

## Chapter 11

- bonding models: valence bond and molecular orbital theory
  - basic concepts of each model
  - strengths and weakness of each model
- valence bond model and orbital hybridization
  - why we might invoke hybridization
  - pi and sigma bonding
  - how multiple bonds form
  - relating bonding and hybridization to molecular geometry
- molecular orbital theory
  - molecular orbitals, bonding, antibonding, nonbonding
  - molecular orbital diagrams and basic rules for construction
  - trends in diatomic molecules
- delocalized orbitals
- bonding in metals
  - band theory, conductors and semiconductors

## Chapter 12

- intermolecular forces
  - types, requirements and relative strength
  - how do im forces contribute to properties
  - hydrogen bonding interactions
- properties of liquids
  - surface tension, vapor pressure, boiling point, critical point, heat of vaporization.
- properties of solids
  - melting point, heat of fusion, sublimation
- phase diagrams: what happens at each interface?
- crystalline solids
  - types of crystalline solids
  - crystal structures, unit cells, relating structure to properties like density, etc.

## Chapter 13

- means to describe concentration
- the thermodynamics of the dissolution process
  - solutions of ionic and molecular species
- colligative properties – why they occur and how to calculate them
- gas solubility
- osmosis

## Chapter 26

- functional group approach to organic chemistry
- know these functional groups:
  - alkane, alkene, alkyne, alcohol, ether amine, aldehyde, carboxylic acid, ester, amide, ketone
- hybridization and shapes for functional groups
- utility of functional group reactivity
- representations of organic compounds and very basic naming
  - isomers
- extension of organic chemistry to polymer chemistry.