Your notes

GCSE Chemistry: revision notes

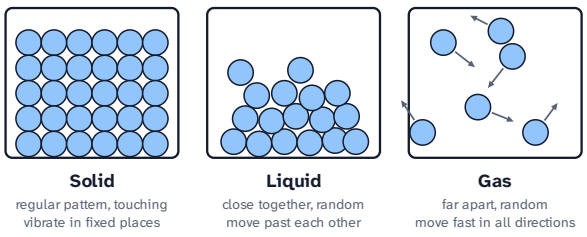
States of matter and state symbols

Contents

1. The three states
2. Changes of state
3. Predicting states
4. Limitations of the particle model
5. State symbols
6. Key terms
7. Quick questions
8. What to do next

The three states

- Solids: particles are closely packed in a regular pattern and vibrate in fixed positions.
- Liquids: particles are close together but randomly arranged and can move around each other.
- Gases: particles are far apart, randomly arranged and move quickly in all directions.



Changes of state

- Melting and **freezing** happen at the **melting point**. Boiling and **condensing** happen at the boiling point.
- The amount of energy needed to change state depends on the strength of the forces between the particles. The stronger the forces, the higher the melting and **boiling points**.
- The nature of the particles (atoms, ions or molecules) and the type of bonding decide how strong these forces are.

Predicting states

- If the temperature is below the **melting point**, the substance is a solid.
- If it is between the **melting point** and the **boiling point**, it is a liquid.
- If it is above the **boiling point**, it is a gas.

Limitations of the particle model

- The simple model shows particles as small, solid, inelastic spheres.
- It does not show the forces between particles, the space between them accurately, or that particles may be atoms, ions or molecules of different shapes.

State symbols

- In equations, (s) means solid, (l) liquid, (g) gas and (aq) **aqueous** (dissolved in water).
- Example: $NaCl(aq) + AgNO_3(aq) \rightarrow AgCl(s) + NaNO_3(aq)$.

Key terms

Melting point	The temperature at which a solid turns into a liquid (and a liquid freezes).
Boiling point	The temperature at which a liquid turns into a gas (and a gas condenses).
Particle model	A model that explains the states of matter using the arrangement and movement of particles.
Aqueous	Dissolved in water, shown by (aq).
Condensing	A gas turning into a liquid.
Freezing	A liquid turning into a solid.
State symbol	A letter in brackets showing the state of a substance in an equation.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. How are particles arranged in a solid?
2. How do particles move in a gas?
3. What does the state symbol (aq) mean?
4. What happens at the boiling point?
5. A substance melts at –7 °C and boils at 59 °C. What state is it at 20 °C?
6. A substance melts at 801 °C. What state is it at 25 °C?
7. What decides how much energy is needed to melt a substance?
8. What is a limitation of the particle model?

Your notes

Answers

1. Closely packed in a regular pattern
2. Quickly in all directions
3. Dissolved in water
4. A liquid turns into a gas
5. Liquid
6. Solid
7. The strength of the forces between the particles
8. It shows particles as solid spheres with no forces between them

What to do next

Practise 10 questions on this topic

Try 7 exam questions, with mark schemes

Read the lesson, one step at a time

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