

Chapter Summary: Phases of Matter: Liquids and Solids

Intermolecular Forces and the Physical Properties of Liquids and Solids

Intermolecular Forces

- Van der Waals Forces
- Hydrogen Bonds
- Dispersion Force
- Ion – dipole interactions
- Dipole-Dipole Force

Intermolecular Forces and Liquid Properties

- Surface Tension
- Cohesion
- Viscosity
- Adhesion

Liquid Phase Changes

- Heat of Vaporization: quantity of heat absorbed to vaporize a given amount of liquid at constant temperature.
- Vapor Pressure: pressure exerted by the vapor of a liquid at a particular temperature. It increases with temperature.

Structure of Solids

- Covalent: amorphous, allotropes.
- Ionic: crystalline, lattice, lattice energy, unit cell.

Solid Phase Changes

- Phase Changes: – Fusion, freezing, vaporization, condensation, sublimation, deposition
- Boiling Point: Temperature at which vapor pressure of a liquid is equal to atmospheric pressure.
- Melting Point or Freezing Point: Temperature at which solid and liquid phases are in equilibrium.
- Supercooling
- Supercritical Fluid: The fluid that exists at and above critical point.
- Enthalpy of Fusion: Quantity of heat required to melt a given amount of solid.
- Phase Diagram: A graphical representation of the states of matter with respect to changes in temperature and pressure.
- Critical temperature: The highest temperature at which a gas can be condensed into a liquid by increasing the pressure of the gas.
- Critical Point: Temperature and pressure at which a liquid and vapor coexist in equilibrium as physically distinct phases.
- Triple Point: The temperature and pressure at which solid, liquid and vapor coexist.

Key Words:

Melting, freezing, vaporization, condensation, sublimation, deposition	Vapor pressure, critical point, triple point, supercritical fluid,	Phase diagram
Van der Waal forces, dipole dipole forces, hydrogen bonding	Surface tension, viscosity	Amorphous, crystalline