

AQA Chemistry GCSE

Required Practical 7

Identifying Ions

Methods taken from the AQA Required Practical Handbook





Identifying Ions

Aim

Use of chemical tests to identify the ions in unknown single ionic compounds covering the ions from flame tests and sulphates.

Equipment List

- Nichrome wire mounted in handle
- Limewater
- 0.4 M dilute hydrochloric acid
- 0.1 M barium chloride solution
- 0.4 M dilute nitric acid
- 0.05 M silver nitrate solution
- 0.4 M known labelled cation salt solutions: LiCl, NaCl, KCl, CaCl₂, CuCl₂
- 0.4 M known labelled anion salt solutions: Na₂CO₃, Na₂SO₄, NaCl, NaBr, NaI
- 0.4 M salt solution labelled 'unknown'.

1. Flame test for metal ions

Method

1. Pour 1 cm³ of each known chloride solution into 5 test tubes.
2. Clean the nichrome wire by dipping it in dilute hydrochloric acid.
3. Dip the nichrome wire into solution and hold the tip in a blue bunsen flame.
4. Record the colour of the flame.
5. Repeat for the following solutions and make sure to clean the wire after each test.
6. Pour 1 cm³ of the unknown salt solution into test tube.
7. Dip the nichrome wire into solution and hold the tip in a blue bunsen flame.
8. Record the colour of the flame, you should be able to compare results with the known chloride with the matching colour flame.

Results

- | | |
|--|--|
| - Lithium (Li ⁺) – crimson flame | - Calcium (Ca ²⁺) – orange-red flame |
| - Sodium (Na ⁺) – yellow flame | - Copper (II) (Cu ²⁺) – green flame |
| - Potassium (K ⁺) – lilac flame | |





2. Carbonate ion (CO_3^{2-}) test

Method

1. Place a 2 cm³ of limewater in a clean test tube.
2. Add a little dilute hydrochloric acid to the unknown solution.
3. If you see bubbles, transfer the gas produced to the limewater using a delivery tube.
4. Repeat this process for the known sodium solutions to identify carbonates ions.

Results

- Bubbles produced and limewater goes cloudy if present.

3. Sulphate ion (SO_4^{2-}) test

Method

1. Add a 10 drops of dilute hydrochloric acid to the unknown solution in a test tube.
2. Add a 2 cm³ barium chloride solution.
3. Pour 1 cm³ of the known sodium solutions into separate test tubes.
4. Add 5 drops of dilute hydrochloric acid and then 2 cm³ of barium chloride.

Results

- White precipitate formed if present.

Halide ion (Cl^- , Br^- , I^-) test

Method

1. Add a 10 drops of dilute nitric acid to the unknown solution in a test tube.
2. Add a 1 cm³ silver nitrate solution to the test tube with the unknown solution.
3. Pour 1cm³ of the know sodium solutions into separate test tubes.
4. Repeat steps 1 and 2 for which of the solutions.
5. Record colour of precipitate formed in each test tube.



Results

- Chloride – white precipitate produced
- Bromide – cream precipitate produced
- Iodide – yellow precipitate produced

