

Exercise walk-through

Group I properties ■ 8.2

eXercise

You must be able to

- describe the alkali metals (soft, one outer electron)
- state the trends in melting point, density and reactivity down the group
- predict the properties of an unfamiliar Group I element

Method — Trends down Group I

- react with water $\rightarrow$ metal hydroxide + hydrogen (more violent down the group).

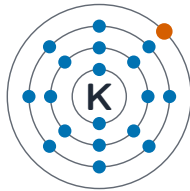
Method — Trends down Group I



lithium
2,1



sodium
2,8,1



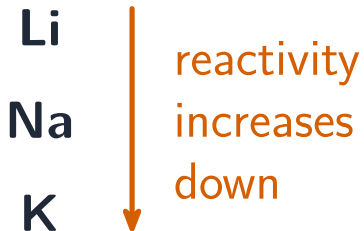
potassium
2,8,8,1

every Group I atom has **one** electron in its outer shell (shown in orange), so they react in similar ways

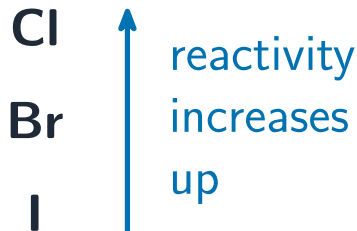
Electron-shell diagrams of Li, Na, K, each with one outer electron

Method — Trends down Group I

Group I



Group VII



Group I reactivity rising down the group

Practice 2.1 ■ 1 mark

State the number of outer-shell electrons in a Group I atom.

Solution 2.1

Method: Trends down Group I

Worked steps

one **B1**.

Practice 2.2 ■ 1 mark

State the trend in reactivity going down Group I.

Solution 2.2

Method: Trends down Group I

Worked steps

reactivity increases **B1**.

Exam-style 3.1 ■ 1 mark

Going down Group I, the melting point:

- A** increases
- B** decreases
- C** stays the same
- D** increases then decreases

Solution 3.1

Method: Trends down Group I

A increases

B decreases 

C stays the same

D increases then decreases

Worked steps

B. Melting point decreases down Group I.

Exam-style 3.2 ■ 1 mark

Rubidium is below potassium in Group 1.

- (a) Predict how its reactivity compares with potassium.
- (b) Predict how its melting point compares with potassium.

Solution 3.2

Method: Trends down Group I

Worked steps

- (a) more reactive than potassium **B1**.
- (b) lower melting point than potassium **B1**.

Exam-style 3.3 ■ 2 marks

Sodium reacts with water.

- (a) Name the two products.
- (b) Explain why potassium reacts more violently than sodium.

Solution 3.3

Method: Trends down Group I

Worked steps

(a) sodium hydroxide **B1**; hydrogen **B1**.

(b) reactivity increases down the group, so potassium is more reactive than sodium **B1**.