

6.4 Redox

Name: _____ Class: _____ Date: _____

Total: 8 marks**KEY WORDS** oxidation 氧化 • electrons 电子 • reducing agent 还原剂 • reduction 还原 • oxidising agent 氧化剂

Objective

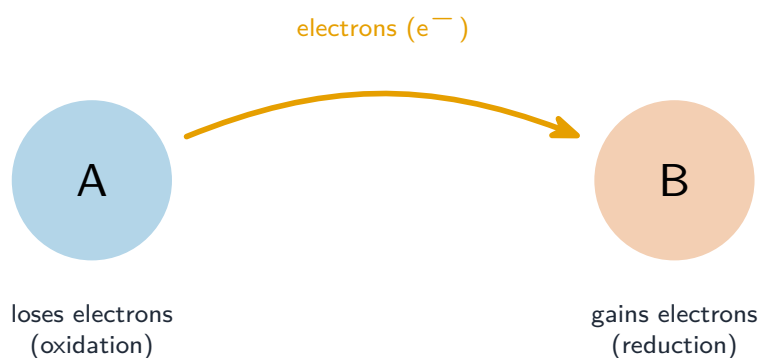
Build the skills to answer exam questions on **redox** 氧化还原 — oxidation and reduction in terms of oxygen and **electrons** 电子, **oxidising/reducing agents** 氧化剂/还原剂, and colour tests.

You must be able to:

- define oxidation and reduction (oxygen, electrons — OIL RIG)
- identify the oxidising agent and the reducing agent
- use the colour changes of manganate(VII) and iodide

1 Worked examples

■ Electron transfer



OIL RIG: Oxidation Is Loss, Reduction Is Gain (of electrons) — they always happen together

- **oxidation:** loss of electrons (or gain of oxygen); **reduction:** gain of electrons (or loss of oxygen).
- **oxidising agent:** is itself reduced; **reducing agent:** is itself oxidised.
- acidified manganate(VII) (purple) → colourless when it acts as an oxidising agent.

2 Practice

2.1 Define oxidation in terms of electrons. [1]

2.2 State the colour change of acidified potassium manganate(VII) when it is reduced. [1]

3 Exam-style questions

3.1 In the reaction $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$, the zinc is: [1]

- **A** reduced (gains electrons)
 - **B** oxidised (loses electrons)
 - **C** the oxidising agent
 - **D** unchanged
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3.2 Consider $\text{Mg} + \text{CuO} \rightarrow \text{MgO} + \text{Cu}$.

(a) State which substance is oxidised and which is reduced (using oxygen). [2]

(b) Name the reducing agent. [1]

3.3 Explain why oxidation and reduction must always happen together in a redox reaction. [2]

Solutions

2.1 the loss of electrons.

2.2 from purple to colourless.

3.1 B. Zinc loses electrons to become Zn^{2+} — it is oxidised.

3.2 (a) magnesium is oxidised (gains oxygen); copper oxide is reduced (loses oxygen).
(b) magnesium.

3.3 electrons lost by one substance must be gained by another; so when one is oxidised, another is reduced at the same time.