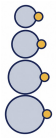
Groups 1 and 2 Map

Edexcel International A Level Chemistry · Unit 2 · Topic 8B Trends in Groups 1 and 2

1 Trends down the groups

8.11-8.12

- Atomic radius **increases**: more shells
- **IE falls**: more shielding
- Reactivity **increases**
- Outer electrons lost more easily



2 Reactions of the metals

8.13

- O_2: $2M + O_2 \rightarrow$ **$2MO$**
- Cl_2: $M + Cl_2 \rightarrow$ **MCl_2**
- Water: $M(OH)_2 + H_2$
- Mg + steam: **MgO** + H_2

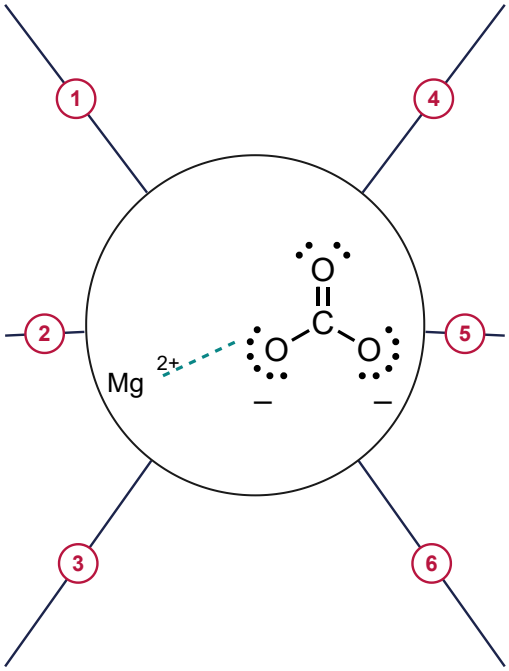


3 Oxides and hydroxides

8.14-8.15

- Basic oxides: $MO + H_2O \rightarrow M(OH)_2$
- Neutralise acids: **salt + water**
- Hydroxides: **more soluble** down
- Sulfates: **less soluble** down





4 Thermal stability

8.16, 8.18

- $MCO_3 \rightarrow MO + CO_2$
- $2M(NO_3)_2 \rightarrow 2MO + 4NO_2 + O_2$
- Larger ion: **less polarising**
- More stable **down** the group



5 Flame and ion tests

8.17, 8.19

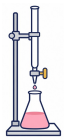
- Li red, Na yellow-orange, K lilac
- Ca brick red, Sr crimson, Ba pale green
- CO_3^{2-}: acid, **limewater**
- SO_4^{2-}: HCl then **$BaCl_2$**; NH_4^+: NaOH



6 Titrations

8.20-8.23

- Concordant: within **0.10 cm³**
- n = c × V; use the **ratio**
- Standard solution: **volumetric flask**
- % uncertainties **add**



Down Group 2: Mg → Ba

one larger ion explains most of the rows

Property	Trend	Why
Atomic radius	increases	one more shell each period
First ionisation energy	decreases	outer electron further out and more shielded
Reaction with water	faster	electrons lost more easily
Hydroxide solubility	increases	$Mg(OH)_2$ sparingly soluble; $Ba(OH)_2$ soluble
Sulfate solubility	decreases	$BaSO_4$ insoluble: the sulfate test
Carbonate stability	increases	larger cation polarises the anion less

Worked examples

Concordant titres

- rough 23.10; 22.45, 22.80, 22.55
- use 22.45 and 22.55
- mean **22.50 cm³**

Ratio 1 : 2

- $H_2SO_4 + 2NaOH$
- 1.00×10^{-3} mol acid
- needs **2.00×10^{-3} mol** NaOH

Overall uncertainty

- titre 0.43 %, pipette 0.24 %
- mass 0.41 %, flask 0.12 %
- total **1.2 %**

Group 2 compounds return in Topic 8C (halide tests), in lattice energy (Topic 13) and in every titration practical.

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