

12.3 Chromatography

Name: _____ Class: _____ Date: _____

Total: 6 marks

KEY WORDS chromatography 色谱法 • paper chromatography 纸色谱法 • chromatogram 色谱图
 • value 比移值 • locating agent 显色剂

Objective

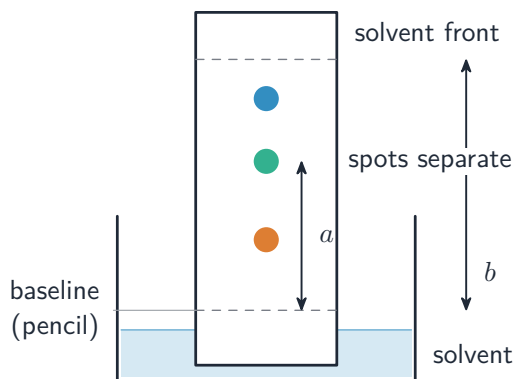
Build the skills to answer exam questions on **chromatography** 色谱法 — separating a mixture, the R_f **value** 比移值, and using a **chromatogram** 色谱图.

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

1 Worked examples

■ Chromatography and R_f



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

Substances travel different distances as the solvent rises; $R_f = \frac{\text{spot distance}}{\text{solvent distance}}$

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

2 Practice

2.1 State what a single spot on a chromatogram tells you about a substance. [1]

2.2 State why a locating agent is sometimes needed. [1]

3 Exam-style questions

3.1 The R_f value of a spot is the distance moved by the spot divided by the distance moved by the: [1]

- **A** paper
 - **B** solvent
 - **C** baseline
 - **D** beaker
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3.2 On a chromatogram, a spot moves 3.0 cm while the solvent moves 12.0 cm.

(a) Calculate the R_f value. [2]

(b) State how a chromatogram can be used to identify an unknown substance. [1]

Solutions

2.1 it is pure (a single substance).

2.2 to make colourless spots show up.

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

3.2 (a) $R_f = \frac{3.0}{12.0} = 0.25$.

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