# BONDING

## Intra Bonds - strong

- Ionic → transfer of electrons between a metal (+ion) and a non metal (- ion)
  - forms lattice structure
- Covalent → sharing of electrons between 2 non-metals
  - forms individual structure

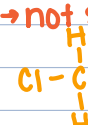
## Polar vs. Non-Polar

**Bonds:**

- Polar → dif atoms
  H-N  O=C=O
- Non Polar → same atoms
  H-H  N≡N

**Molecules:**

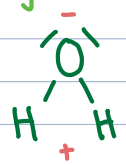
Polar → not symetrical



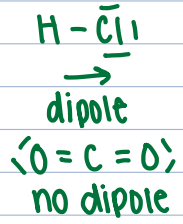
Non Polar → symetrical
O=C=O

## Inter Bonds - weak

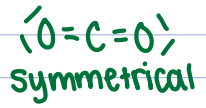
- Hydrogen Bonding
  - O, N, F
  - permanent dipole
  - high boiling point



- Dipole-Dipole
  - polar molecules
    ↳ aesymmetrical
  - permanent dipoles

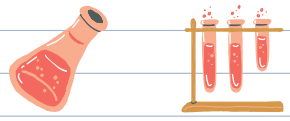



- LDF
  - non-polar molecules
    ↳ symetrical
  - induced dipoles




## Electronegativity

- increases left to right →
- F is most electroneg.
- O is more electroneg. than hydrogen



## Ranking IMF's

Strong

Ionic
H-Bonding [FON]
dipole-dipole polar
LDF nonpolar
} covalent

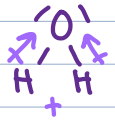
Weak

highest BP — $MgBr_2$ — $H_2O$ — $CH_2F_2$ — $CO_2$ — lowest BP

↳ needs energy
- held strongly together (bond)

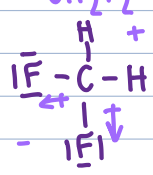
doesn't need as much
- held weakly together (bond)

$H_2O$



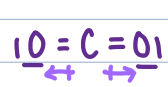
LDF
dipole
polar
h-bond

$CH_2F_2$



LDF
dipole
polar

$CO_2$



LDF
non polar

$MgBr_2$
↑
metal + non
ionic

## Solids

**Ionic Solid:**

- NaCl
- MgO → higher lattice energy
- $NH_4Cl$
- high melting point

lattice energy:

**Molecular Solids:**

- $CO_2$ non metals
- $H_2O$
- $F_{2(g)}$ melting point
- $Cl_{2(g)}$ increases going
- $Br_{2(l)}$ down

**Metals:**

- conduct electricity + heat
- hammered
- ductile

Lattice energy:
- increases as charge increase
- radius increase, energy decrease

-hard

$I_{2(l)}$
-$I_{2(s)}$
-soft

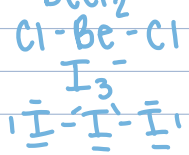
## Valence Shell Electron Pair Repulsion (VSEPR Theory)

- Linear - 180°

$BeCl_2$

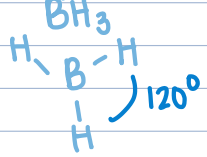
Cl - Be - Cl

$I_3^-$

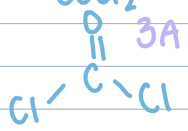


- Trigonal Planar - 120°

$BH_3$

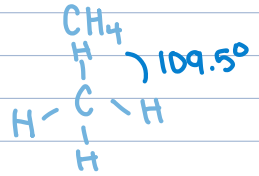



$COCl_2$



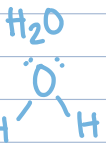

- Tetrahedral - 109.5°

$CH_4$

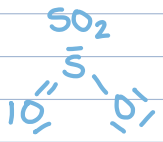



- Bent

$H_2O$




$SO_2$




- Trigonal Pyramidal - >109.5

$NH_3$