

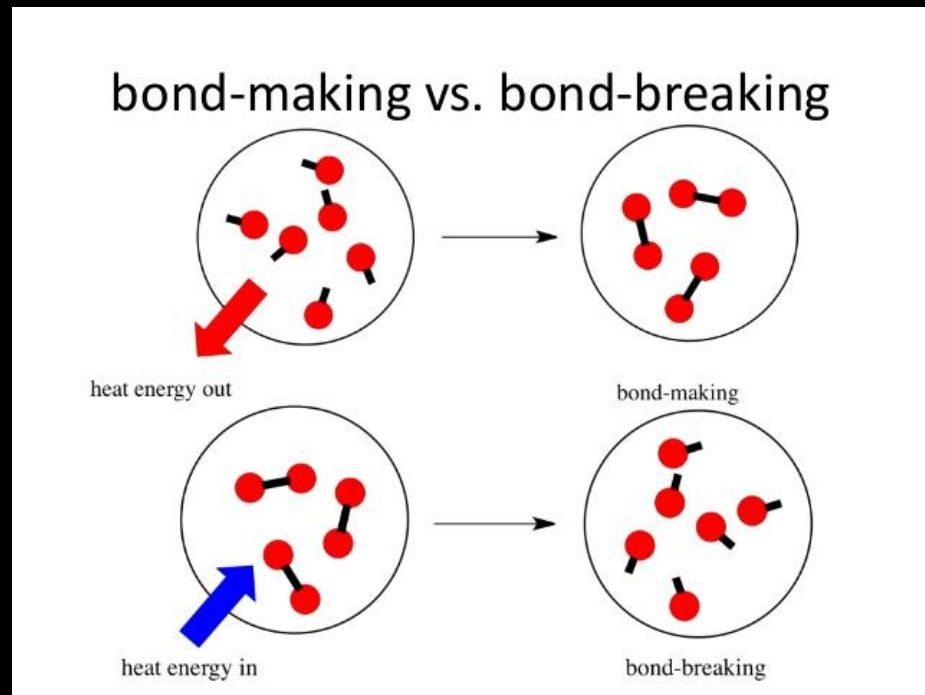
Chemistry Topic 6

Bonding

- 12/14 Chemistry
- Topic 6 - Bonding
- Aim: How can we draw Lewis Dot structures?
- Obj: SWBAT draw Lewis Dot structures for elements and compounds
- Do Now: Under what conditions do gases behave most like ideal gases?
- Homework: STUDY

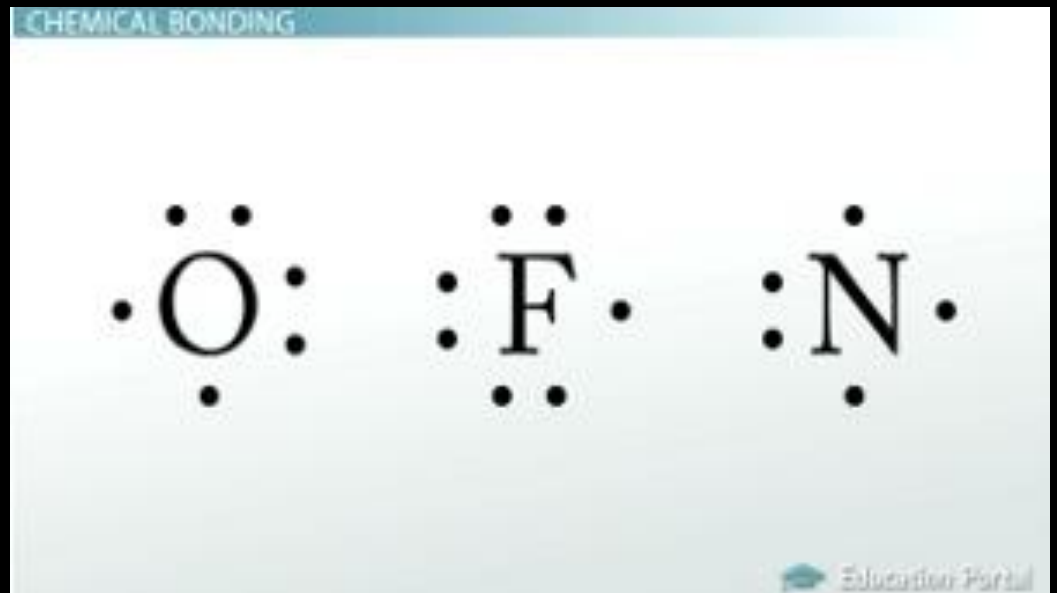
Energy in Bonds

- When bonds form, energy is released (exothermic, $-\Delta H$, energy on the right side of the equation)
- When bonds break, energy is absorbed (endothermic, $+\Delta H$, energy on the left side of the equation)



