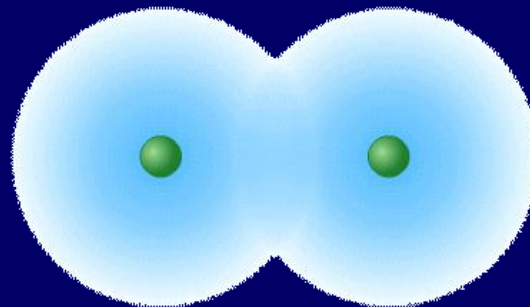
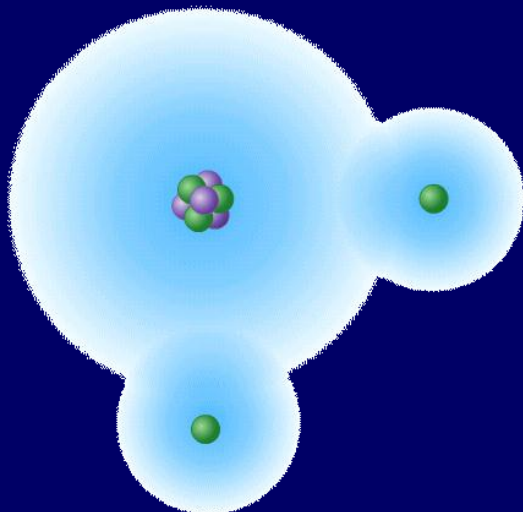


Unit 6 - Chemical Bonding

Part III.

