

What Are Phase Transitions?

Worksheet

Phase transitions occur when thermal energy overcomes or is overcome by intermolecular forces. Melting, freezing, evaporation, condensation, sublimation, and deposition are the six main transitions between three states.

Questions

1. Ice melting at 0 C is which type of phase transition?
A) evaporation
B) melting
C) condensation
D) deposition
2. Which transition requires heat removal?
A) melting
B) evaporation
C) freezing
D) sublimation
3. Dry ice subliming means
A) ice forming from vapor
B) solid becoming liquid then gas
C) solid directly to gas
D) gas becoming liquid
4. Boiling point increases with
A) lower pressure
B) higher pressure
C) temperature
D) volume
5. Ice at 0 C absorbs 334 kJ/kg heat. Does temperature change during melting?
6. Water boils at 100 C at sea level, 95 C at 2000 m altitude. Why?
7. Dry ice (solid CO) disappears at room temperature without becoming liquid. What's this process?
8. Define: Define a phase transition.
9. Define: What is the latent heat of vaporization?
10. Define: Why doesn't temperature change during melting?

Answer Key

1. B) melting - Melting is solid to liquid.
2. C) freezing - Freezing converts liquid to solid by removing heat.
3. C) solid directly to gas - Sublimation skips the liquid phase.
4. B) higher pressure - Higher pressure pushes harder on the liquid surface, raising boiling point.
5. No. During a phase transition, temperature remains constant. All absorbed energy goes to breaking molecular bonds, not kinetic energy. Temperature rises again only after all ice melts.
6. Boiling point depends on atmospheric pressure. At altitude, lower pressure less force pushing down on liquid. Molecules escape to gas more easily lower boiling point.
7. This is sublimation - solid transforms directly to gas. CO phase diagram shows: solid gas without liquid phase at atmospheric pressure.
8. A process where matter changes from one state (solid, liquid, or gas) to another without changing composition.
9. The energy required to convert 1 kg of liquid to gas at constant temperature and pressure.
10. Energy input breaks bonds, not accelerating molecular motion until the transition completes.

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