Lewis Electron Dot Structures

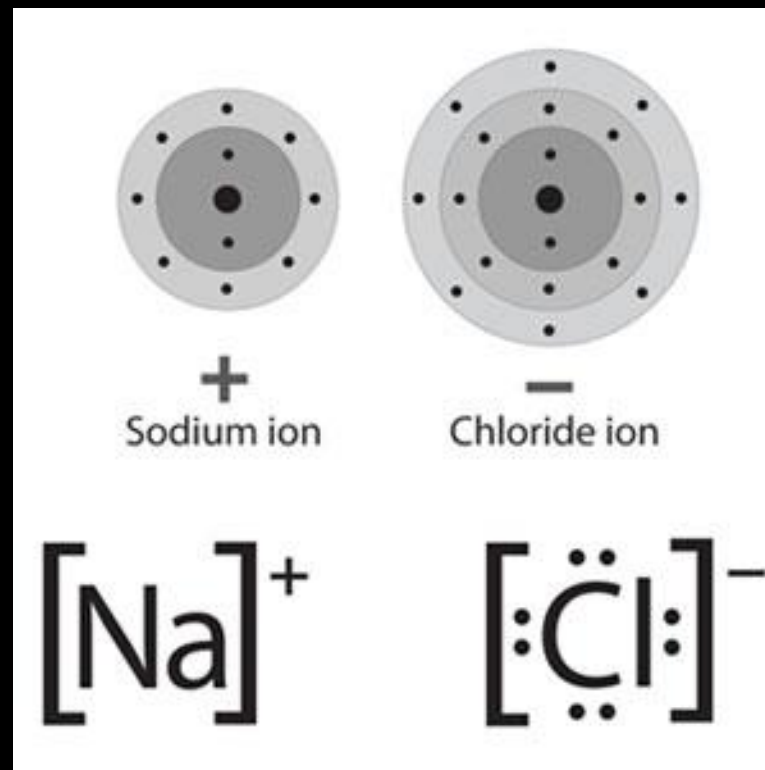
- Chemical Symbol of an element surrounded by its number of valence electrons.
- Inner electrons are NOT shown and are known as the *kernel*



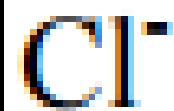
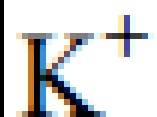
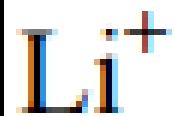
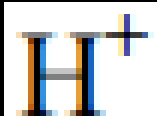
Hydrogen	
Helium	
Lithium	
Beryllium	
Boron	
Carbon	
Nitrogen	

Oxygen	
Fluorine	
Neon	
Potassium	
Silicon	
Chlorine	
Phosphorus	

- When elements gain or lose electrons they become ions.
- Put ions in brackets [] and place the charge outside as a superscript.



- 12/16 Chemistry
- Topic 6 - Bonding
- Aim: How can we draw Lewis Dot Structures for atoms, ions, and compounds?
- Obj: SWBAT S draw Lewis Dot Structures
- Do Now: Draw the Lewis Dot Structure for K, K^+ , Br, and Br^-

