

# 12.3 Chromatography

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Total: 6 marks

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

## Objective

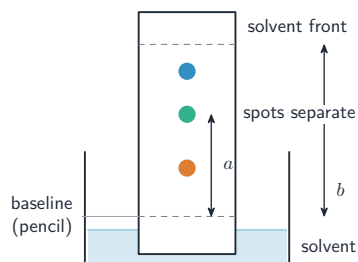
Build the skills to answer exam questions on **chromatography** 色谱法 — separating a mixture, the  $R_f$  **value** 比移值, and using a **chromatogram** 色谱图.

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]

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

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## 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

\_\_\_\_\_

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]

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

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## Solutions

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**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.