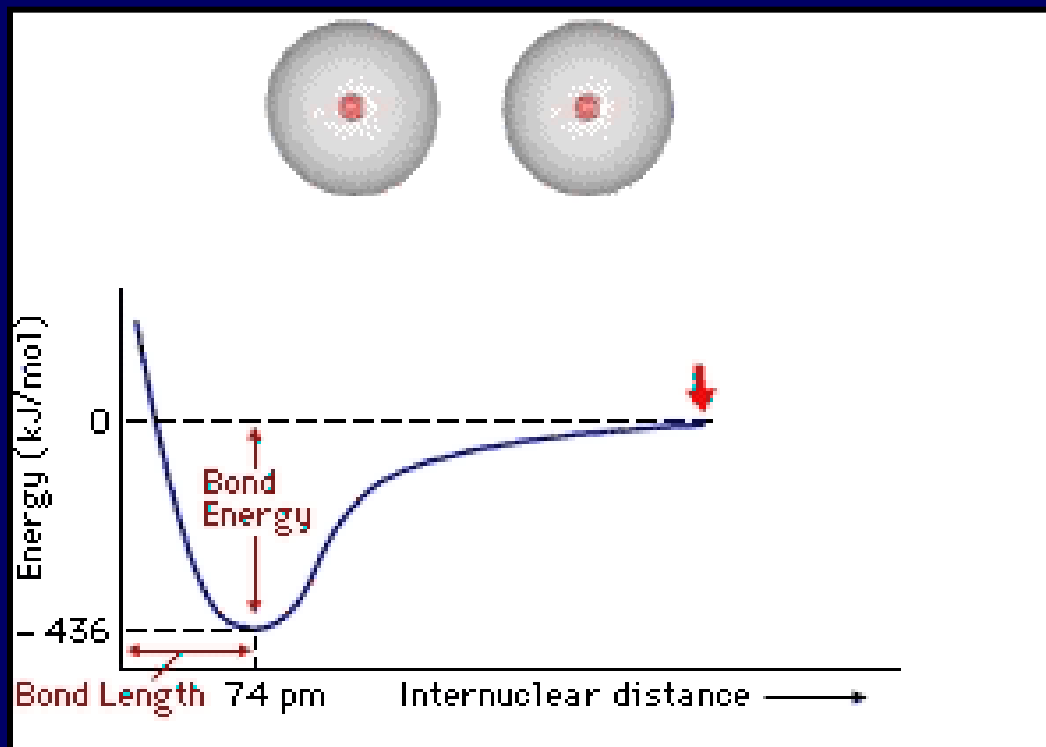
Molecular Compounds



A. Energy of Bond Formation

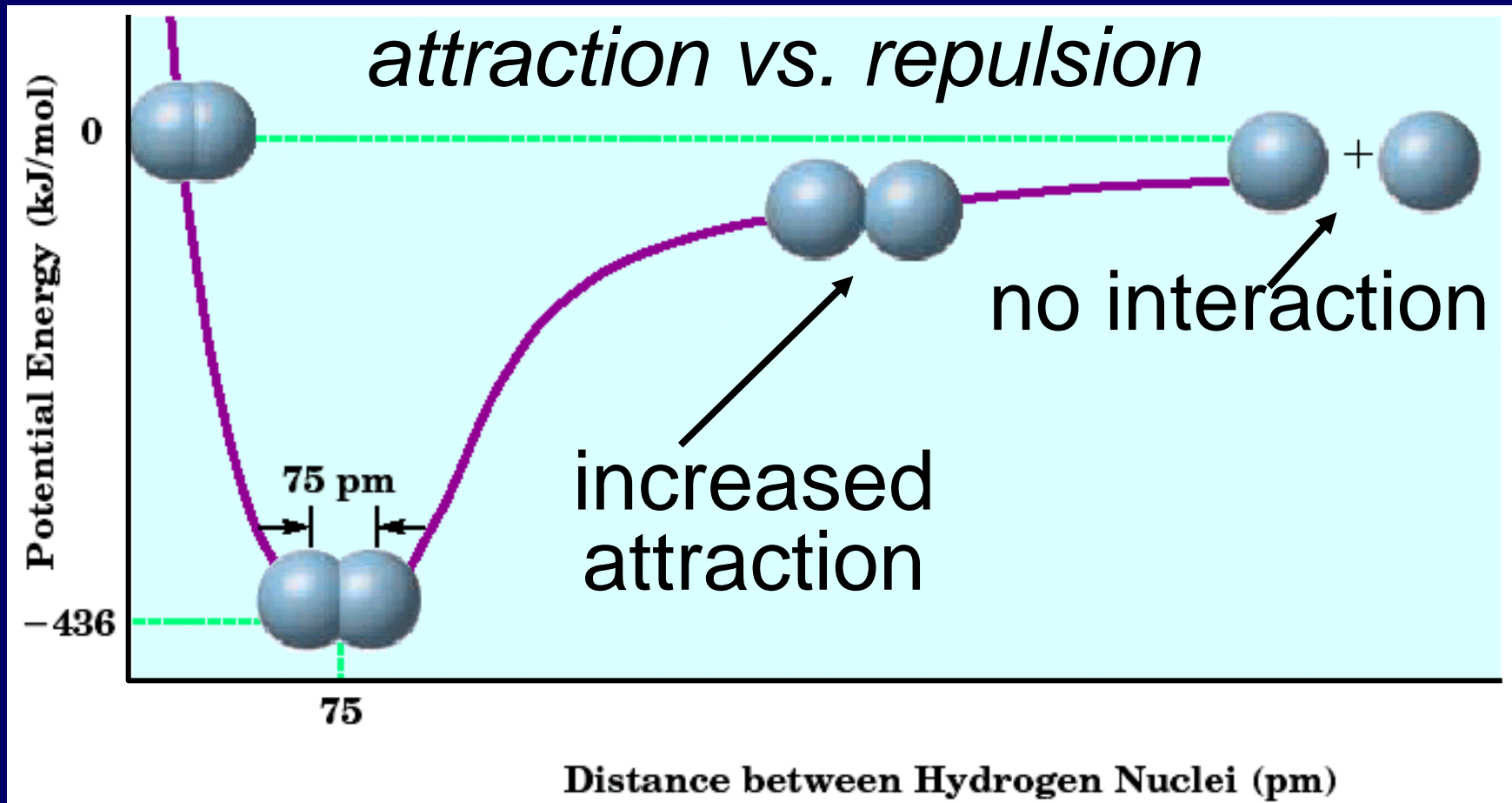
⌘ Potential Energy-atoms bond to lower their potential energy (and gain stability)