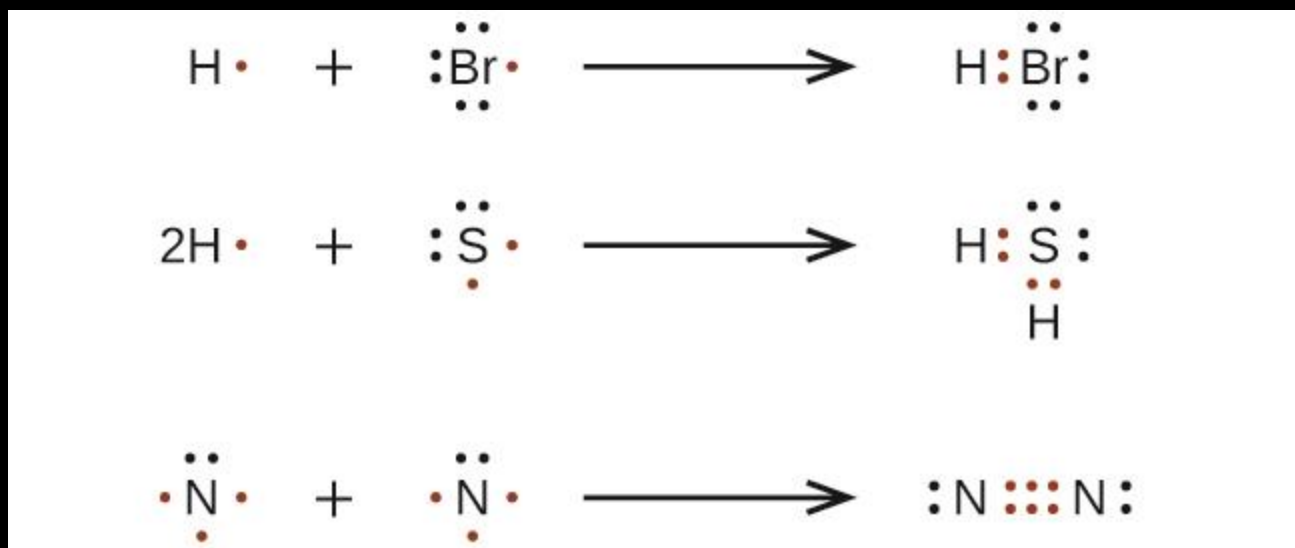


Lewis Electron Dot Diagrams of Compounds

1. Determine total number of valence electrons
2. Put a bond between the central atom and those surrounding it (central atom is usually the one that you only have 1 of)

***USE A DASH TO
REPRESENT 2
ELECTRONS***

3. Use left over electrons to fill the other atoms' octets (each element wants 8 valence electrons, except Hydrogen, who only wants 2)
4. You might have to make double or triple bonds to make it work



Practice



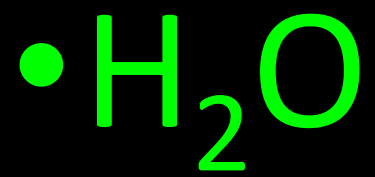
- 12/17 Chemistry
- Topic 6 - Bonding
- Aim: How can we draw Lewis Dot Structures for atoms, ions, and compounds?
- Obj: SWBAT draw Lewis Dot Structures
- Do Now: Draw the Lewis Dot Structure for CF_4 , CBr_4 , CCl_4 , and CI_4

- I_2

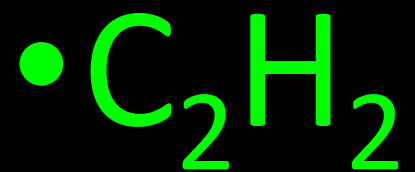
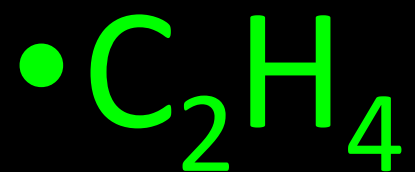
- Cl_2

