

Exercise walk-through

Chromatography ■ 12.3

eXercise

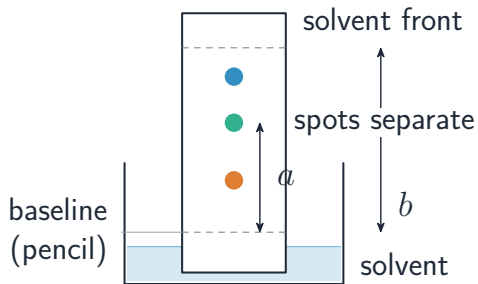
You must be able to

- describe paper chromatography and the use of a locating agent
- calculate an R_f value
- use a chromatogram to identify substances and check purity

Method — Chromatography and R_f

- **colourless** substances need a **locating agent** to show the spots.
- a **pure** substance gives only one spot.

Method — Chromatography and R_f



$$R_f = \frac{a}{b} = \frac{\text{spot}}{\text{solvent}}$$

Chromatography paper: a mixture separating into spots below the solvent front

Practice 2.1 ■ 1 mark

State what a single spot on a chromatogram tells you about a substance.

Solution 2.1

Method: Chromatography and Rf

Worked steps

it is pure (a single substance) **B1**.

Practice 2.2 ■ 1 mark

State why a locating agent is sometimes needed.

Solution 2.2

Method: Chromatography and Rf

Worked steps

to make colourless spots show up **B1**.

Exam-style 3.1 ■ 1 mark

The R_f value of a spot is the distance moved by the spot divided by the distance moved by the:

A paper

B solvent

C baseline

D beaker

Solution 3.1

Method: Chromatography and R_f

A paper

B solvent



C baseline

D beaker

Worked steps

B. $R_f = \frac{\text{distance moved by the spot}}{\text{distance moved by the solvent}}.$

Exam-style 3.2 ■ 2 marks

On a chromatogram, a spot moves 3.0 cm while the solvent moves 12.0 cm.

- (a) Calculate the R_f value.
- (b) State how a chromatogram can be used to identify an unknown substance.

Solution 3.2

Method: Chromatography and R_f

Worked steps

(a) $R_f = \frac{3.0}{12.0} = 0.25$ **M1** **A1**.

(b) compare its spot/ R_f with those of known substances run alongside **B1**.