- based on position of an object
- low PE = high stability



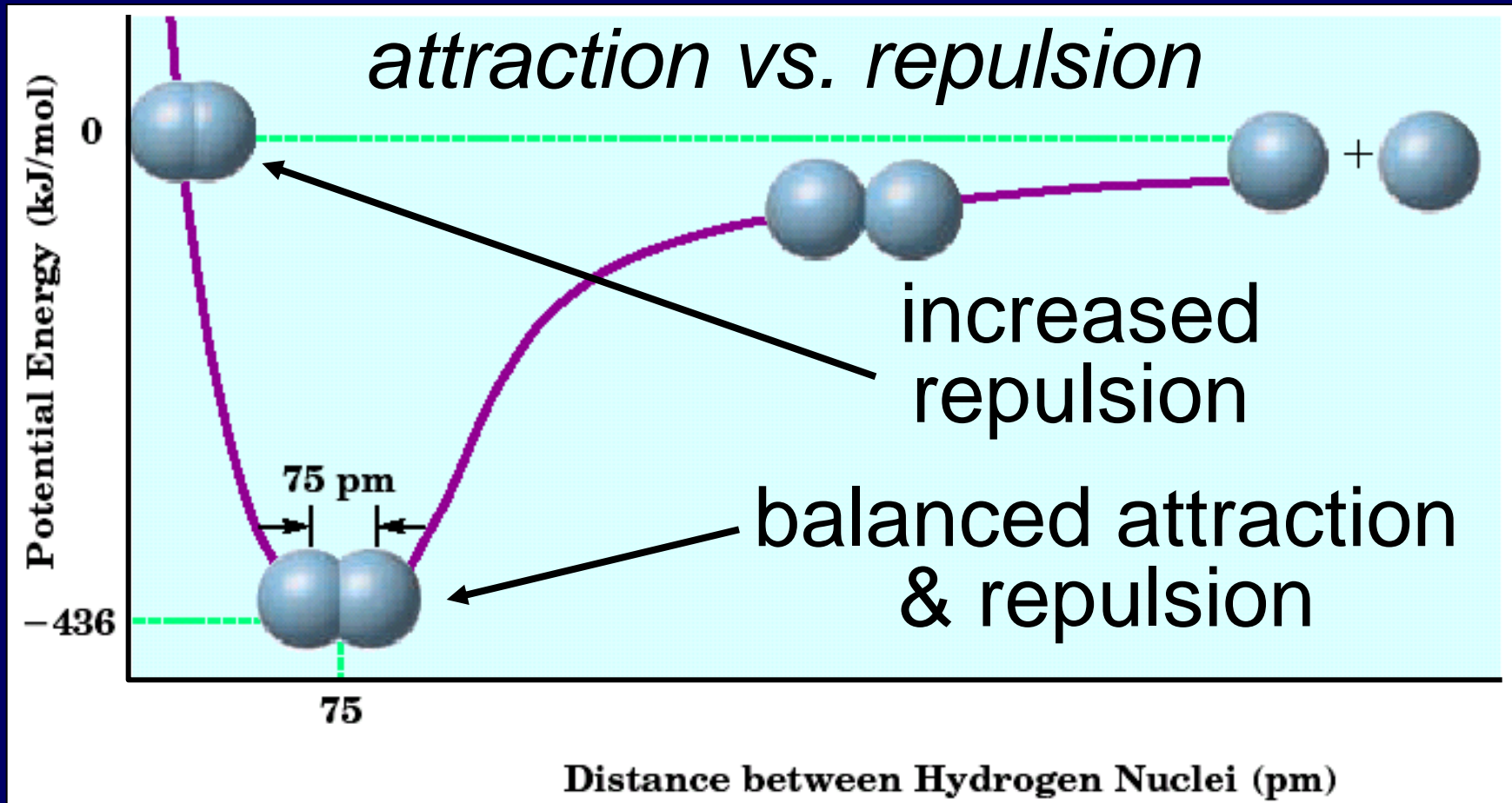
A. Energy of Bond Formation

⌘ Potential Energy Diagram



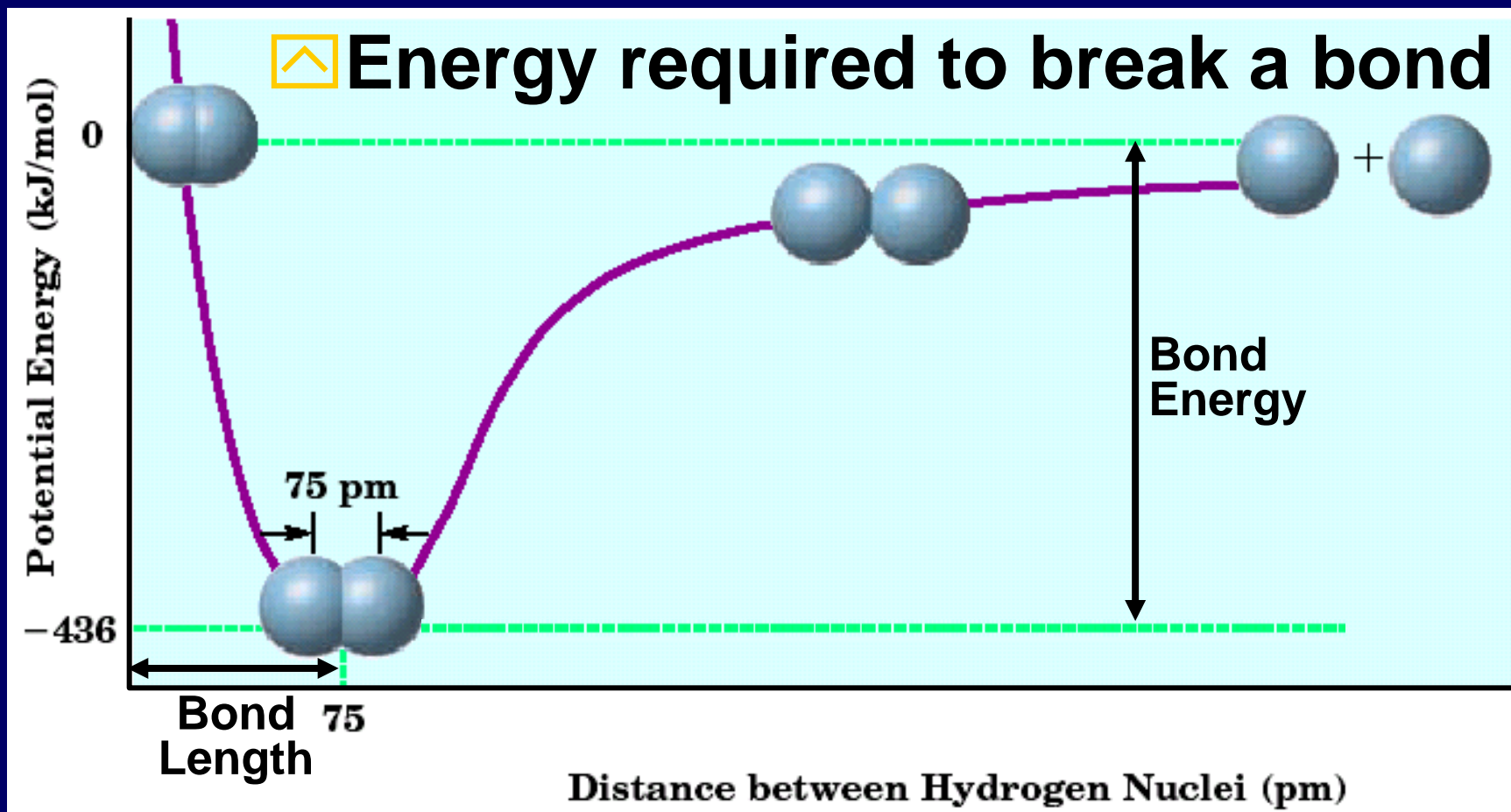
A. Energy of Bond Formation

⌘ Potential Energy Diagram



A. Energy of Bond Formation

⌘ Bond Energy



A. Energy of Bond Formation

⌘ Bond Energy

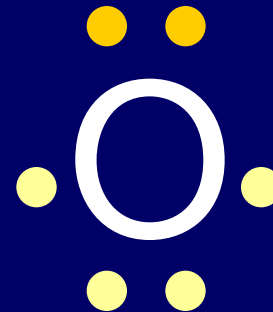