- N_2

- O_2





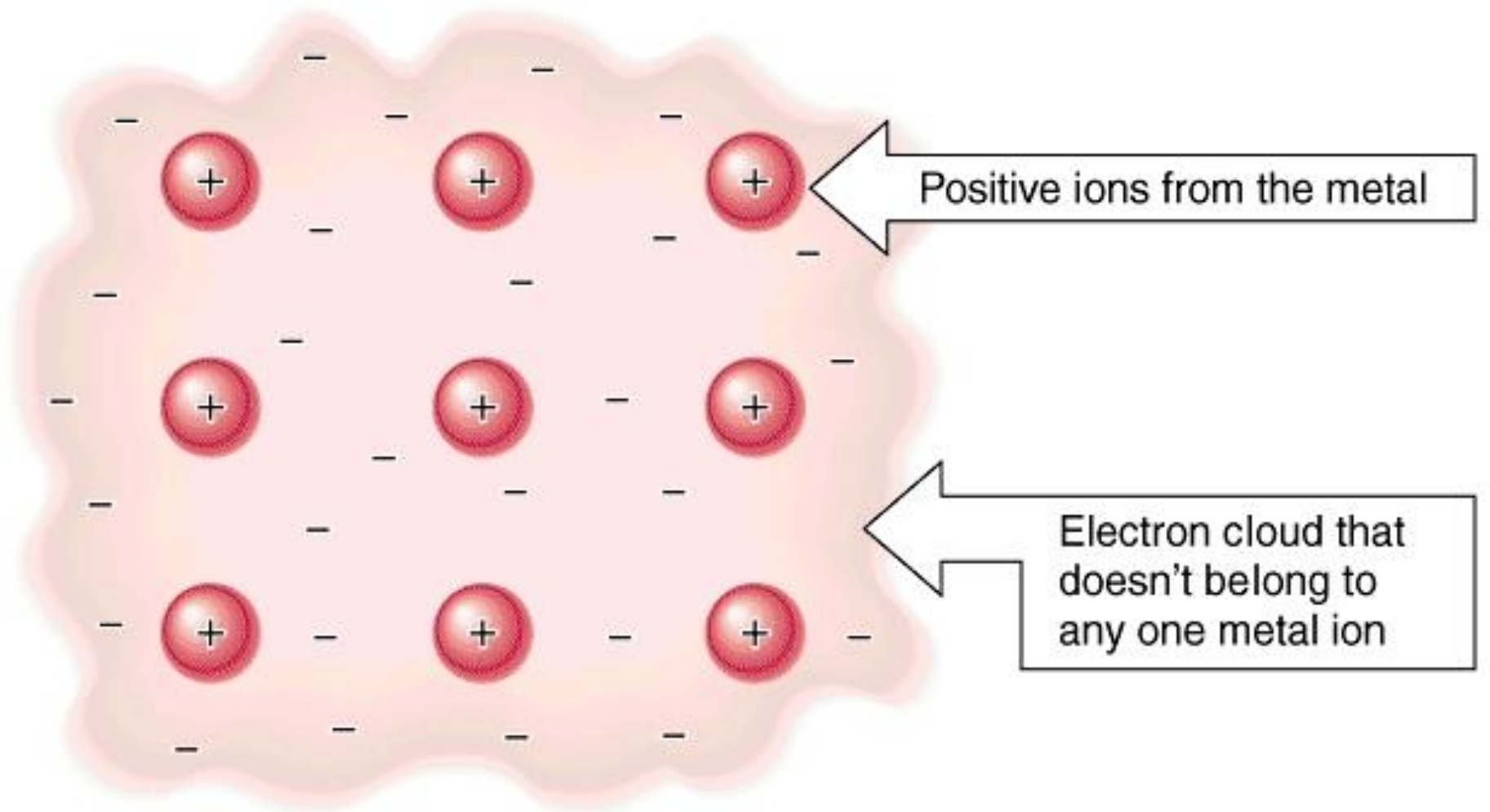


- 12/18 Chemistry
- Topic 6 - Bonding
- Aim: How do different elements form bonds and what effect does this have on the properties of the compounds?
- Obj: SWBAT distinguish between different forms of bonds and their properties
- Do Now: Why do elements want 8 valence electrons? Hint: which elements already have 8?
- Homework: STUDY (like your Christmas break depends on it)

Metallic Bonds

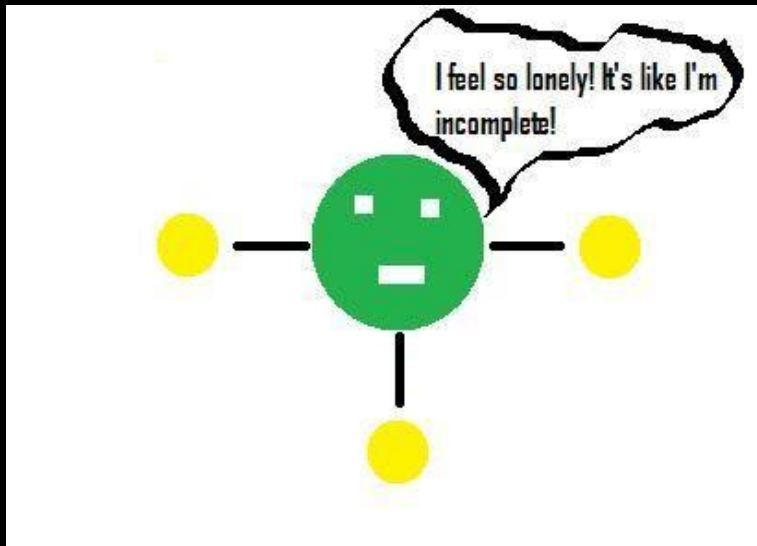
- Formed between metal atoms
- Conducts electricity well due to its

