

Topic 8 AQA Chemistry - Chemical Analysis

- Triple Science Content only in purple
- Triple Science and Higher Content Only in blue

What is a pure substance?

- **A pure substance = a single element or compound, that has not been mixed with any other substance**
- They have **specific** melting and boiling points.
- This allows to **identify** certain elements and substances accurately

What is a formulation?

- **A formulation = mixture that has been made as a useful product**
- They are made by **mixing** the components in measured quantities to form a useful product.
- Examples are **fuels, cleaning agents** etc.

What is chromatography?

A technique used to separate mixtures

Paper Chromatography

Basic idea:

Different substances in a mixture move through paper at different speeds because they have different attractions to the *mobile* and *stationary* phases.

Phases:

- **Mobile phase:** The solvent (e.g., water or ethanol) that moves through the paper.
- **Stationary phase:** The paper (usually filter paper).

Process:

1. Draw a pencil line near the bottom of the paper (baseline).
2. Place small spots of the mixture (e.g., ink) on the line.
3. Dip the bottom of the paper into the solvent (below the baseline).
4. As the solvent moves up, it carries the substances with it.
5. Different substances travel at different speeds and separate.

Rf value = distance moved by substance ÷ distance moved by solvent

- Different compounds have **different Rf values**, which can be used to **identify** the compounds
- A mixture may separate into **different spots** of different compounds depending on the solvent, but a **pure** compound will produce a **single** spot.

You need to know the Identification of common gases

Test for hydrogen

- Use a **burning splint** held at the open end of a test tube
- o Creates a **'squeaky pop'** sound

Test for oxygen

- Uses a **glowing splint** inserted into a test tube
- o Splint **relights** in oxygen

Test for carbon dioxide

- Bubble the gas through the **limewater**
- o it will **turn milky/cloudy**.

Test for chlorine

- Use **damp litmus paper**
- The **paper is bleached and turns white if chlorine is present.**

What are Flame tests?

- Flame tests can be used to **identify metal ions.**

Aluminium, calcium and magnesium ions form a white precipitate with Sodium Hydroxide.
Only aluminium's precipitate dissolves when excess Sodium Hydroxide is added.
Copper(II) produces a blue precipitate
Iron(II) produces a green precipitate
Iron(III) produces a brown precipitate
Remember These!

Test for Carbonates

- **Carbonates + dilute acids = carbon dioxide.**
- This gas can be **bubbled through limewater**, if the limewater goes **cloudy**, the gas is CO_2 .

Test for Halides

- First add **dilute nitric acid**, then **silver nitrate** solution, and observe the following colours for the **halides**
- Chloride gives a **white precipitate**
- Bromide gives a **cream precipitate**

- Iodine gives a **yellow precipitate**

Test for Sulfates

- First add **dilute hydrochloric acid with** barium chloride
- A white precipitate will then form.

What are Instrumental methods?

- A way to detect elements and compounds

o These are: accurate, sensitive and rapid

What is Flame emission spectroscopy?

It is An Example of an instrumental method used to analyse **metal ions in solutions**

- Sample of the solution is put into a flame and the light given out is passed through a spectroscope
- A line spectrum is given out which can be used to identify the metal ions.