

Exercise walk-through

Group VII properties ■ 8.3

eXercise

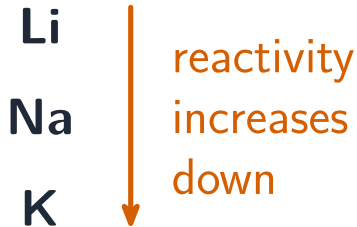
You must be able to

- describe the halogens (diatomic, colours/states) and the trends down the group
- write and explain a halogen displacement reaction
- predict the products of a displacement

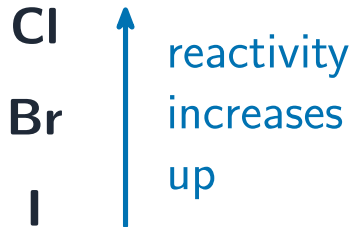
Method — Displacement

$\text{Cl}_2 + 2\text{KBr} \rightarrow 2\text{KCl} + \text{Br}_2$ — chlorine (more reactive) displaces bromine.

Group I

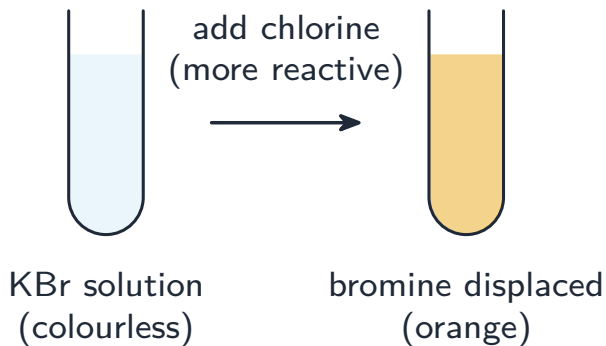


Group VII



Group I and Group VII reactivity arrows pointing opposite ways

Method — Displacement



Chlorine displacing bromine: solution turns orange

Practice 2.1 ■ 1 mark

State the colour and state of chlorine at room temperature.

Solution 2.1

Worked steps

a pale yellow-green gas **B1**.

Practice 2.2 ■ 1 mark

State the trend in reactivity down Group VII.

Solution 2.2

Method: Displacement

Worked steps

reactivity decreases **B1**.

Exam-style 3.1 ■ 1 mark

Which halogen is the most reactive?

A chlorine

B bromine

C iodine

D they are equal

Solution 3.1

Method: Displacement

A chlorine



B bromine

C iodine

D they are equal

Worked steps

A. Chlorine is the most reactive (reactivity decreases down the group).

Exam-style 3.2 ■ 2 marks

Chlorine is bubbled into colourless potassium iodide solution.

- (a) Write the equation for the reaction.
- (b) State and explain the colour change.

Solution 3.2

Method: Displacement

Worked steps

(a) $\text{Cl}_2 + 2\text{KI} \rightarrow 2\text{KCl} + \text{I}_2$ **M1** **A1**.

(b) the solution turns brown/orange **M1**; because iodine has been displaced/formed **A1**.

Exam-style 3.3 ■ 2 marks

Predict whether bromine will displace chlorine from potassium chloride, and explain your answer.

Solution 3.3

Method: Displacement

Worked steps

no — bromine will not displace chlorine (M1); because chlorine is more reactive than bromine, so only a more reactive halogen can displace a less reactive one (A1).