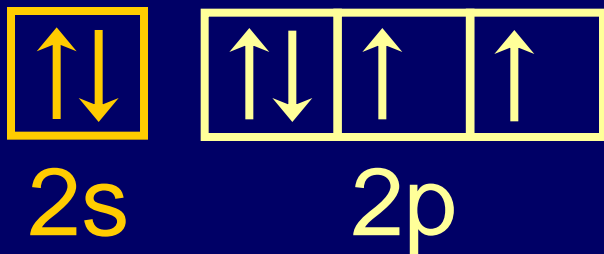
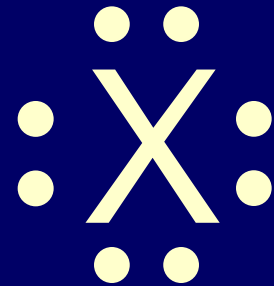
⏏ Short bond = high bond energy

Bond	Bond length (pm)	Bond energy (kJ/mol)	Bond	Bond length (pm)	Bond energy (kJ/mol)
H-H	74	436	C-C	154	346
F-F	141	159	C-N	147	305
Cl-Cl	199	243	C-O	143	358
Br-Br	228	193	C-H	109	418
I-I	267	151	C-Cl	177	327
H-F	92	569	C-Br	194	285
H-Cl	127	432	N-N	145	163
H-Br	141	366	N-H	101	386
H-I	161	299	O-H	96	459

