Your notes

GCSE Chemistry: revision notes

Purity, formulations and chromatography

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Pure substances

- In chemistry, a **pure substance** is a single element or compound, not mixed with any other substance.
- **Pure substances** melt and boil at specific temperatures. Mixtures melt and boil over a range of temperatures.
- Melting point and boiling point data can tell **pure substances** apart from mixtures. Impurities usually lower the melting point.
- In everyday language, 'pure' can mean a substance that has had nothing added to it, such as 'pure' orange juice, which is really a mixture.

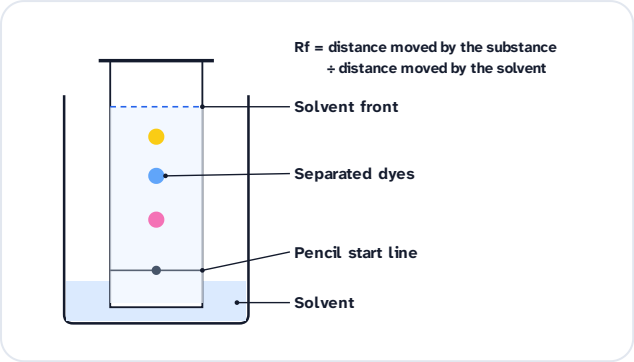
Formulations

- A **formulation** is a mixture that has been designed as a useful product.
- The components are mixed in carefully measured quantities so the product has the properties needed.
- Examples: fuels, cleaning agents, paints, medicines, alloys, fertilisers and foods.

Chromatography

- **Chromatography** separates mixtures and helps identify substances.
- It uses a **stationary phase** (the paper) and a **mobile phase** (the solvent). Substances move different distances depending on how they are attracted to each phase.
- Rf = distance moved by the substance ÷ distance moved by the solvent. **Rf values** are always less than 1.
- Different compounds have different **Rf values** in a given solvent, so a substance can be identified by comparing it with known substances.

- A pure compound produces a single spot in all solvents. A mixture may separate into several spots.



Required practical: paper chromatography

- Draw a start line in pencil (it won't run like ink) about 1 cm above the bottom of the paper.
- Put small spots of the samples on the line, and place the paper in a beaker of solvent with the solvent level below the line.
- Cover with a lid so the solvent doesn't evaporate. Remove the paper when the solvent is near the top, and mark the **solvent front**.
- Measure the distances and calculate the **Rf value** of each spot.

Key terms

Pure substance	A single element or compound, not mixed with anything else.
Impurity	An unwanted substance mixed with a pure substance.
Formulation	A mixture designed as a useful product, with components in measured quantities.
Chromatography	A method of separating and identifying substances in a mixture.
Stationary phase	The part of chromatography that doesn't move, such as the paper.
Mobile phase	The solvent that moves through the stationary phase.
Rf value	Distance moved by a substance ÷ distance moved by the solvent.
Solvent front	The furthest point the solvent reaches up the paper.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. How can you tell a pure substance from a mixture?
2. What is a formulation?
3. What is the stationary phase in paper chromatography?

Your notes

4. How is an Rf value calculated?
5. A spot moves 3.0 cm and the solvent moves 6.0 cm. What is the Rf value?
6. Why is the start line drawn in pencil?
7. Why must the solvent level be below the start line?
8. How many spots does a pure substance give?

Answers

1. A pure substance melts at a specific temperature
2. A mixture designed as a useful product
3. The paper
4. Distance moved by substance ÷ distance moved by solvent
5. 0.5
6. Pencil won't dissolve and run in the solvent
7. So the samples don't dissolve into the solvent in the beaker
8. One

What to do next

Practise 10 questions on this topic

Try 7 exam questions, with mark schemes

Read the lesson, one step at a time

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