

13 Pigments and spectra – Part 2

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)
pigments	色素	_____
chlorophyll	叶绿素	_____
absorption spectrum	吸收光谱	_____
action spectrum	作用光谱	_____
Chromatography	色谱法	_____

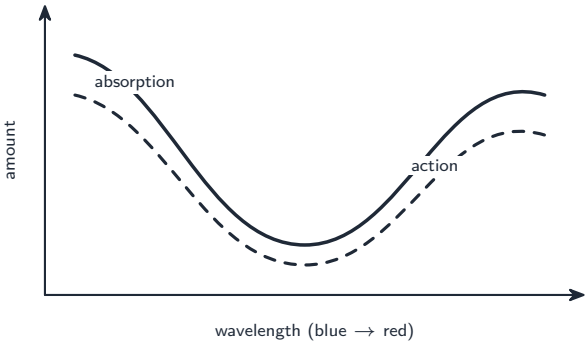
Recall

Light is trapped by coloured **pigments** 色素 in the thylakoids. We can study and separate them.

New ideas

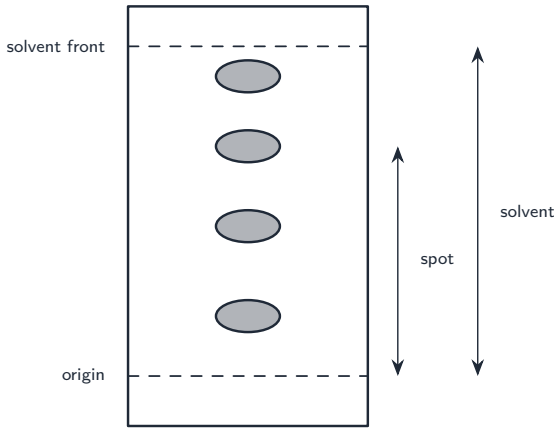
Read these first, then do the Practice.

■ 1 Two spectra that match



- **chlorophyll** 叶绿素 and other pigments absorb mainly red and blue light;
- the **absorption spectrum** 吸收光谱 shows how much light a pigment absorbs;
- the **action spectrum** 作用光谱 shows how fast photosynthesis goes. They match closely — proof the pigments drive photosynthesis.

■ 2 Separating pigments



Chromatography 色谱法 separates pigments: each travels its own distance. Its **R_f value** is the spot distance ÷ the solvent distance.

Worked example. A pigment spot moves 4.0 cm while the solvent moves 8.0 cm, so its $R_f = 4.0/8.0 = 0.50$.

Watch out: chlorophyll absorbs mainly red and blue light and *reflects* green — which is why leaves look green. The absorption and action spectra *match*, which is the evidence that pigments drive photosynthesis.

Practice

Try these in order.

13.6 What is a *pigment*? [1]

13.7 Which two colours of light does *chlorophyll* absorb most? [1]

13.8 What does an *absorption spectrum* show? [1]

13.9 Why does the action spectrum matching the absorption spectrum matter? [1]

13.10 Write the formula for an *Rf value*. [1]

13.11 Challenge. Leaves look green, yet green light is the *least* useful for photosynthesis. Explain the link between these two facts. [2]