B. Lewis Structures

⌘ Electron Dot Diagrams

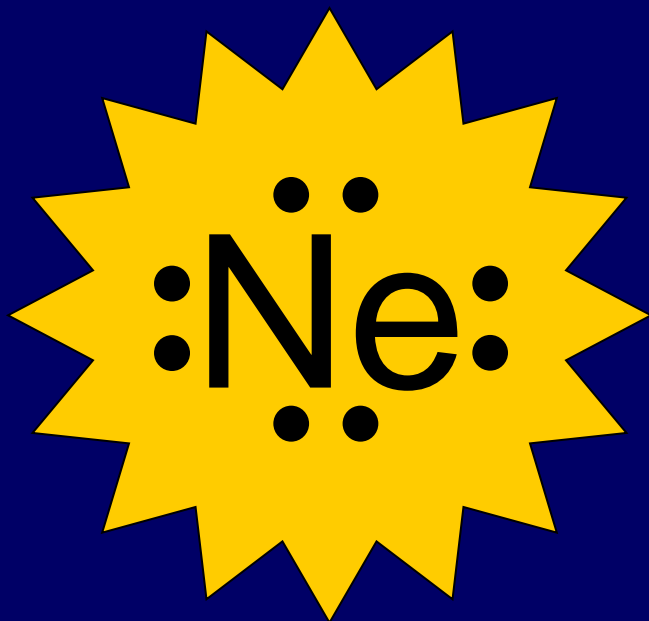
- show valence e^- as dots
- distribute dots like arrows in an orbital diagram
- 4 sides = 1 s-orbital, 3 p-orbitals
- EX: oxygen



B. Lewis Structures

⌘ Octet Rule

- Most atoms form bonds in order to obtain 8 valence e⁻
- Full energy level stability ~ Noble Gases

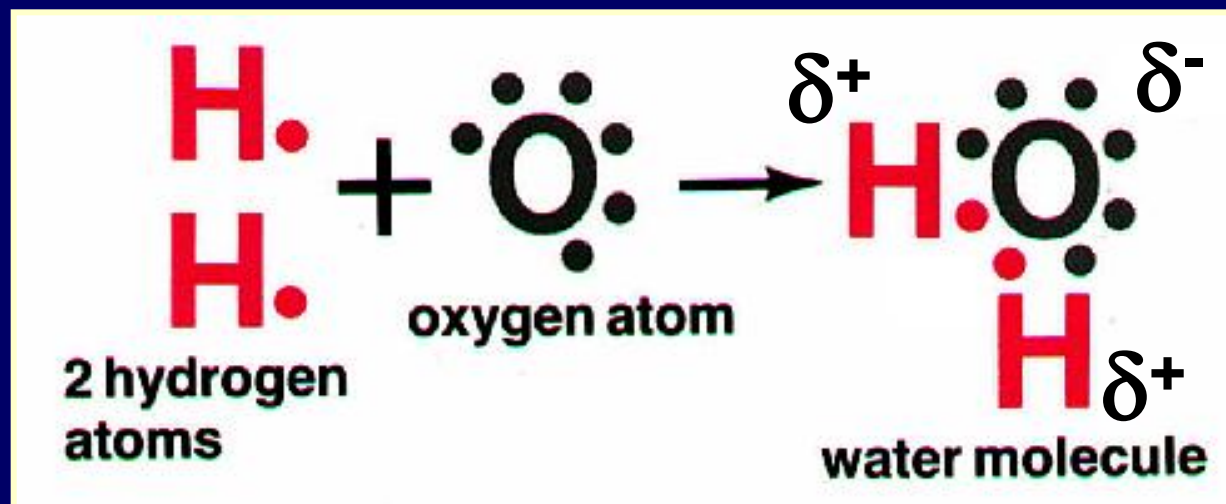


B. Lewis Structures

⌘ Nonpolar Covalent - no charges



⌘ Polar Covalent - partial charges



Quiz

⌘ The attraction of an atom for the shared electrons that form a covalent bond between it and another atom is called its

- a. electron affinity
- b. electronegativity
- c. resonance
- d. hybridization

Quiz

⌘ A compound that vaporizes at room temperature is most likely to be

- a. molecular compound
- b. ionic compound
- c. metal
- d. brittle compound

Quiz

⌘ If 2 covalently bonded atoms move closer than a distance of the bond length, the potential energy of the atoms

- a. becomes negative
- b. decreases
- c. increases
- d. remains constant

Quiz

⌘ There are _____ diatomic elements that are found in nature as diatomic elements.

a. 5

b. 6

c. 7

d. 8

Name them: H_2 , N_2 , O_2 , F_2 , Cl_2 , Br_2 , & I_2

Quiz

⌘ What information is provided in a molecular formula?

what elements

Number of atoms of each element

Quiz

⌘ What are the only elements that exist mostly as uncombined elements in nature?

- a. alkali metals
- b. transition metals
- c. transuranium elements
- d. noble gases