

9.6 Extraction of metals

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS blast furnace 高炉 • electrolysis 电解 • reduction 还原
 • carbon monoxide 一氧化碳 • limestone 石灰石

Objective

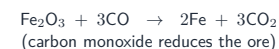
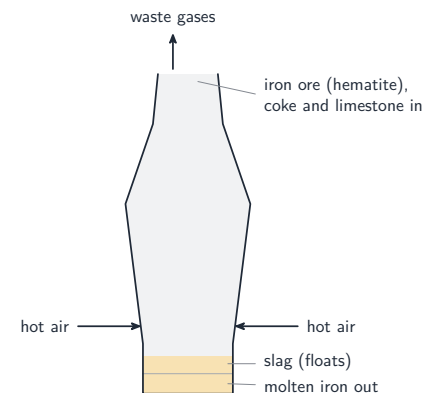
Build the skills to answer exam questions on the **extraction of metals** 金属的提取 — choosing the method, the **blast furnace** 高炉 for iron, and **electrolysis** 电解 for aluminium.

You must be able to:

- link the extraction method to the metal's place in the reactivity series
- describe the reduction of iron oxide in the blast furnace
- describe the extraction of aluminium by electrolysis

1 Worked examples

■ Iron and aluminium



Carbon monoxide reduces iron(III) oxide; limestone removes impurities as slag

most reactive		
K	potassium	
Na	sodium	
Ca	calcium	
Mg	magnesium	above carbon:
Al	aluminium	extract by electrolysis
C	carbon (non-metal)	
Zn	zinc	
Fe	iron	below carbon:
H	hydrogen (non-metal)	extract by reduction
Cu	copper	with carbon
Ag	silver	
Au	gold	
least reactive		

Metals above carbon → electrolysis; metals below carbon → heat with carbon

- **iron:** CO reduces Fe_2O_3 to iron.
- **aluminium:** electrolysis of Al_2O_3 dissolved in molten cryolite.

2 Practice

2.1 State which metal-extraction method is used for metals **above** carbon in the reactivity series. [1]

2.2 Name the ore that iron is extracted from. [1]

3 Exam-style questions

3.1 Aluminium is extracted by electrolysis rather than by heating with carbon because it is: [1]

A	B
C	D

- A less reactive than carbon
- B more reactive than carbon
- C a non-metal
- D a transition metal

3.2 Iron is extracted in the blast furnace.

(a) Name the substance that reduces the iron(III) oxide. [1]

(b) State the role of the limestone. [2]

3.3 In the extraction of aluminium, state why cryolite is used and name the product at the cathode. [2]
