

Exercise walk-through

Extraction of metals ■ 9.6

eXercise

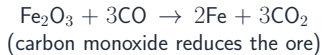
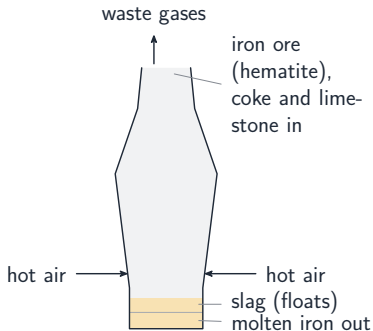
You must be able to

- 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

Method — Iron and aluminium

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

Method — Iron and aluminium



A labelled blast furnace

Method — Iron and aluminium

most reactive			
↓	K	potassium	
	Na	sodium	
	Ca	calcium	above carbon:
	Mg	magnesium	extract by
	Al	aluminium	electrolysis
	C	carbon (non-metal)	

	Zn	zinc	below carbon:
	Fe	iron	extract by re-
	H	hydrogen (non-metal)	duction with
	Cu	copper	carbon
	Ag	silver	
	Au	gold	
least reactive			

The reactivity series, with carbon marked

Practice 2.1 ■ 1 mark

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

Solution 2.1

Method: Iron and aluminium

Worked steps

electrolysis **B1**.

Practice 2.2 ■ 1 mark

Name the ore that iron is extracted from.

Solution 2.2

Worked steps

hematite (iron(III) oxide) **B1**.

Exam-style 3.1 ■ 1 mark

Aluminium is extracted by electrolysis rather than by heating with carbon because it is:

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

Solution 3.1

Method: Iron and aluminium

A less reactive than carbon

B more reactive than carbon 

C a non-metal

D a transition metal

Worked steps

B. Aluminium is more reactive than carbon, so carbon cannot reduce it.

Exam-style 3.2 ■ 1 mark

Iron is extracted in the blast furnace.

- (a) Name the substance that reduces the iron(III) oxide.
- (b) State the role of the limestone.

Solution 3.2

Method: Iron and aluminium

Worked steps

- (a) carbon monoxide **B1**.
- (b) it decomposes to calcium oxide **M1**, which reacts with sandy impurities to form slag **A1**.

Exam-style 3.3 ■ 2 marks

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

Solution 3.3

Method: Iron and aluminium

Worked steps

cryolite lowers the melting point of the aluminium oxide (saving energy) **M1**;
aluminium forms at the cathode **A1**.