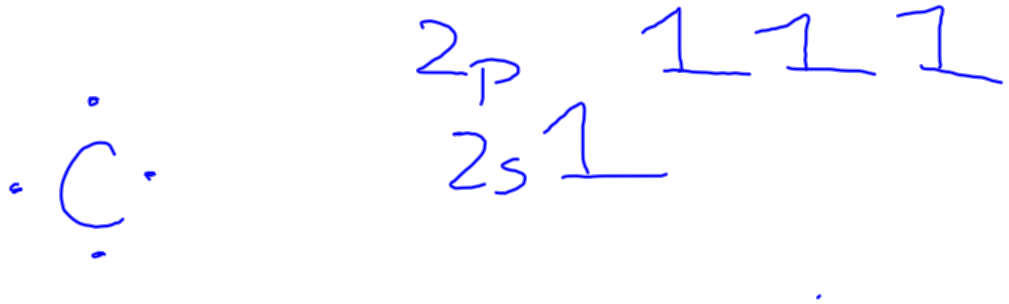
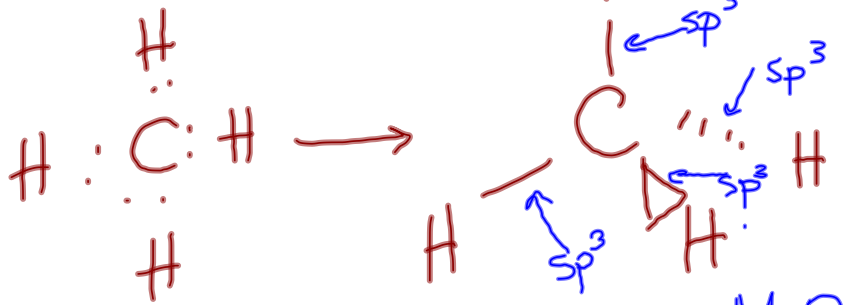
Chemical Bonding Topics

- Octet Rule
- Electron Dot Structure
- Metallic Bonding
- Covalent Bonding
- Coordinate Covalent Bonding
- VSEPR Theory
- Hybridization
- Polarity
- Intermolecular Forces
- Properties of Ionic Crystals, Covalent Compounds, Network Solids


2p 1 1 1
C
2s 1

CH_4

Tetrahedral



A. O. → M. O.

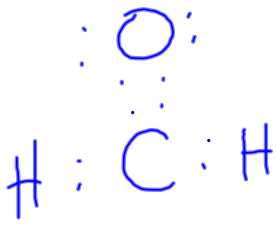
$S + P_x + P_y + P_z \longrightarrow sp^3 + sp^3 + sp^3 + sp^3$

