IGCSE CHEMISTRY • EXERCISE SHEET

9.5 Corrosion of metals

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS rusting 生锈 • sacrificial protection 牺牲保护 • galvanising 镀锌 • electrons 电子 • barrier methods 隔

Objective

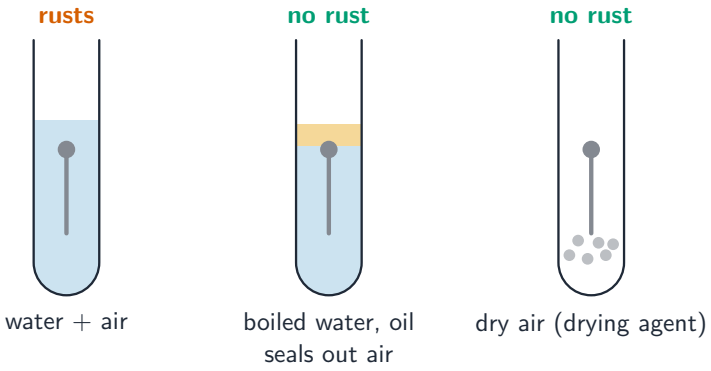
Build the skills to answer exam questions on the **corrosion of metals** 金属腐蚀 — **rusting** 生锈, what it needs, and how to prevent it (including **sacrificial protection** 牺牲保护).

You must be able to:

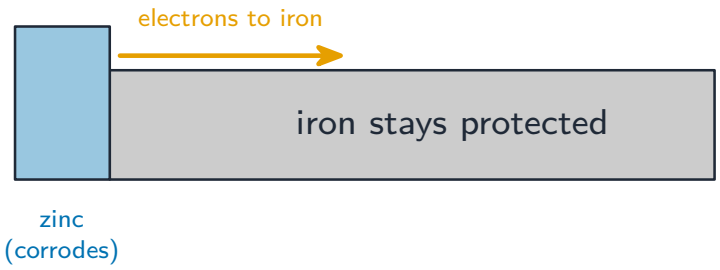
- state that rusting needs oxygen and water
- describe barrier methods and galvanising
- explain sacrificial protection

1 Worked examples

■ Preventing rust



Rusting needs both water and oxygen



The more reactive zinc corrodes instead of the iron — sacrificial protection

- **barrier methods:** painting, greasing, plastic coating.

2 Practice

2.1 State the two substances needed for iron to rust. [2]

2.2 Name the process of coating iron with zinc. [1]

3 Exam-style questions

3.1 Rust is: [1]

- **A** iron(II) sulfate
- **B** hydrated iron(III) oxide
- **C** iron carbonate
- **D** zinc oxide

3.2 In an experiment, an iron nail is kept in (i) water and air, (ii) boiled water under oil, and (iii) dry air with a drying agent.

(a) State in which tube the nail rusts, and why. [2]

(b) State the purpose of the boiled water in tube (ii). [1]

3.3 A block of zinc is attached to the steel hull of a ship. Explain how this protects the steel from rusting, even if the surface is scratched. [3]

Solutions

2.1 oxygen; water.

2.2 galvanising.

3.1 B. Rust is hydrated iron(III) oxide.

3.2 (a) only tube (i); because it is the only one with both water and oxygen present.
(b) boiling removes the dissolved oxygen from the water.

3.3 zinc is more reactive than iron, so it corrodes instead of the iron; the zinc loses electrons / gives them to the iron; so the iron is protected even where the surface is scratched.