

Bonding

Why does bonding occur?

- Atoms are most stable when they have 8 valence electrons

Forming bonds - Energy is released

Break bonds - Energy is absorbed

BARF
↑ endothermic ↓ exothermic

Ionic

- between a metal & a non-metal
Ex.) CaCl_2 , MgSO_4
- electrons are transferred
(lost from metal, gained by non-metal)
- solid compounds
- brittle
- only conduct electricity in liquid and (aq) phase
- high melting & boiling points END > 1.7

Covalent

- non-metal bonding
Ex.) CO_2 , CH_3OH
- electrons are shared
- molecular compounds
- low melting & boiling points

END of 0-1.6

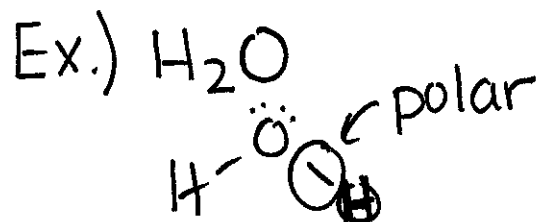
Metallic

- between metals
Ex.) Mg, Fe, Cu
- mobile sea of electrons
- solids (except Hg)
- high melting & boiling points
- conduct electricity in all phases

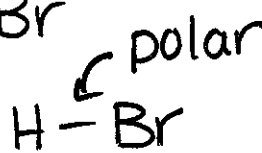
Polar Bonds - unequal sharing of electrons

END ~~0-1.7~~ .4-1.7

Ex.) H_2O



HBr



Non-polar Bonds - equal sharing of electrons

END 0-.3

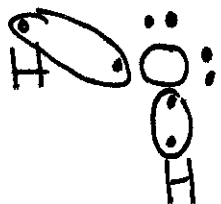
Ex.) Br_2 Na_2 H_2



★ the greater the END-, the more polar the bond

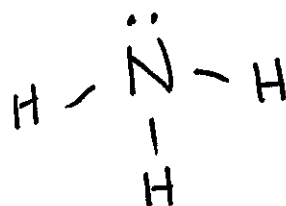
Polar Molecule - unequal distribution of charge
- not symmetrical

Ex.) H_2O



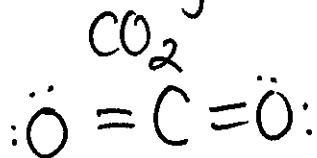
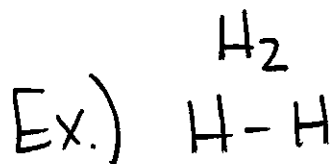
not symmetrical

NH_3

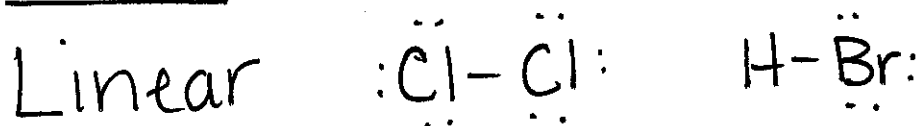


not symmetrical

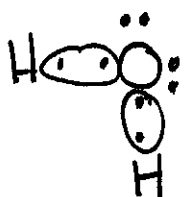
Non-Polar Molecule - equal distribution of charge
- symmetrical



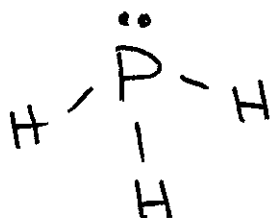
Shapes



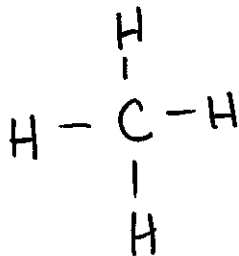
Bent



Pyramidal



Tetrahedral



} Polar Molecules

Intermolecular Forces - force of attraction between molecules

Van der Waals - exist between non-polar molecules

- very weak

- most molecules w/ this force are in the gas phase

- more electrons a molecule has, the stronger the van der Waals force

Dipole-Dipole - occurs between polar molecules

Ex.) HBr, PH₃, HCl

- moderate strength (gases or liquids)

Hydrogen Bonding - occurs between polar molecules with a Hydrogen bonded to F, O, N

Ex.) H₂O, HF, NH₃, CH₃OH

- very strong

• high boiling points + melting points