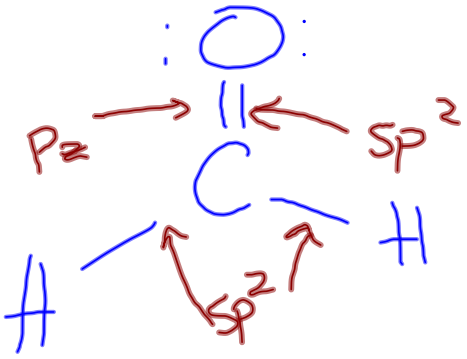
↳ 4σ

NH_3

TRIGONAL PLANAR

CH_2O





$S + p_x + p_y \longrightarrow sp^2 + sp^2 + sp^2$

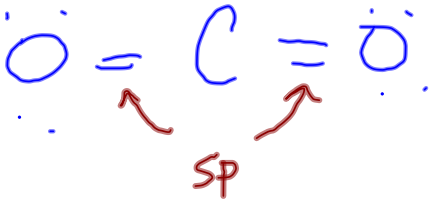
↳ 3σ

p_z

↳ π

CO_2

LINEAR

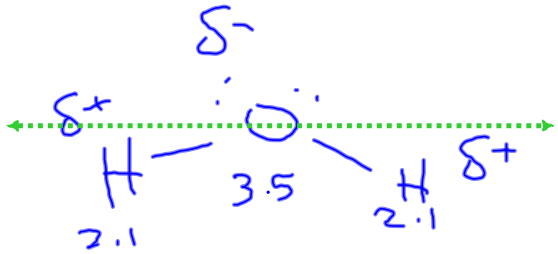


$S + P_y \longrightarrow Sp + sp$

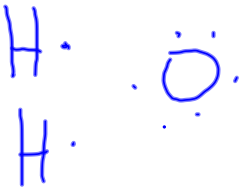
$\hookrightarrow 2\sigma$

P_x, P_z

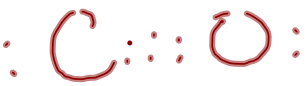
$\hookrightarrow \pi, \pi$

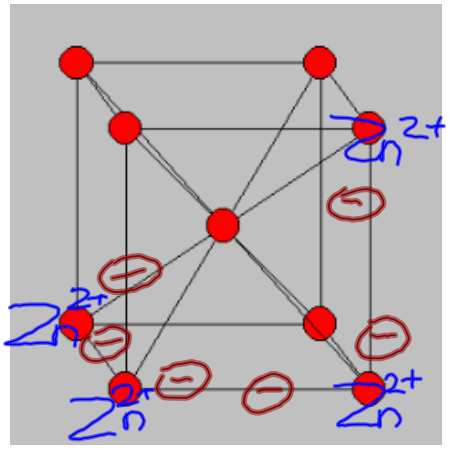


H_2O

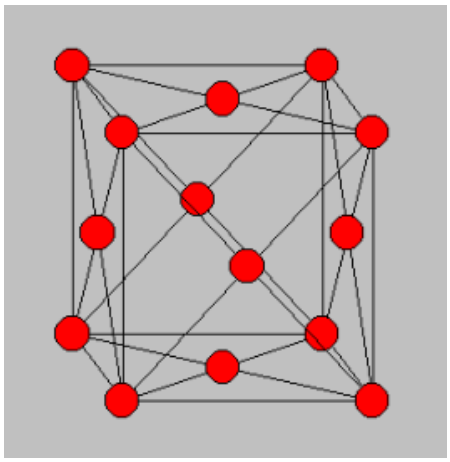


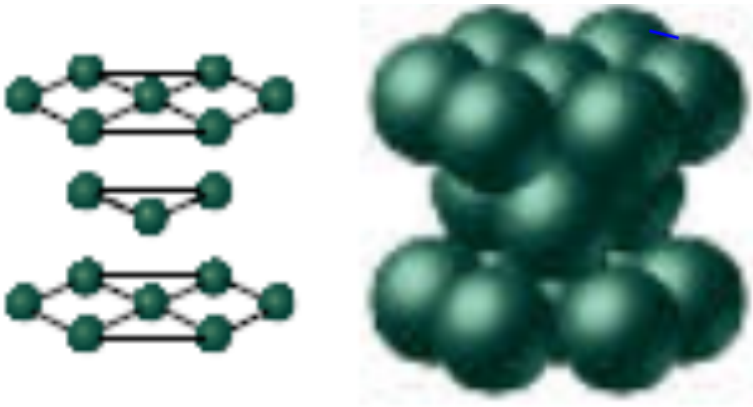
CO



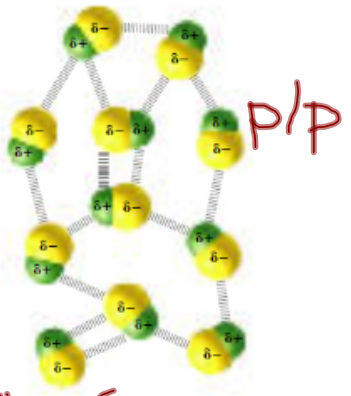


Zn

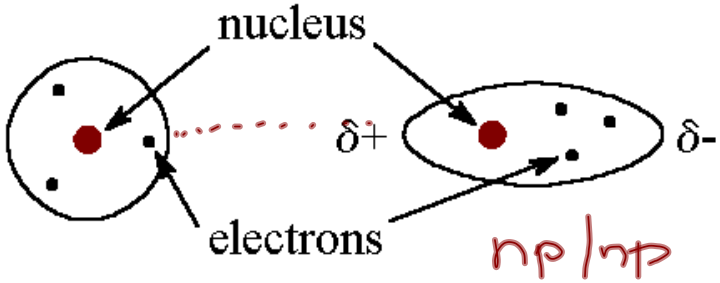




Hexagonal close-packed



p/p



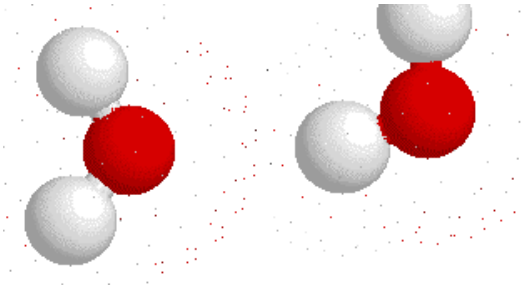
np/np

symmetrical distribution

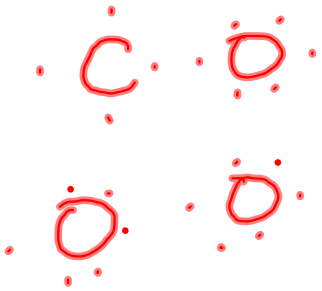
unsymmetrical distribution

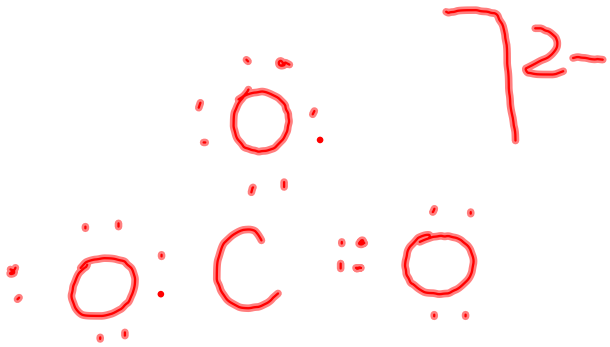
δ+ δ-

H – Cl ··· H – Cl δ+ δ-



CO_3^{2-}