***“SEA OF MOBILE
ELECTRONS”***



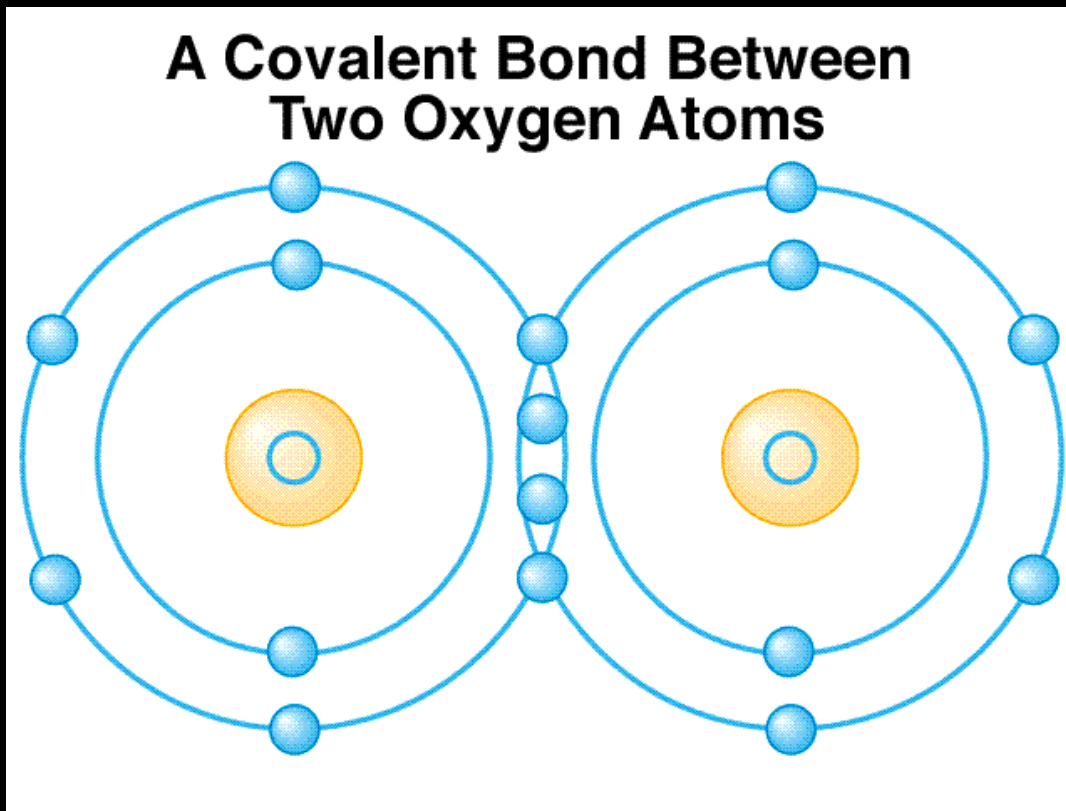
Octet Rule

- Octet = maximum number of valence electrons that an atom can have. (Noble Gases have a complete octet)
- Octet Rule = atoms generally react by gaining, losing, or sharing electrons in order to achieve a complete octet of 8 valence electrons.



