

1.2 Diffusion

Name: _____ Class: _____ Date: _____

Total: 8 marks

Objective

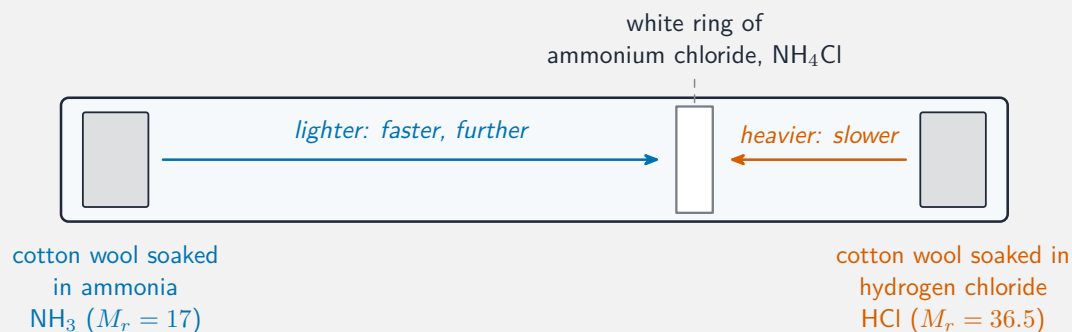
Build the skills to answer exam questions on **diffusion** 扩散—what it is, why it happens, and how the **rate** depends on **relative molecular mass** 相对分子质量.

You must be able to:

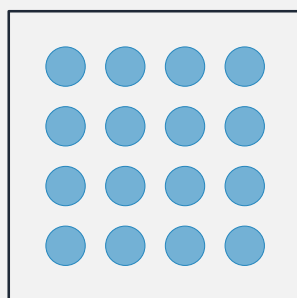
- describe diffusion as spreading from high to low concentration
- explain diffusion using the random motion of particles
- explain why lighter molecules diffuse faster (the NH_3/HCl experiment)

1 Worked examples

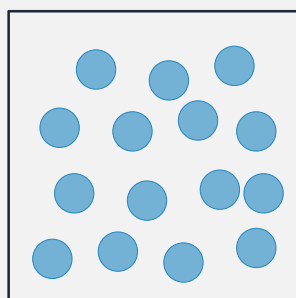
■ The NH_3/HCl experiment



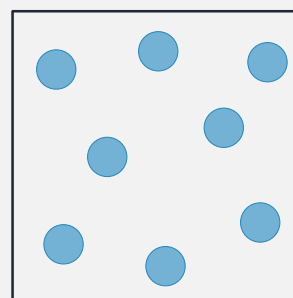
Ammonia ($M_r = 17$) is lighter, so it diffuses faster and further; the ring forms nearer HCl



solid
regular, touching
vibrate in place



liquid
close, random
slide past each other



gas
far apart, random
move fast

- **diffusion:** particles spread from high to low concentration because they move randomly.
- happens in gases and liquids, **not** solids (particles can't move from place to place).
- lighter molecules (smaller M_r) diffuse **faster**.

2 Practice

2.1 Define diffusion. [1]

2.2 State why diffusion does not occur in solids. [1]

3 Exam-style questions

3.1 Two gases diffuse along a tube. The one that travels faster has the: [1]

- **A** larger relative molecular mass
 - **B** smaller relative molecular mass
 - **C** higher density
 - **D** larger molecules
-

3.2 In the experiment, ammonia ($M_r = 17$) and hydrogen chloride ($M_r = 36.5$) diffuse from opposite ends of a tube and form a white ring.

(a) State, with a reason, at which end the white ring forms nearer. [2]

(b) Name the white solid formed. [1]

3.3 Explain, in terms of particles, why you can smell perfume from across a room. [2]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **1.2 Diffusion** past-paper sheet in the Library, or try these in **Practice mode**:

- 0620/21 N25 —Q2 (diffusion)
- 0620/22 N25 —Q3 (rate of diffusion)

Solutions

2.1 the spreading of particles from a region of high concentration to a region of low concentration.

2.2 the particles in a solid cannot move from place to place (only vibrate).

3.1 B. The gas with the smaller relative molecular mass diffuses faster.

3.2 (a) nearer the hydrogen chloride end; because ammonia is lighter, so it diffuses faster and travels further.

(b) ammonium chloride (NH_4Cl).

3.3 the perfume particles move randomly in all directions; they diffuse and mix with the air until they reach your nose.