Chapter 8

molecular compounds

Covalent bonds share electrons

molecules are neutral atoms joined together (NM : NM)

ionic compounds - M : NM strongest ↑ mp : bp

Metalic compound - M : M mixtures, alloys

Structural formula - used to show the arrangement of atoms in molecules

molecular formula - shows the actual number of atoms in a molecule H_2O

emperical formula - the reduced ratio of atoms $C_6H_{12}O_6 \rightarrow CH_2O$

ionic - metal : nonmetal, strongest, cation and anion, solid, ↑ mp : bp formula crystals

molecules - nonmetal : nonmetal, neutral, most abundent, no particular common phase at room temp, molecular and structural formula, empirical formula

metallic - metal : metal, mixture, alloy, ↑ mp : bp

Covalent bonding - octet rule still applies

$Br_2\ I_2\ N_2\ Cl_2\ H_2\ O_2\ F_2$

$H\cdot + H\cdot \rightarrow H:H \rightarrow H-H$

$H\uparrow + H\downarrow = H_2\uparrow\downarrow$

longest to shortest bond

single bond, double bond, triple bond (releases more energy when formed N_2)

coordinate bond - one atom contributes both e⁻ to be more stable

Molecular Geometry

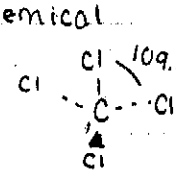
Bond strength

Bond polarity

size } most noticable in biochemical reactions

shape }

molar shape CCl



tetra hedral

Shapes	
linear	180°

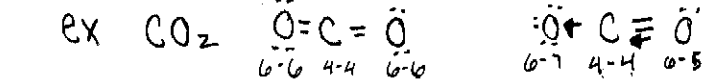
e⁻ domain: about or around central atom : 4

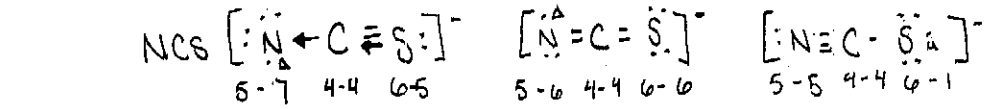
molecular shape determined by VSEPR

Valence Shell Electron Pairs Repell

Formal Charge - tells which e⁻ dot structure is most likely to occure

- the structure with SMALLEST (absolut value)
- tie? winner is one with most e⁻negative atom
- to find # valence electrons - # assigned electrons

ex CO_2 

NCS 

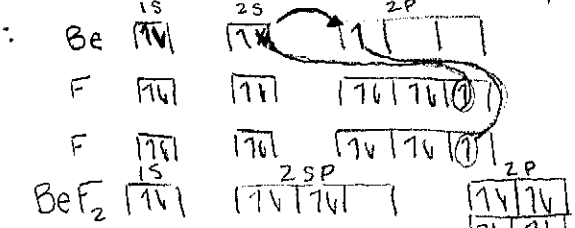
bond dissociation energy - energy required to break bond

KJ/mol , 1 mole = 6.02×10^{23}

also amount of energy to create bond

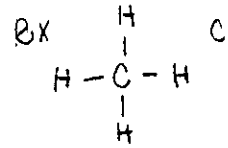
hybrid orbital: when compounds form orbital overlap

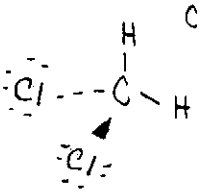
ex BeF_2 :F-Be-F: 2e⁻ domains sp, 3e⁻ domains sp^2, 4e⁻ domains sp^3



molecule polarity: when charges aren't evenly distributed among the whole molecule the molecule is polar or charged

- when the charges are evenly distributed the molecules are non-polar

ex  CH_4 non-polar (no charge on hydrogen)

 CH_2Cl_2 polar (electrons on Cl)

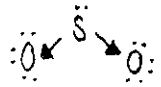
 polar (electrons on O)

Chapter 8 cont.

molecule polarity cont.

ex

:N≡N: non-polar (even amount of electrons)

 polar (sulfur only has 2 e^-, oxygen has 6)

hint: shared electrons are being pulled (more attracted) to less negative atom

linear and triangular planer are usually non-polar