

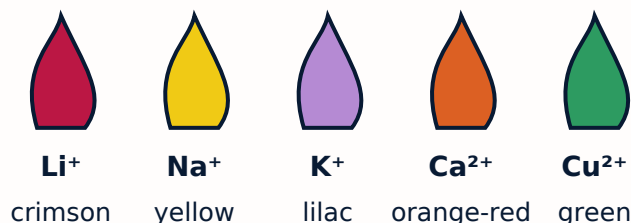
C8 Identify metal ions

Separate Chemistry Paper 2 extras | AQA 8462 | Core: Foundation + Higher

Supplement to shared topic notes: revise the main topic sheets as well.

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Flame tests



A clean wire loop is dipped into the sample and placed in a **non-luminous blue flame**. Observe the flame colour. Clean the loop between samples until it gives no colour.

Metal ion	Flame colour
Lithium	Crimson
Sodium	Yellow
Potassium	Lilac
Calcium	Orange-red
Copper	Green

A contaminated loop can give a false result. In a **mixture**, one flame colour may mask another; a visible colour does not prove only one metal ion is present.

Use the colour **names** as well as the illustrations: printers and screens reproduce colours differently.

For supervised school work: follow the teacher's method and wear eye protection.

Sodium hydroxide tests



Add sodium hydroxide solution to a fresh portion of the sample, then add **excess**. A precipitate is an insoluble solid formed in the liquid.

Ion	Precipitate	In excess NaOH
Al ³⁺	White	Dissolves
Ca ²⁺	White	Remains
Mg ²⁺	White	Remains
Cu ²⁺	Blue	Remains
Fe ²⁺	Green	Remains
Fe ³⁺	Brown	Remains

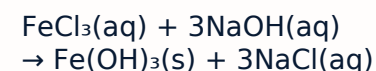
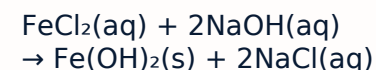
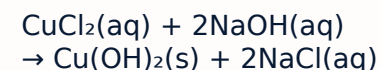
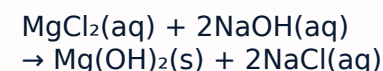
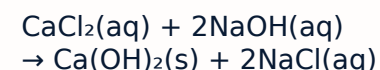
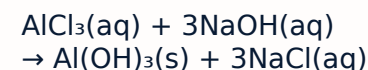
A white precipitate alone cannot distinguish aluminium, calcium and magnesium. Use the excess-NaOH result and, where useful, a flame test.

A calcium flame is orange-red. Magnesium is not one of the five specified diagnostic flame colours.

Balanced hydroxide equations

Balance every element on both sides. Change the large numbers in front of formulae, **not subscripts**. Hydroxide precipitates have state symbol (**s**).

Full formula equation: chloride examples



Each starting salt here is a soluble chloride. Sodium chloride remains dissolved, while the metal hydroxide forms a precipitate.

Equations for aluminium hydroxide dissolving in excess NaOH are not required. The equations above are suitable for both tiers.

C8 Anions, practical work and instruments

Separate Chemistry Paper 2 extras | AQA 8462 | Core: Foundation + Higher

Supplement to shared topic notes: revise the main topic sheets as well.

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Tests for negative ions

Ion	Reagent and positive result
Carbonate, CO_3^{2-}	Add dilute acid. CO_2 bubbles form; the gas turns limewater cloudy.
Chloride, Cl^-	Dilute nitric acid, then silver nitrate: white precipitate.
Bromide, Br^-	Dilute nitric acid, then silver nitrate: cream precipitate.
Iodide, I^-	Dilute nitric acid, then silver nitrate: yellow precipitate.
Sulfate, SO_4^{2-}	Dilute hydrochloric acid, then barium chloride: white precipitate.

Acid removes carbonate ions that could otherwise form a misleading precipitate. For halides, **do not use hydrochloric acid**: it adds chloride ions.

Silver halide precipitates: AgCl , AgBr and AgI . The sulfate precipitate is **BaSO_4** . Record both the reagent and the observation.

Fizzing alone does not identify CO_2 ; include the limewater result.

RP7: identify an unknown salt

1. Label clean test tubes and prepare a solution if needed.
2. Use **fresh, separate portions** for different tests.
3. Record observations before naming ions.
4. Combine cation and anion evidence.

Observation	Conclusion
Blue solid with NaOH	Copper(II) ions present
White solid with acidified BaCl_2	Sulfate ions present
Both in a single ionic compound	Copper(II) sulfate

Use clean apparatus and separate droppers to prevent contamination. Repeat doubtful tests; compare with known samples when available.

8462 Paper 2 practical numbers

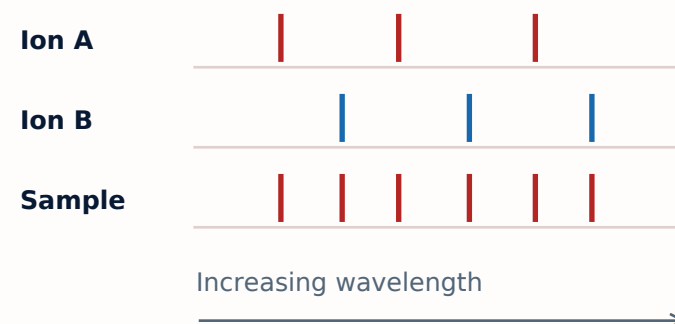
Number	Focus
RP5	Concentration and reaction rate
RP6	Paper chromatography and R_f
RP7	Identify ions in unknown salts
RP8	Water analysis and purification

The other practical methods are covered in shared notes. All ion-test content on these two pages is core.

Flame emission spectroscopy

A solution enters a flame. A spectroscope separates the emitted light into a **line spectrum**. Compare the pattern with reference spectra to identify metal ions.

Illustrative line patterns



The sample contains both A and B: its lines match both reference patterns. Match **positions**, not just the number of lines.

Measure emission intensity and compare with calibration data to determine **concentration**. A larger calibrated signal can indicate more of that ion in solution.

Instrumental methods are **rapid, sensitive and accurate**. They can detect small quantities and identify mixtures that a simple flame colour may not resolve.

Use the reference data supplied in a question. The illustrative spectra above are not real spectra for named elements.