

States of Matter and Particle Arrangement

Chapter 7: Particulate Nature of Matter · Topic 2

Key Concept

In gases, particles are far apart with very weak forces between them, allowing them to move freely and rapidly in all directions, filling any available space — this is why gases have neither a fixed shape nor a fixed volume. As a substance changes state (like ice melting to water, or water boiling to steam), only the particle arrangement and energy change; the particles themselves remain the same, meaning the chemical identity of the substance is unchanged during these physical state changes.

Quick Revision Notes

- Solids: particles tightly packed, fixed arrangement, vibrate in place.
- Liquids: particles close but able to move; fixed volume, changeable shape.
- Gases: particles far apart, move freely; no fixed shape or volume.
- Changing state only changes particle arrangement/energy, not the substance's chemical identity.

Practice Questions

- 1 Explain why solids have a fixed shape but liquids do not.
- 2 Describe how the arrangement of particles changes when a solid melts into a liquid.
- 3 Why do gases fill the entire container they are placed in?