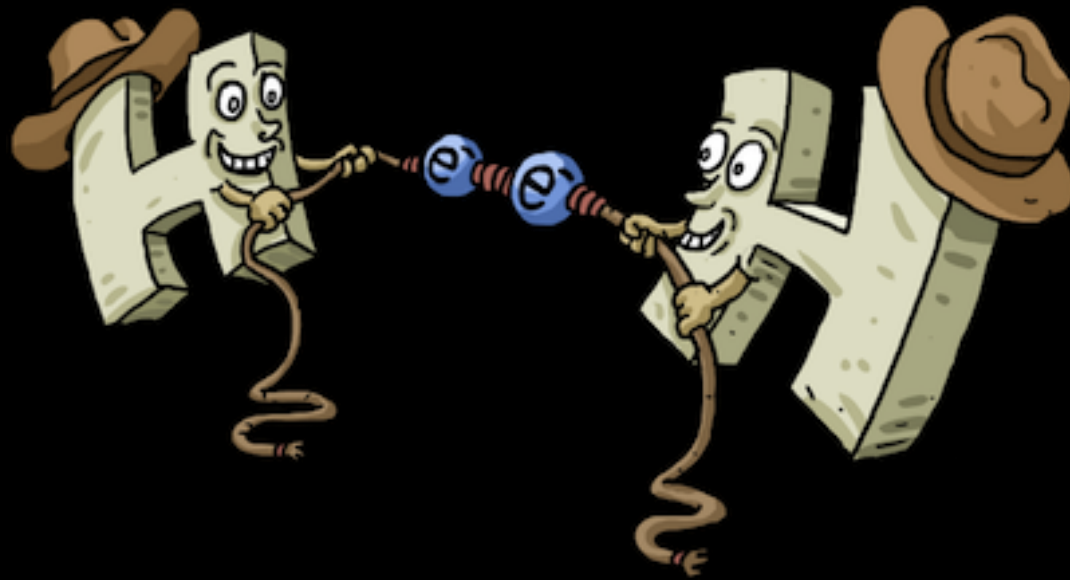
Covalent Bonds

- Formed when atoms **SHARE** electrons
- Usually between 2 nonmetals.



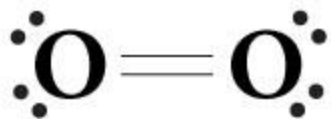
Nonpolar Covalent Bonds

- Electrons are shared ***EQUALLY***
- Happens when the 2 elements have the same (or close to) ***ELECTRONEGATIVITY***

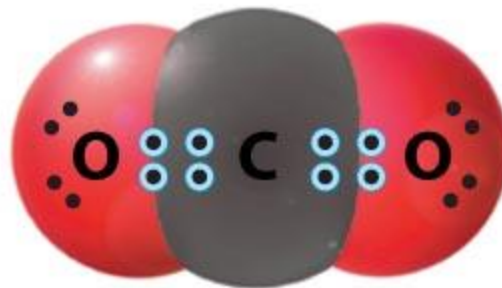


Multiple Covalent Bonds

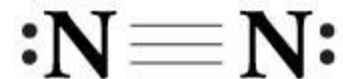
- When atoms share more than 1 pair of electrons.
- Ex. O₂ (double bond), N₂ (triple bond)



Oxygen, O₂



Carbon dioxide, CO₂



Nitrogen, N₂

Polar Covalent Bonds

- Electrons are shared ***UNEQUALLY***
- Happens when the 2 elements have different ***ELECTRONEGATIVITIES***

Polar Covalent Bond



A polar covalent bond is a bond formed when the shared pair of electrons in a covalent bond are not shared equally.

This is due to different elements having different electronegativities.

