can be reduced by carbon monoxide?
2. Distinguish roasting and calcination.
3. Predict whether zinc displaces copper from copper sulphate and justify.

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CHAPTER 7

Some Compounds of Industrial Importance

Chapter mission: connect raw materials, reaction conditions, products, uses and safety in major industrial chemical processes.

Industrial chemistry

• An industrial process balances yield, reaction rate, energy use, raw-material cost, catalyst life, safety and environmental impact.

• A catalyst speeds up attainment of equilibrium but does not change the equilibrium yield. Temperature and pressure may affect both rate and equilibrium position.

• Recycling unreacted gases improves efficiency and reduces waste.

Ammonia and the Haber process

• Nitrogen and hydrogen react reversibly to form ammonia. The gases are purified, compressed, passed over an iron catalyst and cooled so ammonia condenses.

• Ammonia is used in fertilisers, nitric acid manufacture, cleaning products and several synthetic materials.

N + 3H ⇌ 2NH + heat

2 2 3

Sulphuric acid and the Contact process

• Sulphur dioxide is first produced and purified, then oxidised reversibly to sulphur trioxide using a catalyst.

• Sulphur trioxide is absorbed safely through an intermediate route before dilution to sulphuric acid.

• Sulphuric acid is important in fertilisers, batteries, petroleum processing, dyes and many chemical industries.

2SO + O ⇌ 2SO + heat

2 2 3

Common industrial materials

Material Key preparation idea Important use

cement controlled heating of limestone and clay construction

glass fusion of silica with suitable additives containers, windows, optics

soap alkaline hydrolysis of fats/oils cleaning

fertiliser supplies plant nutrients improves crop nutrition

Safety and sustainability

• Industrial gases and concentrated acids require closed systems, protective equipment, monitoring and correct emergency procedures.

• Cleaner production uses efficient catalysts, heat recovery, recycling, waste treatment and safer raw materials.

• Fertilisers are useful when applied according to soil and crop need; overuse may pollute water and damage soil balance.

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Exam focus

• For each process, connect equation, catalyst, conditions, separation and recycling.

• Explain a compromise condition using both rate and equilibrium.

• Include health and environmental responsibility in application questions.

Practice

1. Why are unreacted gases recycled in the Haber process?
2. State the catalytic oxidation step in the Contact process.
3. Explain two ways an industry can reduce chemical waste.

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Final Revision Checklist

- I can track oxidation and reduction at electrodes.
- I can choose a metal-extraction route from reactivity.
- I can describe industrial processes as connected stages.
- I can discuss safety, efficiency and environmental effects.

Padikam Learning Content

Prepared as an independent learning companion using the SCERT textbook only as the syllabus and notation reference.