

12 Separating and purifying – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)		
solute	溶质	_____	_____	_____
solvent	溶剂	_____	_____	_____
solution	溶液	_____	_____	_____
residue	残渣	_____	_____	_____
filtrate	滤液	_____	_____	_____
titration	滴定	_____	_____	_____
pipette	移液管	_____	_____	_____
indicator	指示剂	_____	_____	_____
burette	滴定管	_____	_____	_____
end-point	终点	_____	_____	_____
filtration	过滤	_____	_____	_____
crystallisation	结晶	_____	_____	_____
simple distillation	蒸馏	_____	_____	_____
fractional distillation	分馏	_____	_____	_____
Paper chromatography	纸色谱法	_____	_____	_____

English	中文	Write it 3 times (English)		
R value	比移值	_____	_____	_____
Impurities	杂质	_____	_____	_____
melting point	熔点	_____	_____	_____
boiling point	沸点	_____	_____	_____

Recall

These words come up in every practical:

- A **solute** 溶质 dissolves in a **solvent** 溶剂 to make a **solution** 溶液.
- The **residue** 残渣 is the solid left on the filter paper; the **filtrate** 滤液 is the liquid that passes through.

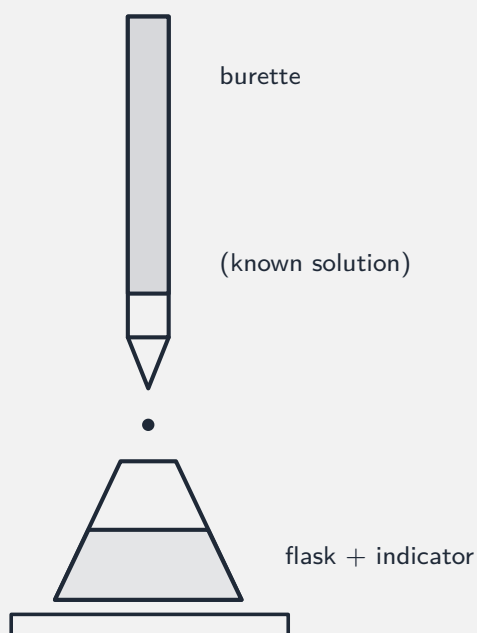
New ideas

Read these first, then do the Practice.

■ 1 Titration

A **titration** 滴定 finds the exact volume of one solution that reacts with another.

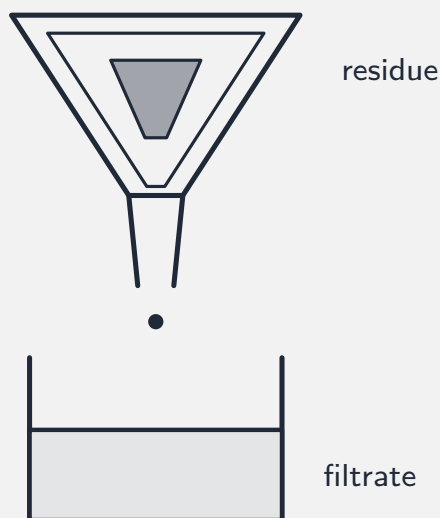
- Measure a fixed volume of one solution into a flask with a **pipette** 移液管, and add a few drops of **indicator** 指示剂.
- Run the other solution in from a **burette** 滴定管 until the colour just changes — the **end-point** 终点.



■ 2 Separating mixtures

Choose the method to match the mixture:

Method	Separates
filtration 过滤	an insoluble solid from a liquid
crystallisation 结晶	a soluble solid from its solution
simple distillation 蒸馏	a solvent (liquid) from a solution
fractional distillation 分馏	two liquids with different boiling points

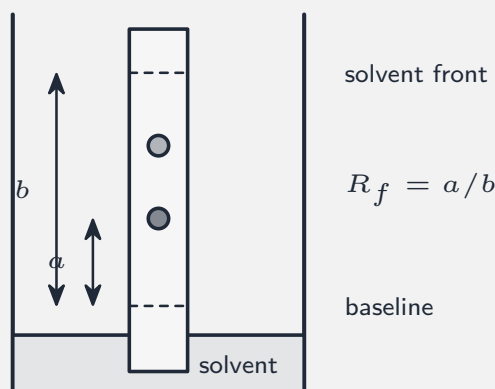


■ 3 Chromatography

Paper chromatography 纸色谱法 separates a mixture of soluble, coloured substances. A spot of the mixture is placed on a pencil baseline; as the solvent rises up the paper, each substance travels a different distance and so separates.

The spots are compared using the **R_f value** 比移值:

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



■ 4 Checking purity

A pure substance melts and boils at sharp, fixed temperatures. **Impurities** 杂质 lower the **melting point** 熔点 and raise the **boiling point** 沸点—so a thermometer can check purity.

Watch out: match the method to the mixture —**filtration** (insoluble solid from a

liquid), **crystallisation** (soluble solid from solution), **distillation** (a liquid from a solution / two liquids). The R_f value is *substance distance* $\div$ *solvent distance*, so it is always **less than 1**.

Practice

Try these in order.

12.1 Name the apparatus used to measure a fixed, accurate volume of solution into a flask. [1]

12.2 In a titration, what is the *end-point*? [1]

12.3 Which method would separate an insoluble solid from a liquid? [1]

12.4 In a chromatography run, a spot moves 4 cm while the solvent moves 8 cm. Work out the R_f value. [1]

12.5 How does the melting point change if a substance is impure? [1]

12.6 Challenge. In a chromatogram, substance A moves 3 cm and substance B moves 6 cm while the solvent moves 8 cm. Calculate the R_f of each, and state which travelled further. [3]