

CAIE Chemistry IGCSE

12.3 Chromatography

Flashcards

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What is paper chromatography used for?



What is paper chromatography used for?

Separating and identifying a mixture of substances.



How does separation occur in paper chromatography?



How does separation occur in paper chromatography?

There is a stationary phase (chromatography paper) and a mobile phase (solvent).

Substances have different solubilities in the mobile phase so will travel at different rates causing separation. More soluble substances travel further.



Describe how you could use paper chromatography to separate a mixture of food colourings



Describe how you could use paper chromatography to separate a mixture of food colourings

- Draw a pencil line 2 cm from the bottom of chromatography paper.
- Place one dot of 3 known food colourings and one dot of the unknown mixture along the line. Label each dot.
- Place the chromatography paper in a beaker containing 1 cm of water.
- Wait for the water to travel up most of the paper and then remove the paper from the beaker and mark the height reached by the solvent. Dry the paper.
- Observe the chromatogram and record results.



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?

It is insoluble in the solvent so will not affect the experiment. Pen ink would dissolve along with the substance being tested and disrupt the chromatogram



Why should the solvent in the beaker be no deeper than 1cm for paper chromatography?



Why should the solvent in the beaker be no deeper than 1cm for paper chromatography?

If it is deeper, it will wash away the substances on the chromatography paper.



In paper chromatography, what is the stationary phase?



In paper chromatography, what is the stationary phase?

The chromatography paper



In paper chromatography, what is the mobile phase?



In paper chromatography, what is the mobile phase?

The solvent

e.g. water or ethanol



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



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

- Their solubility in the mobile phase.
- Their attraction to the chromatography paper.



What is an R_f value?

(extended only)



What is an Rf value? (extended only)

Rf value is the ratio between the distance travelled by the dissolved substance (the solute) and the distance travelled by the solvent.



How do you calculate R_f values? (extended only)



How do you calculate Rf values? (extended only)

Rf =

Distance travelled by substance

Distance travelled by solvent



In paper chromatography, what affects
the R_f value of a substance?
(extended only)



In paper chromatography, what affects the R_f value of a substance? (extended only)

The solvent.

Repeating the experiment with a different solvent will change the R_f value.



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?

From the pencil baseline to the middle of the spot of the substance.



How many spots will be observed on a chromatogram of a pure substance?



How many spots will be observed on a chromatogram of a pure substance?

One



How can you identify that two mixtures contain a substance which is the same using a chromatogram?



How can you identify that two mixtures contain a substance which is the same using a chromatogram?

Both mixtures will produce different chromatograms but the position of one spot will match exactly.



How does solubility affect the distance a substance travels in paper chromatography?



How does solubility affect the distance a substance travels in paper chromatography?

A substance that is more soluble in the mobile phase will travel further up the chromatography paper.



How can paper chromatography be used
if a mixture contains colourless
substances? (extended only)



How can paper chromatography be used if a mixture contains colourless substances? (extended only)

Using locating agents

After the chromatogram has been produced, it is treated with a locating agent to make the spots visible.