C_2H_2

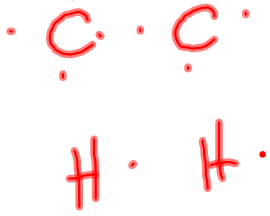
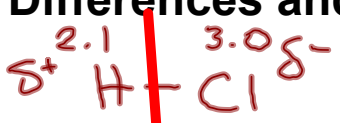


Table 6.3 Electronegativity Differences and Bond Types



Electronegativty difference range	Most probable type of bond	Example
0.0-0.4	Nonpolar covalent	H - H (0.0)
0.4-1.0	Moderately polar covalent	H - Cl (0.9)
1.0-2.0	Very polar covalent	H - F (1.9)
≥ 2.0	Ionic	Na^+ Cl^- (2.1)

* No sharp boundary between ionic and covalent

Table 6.2

Electronegativity Values for Selected Elements

H 2.1						
Li 1.0	**Be** 1.5	**B** 2.0	**C** 2.5	**N** 3.0	**O** 3.5	**F** 4.0
Na 0.9	**Mg** 1.2	**Al** 1.5	**Si** 1.8	**P** 2.1	**S** 2.5	**Cl** 3.0
K 0.8	**Ca** 1.0	**Ga** 1.6	**Ge** 1.8	**As** 2.0	**Se** 2.4	**Br** 2.8
Rb 0.8	**Sr** 1.0	**In** 1.7	**Sn** 1.8	**Sb** 1.9	**Te** 2.1	**I** 2.5
Cs 0.7	**Ba** 0.9	**Tl** 1.8	**Pb** 1.9	**Bi** 1.9		

Chapter 8 Review

p. 207-209 #48, 49, 60, 63, 65, 75, 78

p. 247-249 #39-61

#62-65, 72, 73, 75, 76