

Chapter 6
Intermolecular Forces: Attractions between Particles
Learning Objectives

8.2.2021

To satisfy the minimum requirements for this course, you should be able to:

1. Describe the various types of intermolecular forces, IMFs, (dipole-dipole forces, ion-dipole forces, London dispersion forces, and hydrogen bonds) and be able to:
 - identify the types of IMFs present based on a molecule's structure
 - rank the relative individual strengths of the different types of IMFs
 - understand the additive nature of IMFs in determining overall properties
 - identify functional groups within a molecule that give rise to hydrogen bonding and its dominate role in determining overall properties
 - rank the strength of dispersion forces based on molecular weight, polarizability, or shape
 - recognize hydration of ions as an important example of ion-dipole forces
 - define solubility, solvent and solute
 - explain how intermolecular forces determine physical properties of molecules; especially solubility, boiling point, melting point and viscosity
 - explain how hydrogen bonding affects the properties of water
2. Name the six phase change processes and be able to:
 - explain what is meant by a physical equilibrium
 - define boiling point and melting (freezing) point and explain why the boiling point of a liquid depends on the pressure on the surface of the liquid
 - use a phase diagram to predict which phases are present at any given temperature and pressure, identify phase changes as temperature and/or pressure are varied, and identify the critical temperature, critical pressure, and triple point
3. Define the following properties of liquids: surface tension, capillary action, and viscosity
 - understand the role of IMFs in determining the relative magnitudes of these properties for different liquids
4. *Naval Application: Fuels and Lubricating Oils*
 - recognize that heavier hydrocarbons generally have stronger intermolecular forces, higher boiling points, and lower vapor pressures
 - (This NavApp will be expanded on in Chapter 19)