

Question #61207, Physics Molecular Physics Thermodynamics

7. If an ice cube melts at 0°C but water also freezes at 0°C, what is the difference between melting and freezing in terms of (a) the energy involved in the phase changes and (b) particles of the substances during the phase changes?

**Answer**

(a) If energy is being absorbed, then more hydrogen bonds are being broken (melting). If energy is being released, more hydrogen bonds become fixed (freezing).

(b) During melting, hydrogen bonds get broken and movement can occur. During freezing, hydrogen bonds become fixed and water molecules cannot move as much.

10. If measurements of a gas are 75L and 300 kilopascals and then the gas is measured a second time and found to be 50L, describe what had to happen to the pressure (if temperature remained constant). Include which law supports this observation.

**Answer**

Boyle's law – describes the relation between the volume (V) and the pressure (P).

According to Boyle's Law if the volume is increased, the pressure is decreased and vice versa.

Calculate the new pressure with

$$P_1V_1 = P_2V_2$$
$$P_2 = \frac{V_1}{V_2}P_1 = \frac{75}{50}300 = 450 \text{ kPa.}$$

The pressure had to **increase** if the volume **decreased**.

11. Which statement matches the scientists to their research on atomic theory?

- a. Dalton used gold foil; Bohr made the planetary model of atoms
- b. Thomson used gold foil; Dalton believed atoms had no internal structure
- c. Rutherford used gold foil; Thomson discovered electrons
- d. Rutherford discovered electrons; Thomson made the planetary model of atoms

**Answer**

c. Rutherford used gold foil; Thomson discovered electrons.