

# WJEC (Wales) Chemistry

## A-level

### SP 4.8e - Paper Chromatography

#### Flashcards

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# What is chromatography?



# What is chromatography?

Chromatography is a process used to separate a mixture into different components. All chromatography processes involve a mobile phase, where the molecules can move, and a stationary phase, where the molecules can't move.



What apparatus is required to analyse biro inks by paper chromatography?



# What apparatus is required to analyse biro inks by paper chromatography?

- Chromatography paper
- Scissors
- A range of coloured biro inks
- 250 cm<sup>3</sup> conical flask with rubber bung
- Dropping pipette



# Outline the experimental procedure to analyse biro inks by paper chromatography



# Outline the experimental procedure to analyse biro inks by paper chromatography

1. Cut a piece of chromatography paper to fit the conical flask. Draw a pencil line 10-15 mm from the bottom edge of the paper.
2. Make a small biro dot on the paper on the pencil line. For different biro dots, ensure that there is a 5 mm gap between the dots along the line.
3. Add the developing solvent to the bottle to a depth of no more than 10 mm.
4. Insert the paper into the solvent. Hold the paper in place with a cork or bung.
5. Leave the flask for 30 minutes. Do not allow the solvent front to reach the bottom of the bung.
6. Remove the paper and mark the position of the solvent front.
7. Leave the paper to dry.



Why should pencil be used to draw the line along the bottom of the chromatography paper?





Why should pencil be used to draw the line along the bottom of the chromatography paper?

Pencil will not affect the experiment as it is insoluble in the solvent and therefore will not travel up the chromatography paper.



Why should the solvent in the flask for paper chromatography be no deeper than 10 mm deep?



Why should the solvent in the flask for paper chromatography be no deeper than 10 mm deep?

If the solvent is deeper it will wash away the substances placed on the baseline of the chromatography paper.



Why should you use a lid when carrying out paper chromatography?



Why should you use a lid when carrying out paper chromatography?

The lid prevents the solvent from evaporating.



In paper chromatography, what is the stationary phase?



In paper chromatography, what is the stationary phase?

The chromatography paper is the stationary phase.



In paper chromatography, what is the mobile phase?





In paper chromatography, what is the mobile phase?

The solvent in the flask is the mobile phase.

Water or ethanol are commonly used as solvents.



What two things affect how long the substances spend in each phase in paper chromatography?



What two things affect how long the substances spend in each phase in paper chromatography?

- The solubility of the substances.
- The attraction of the substances to the chromatography paper.



What is an Rf value and how can it be calculated?



# What is an R<sub>f</sub> value and how can it be calculated?

The R<sub>f</sub> value is the retention factor. It is unique to each component in the mixture being analysed so it can be used to identify particular components:

$$R_f = \frac{\text{distance moved by component}}{\text{distance moved by solvent}}$$



# What is the $R_f$ value dependent on?



What is the  $R_f$  value dependent on?

The  $R_f$  value is dependent on the solvent.

If you repeat the experiment with a different solvent, the  $R_f$  value will change.



When measuring the distance moved by a substance on the chromatography paper, where should you measure between?





When measuring the distance moved by a substance on the chromatography paper, where should you measure between?

Measure from the pencil baseline to the middle of the spot of the substance.



# How does paper chromatography separate a mixture?



# How does paper chromatography work to separate a mixture?

- The mobile phase moves through the stationary phase so anything dissolved in it will move with it.
- Compounds interact differently with each phase so will move different amounts through the stationary phase, causing them to separate.