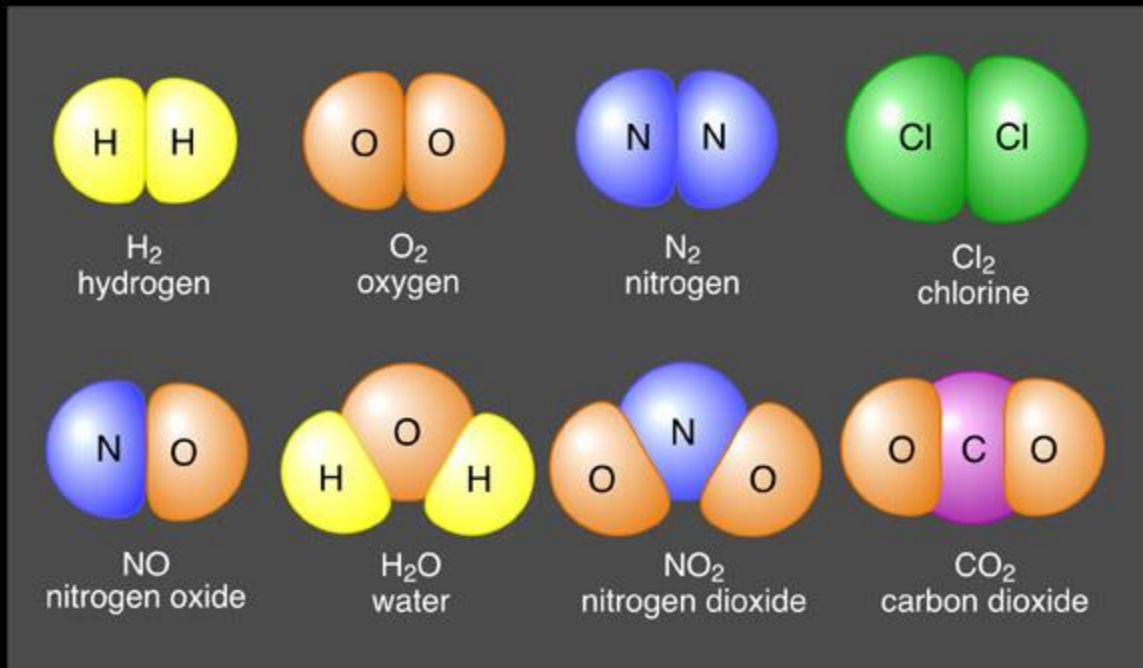
Molecular Substances

- Properties

- Soft

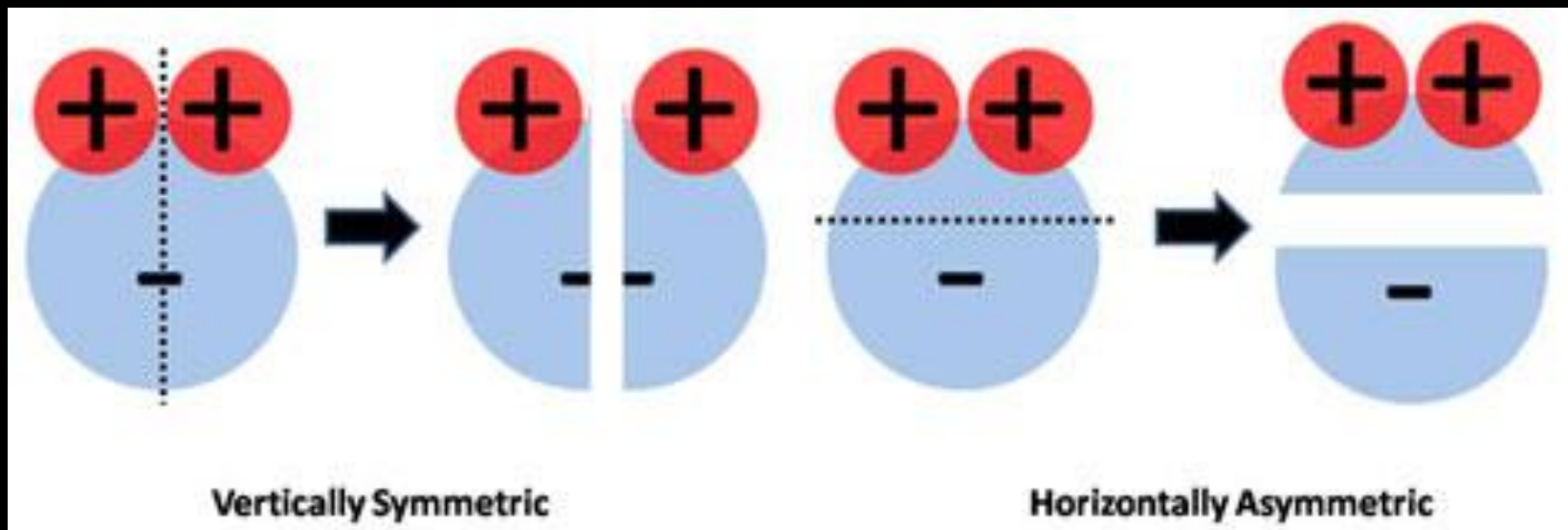
- Poor conductors of heat and electricity

- Low melting and boiling points



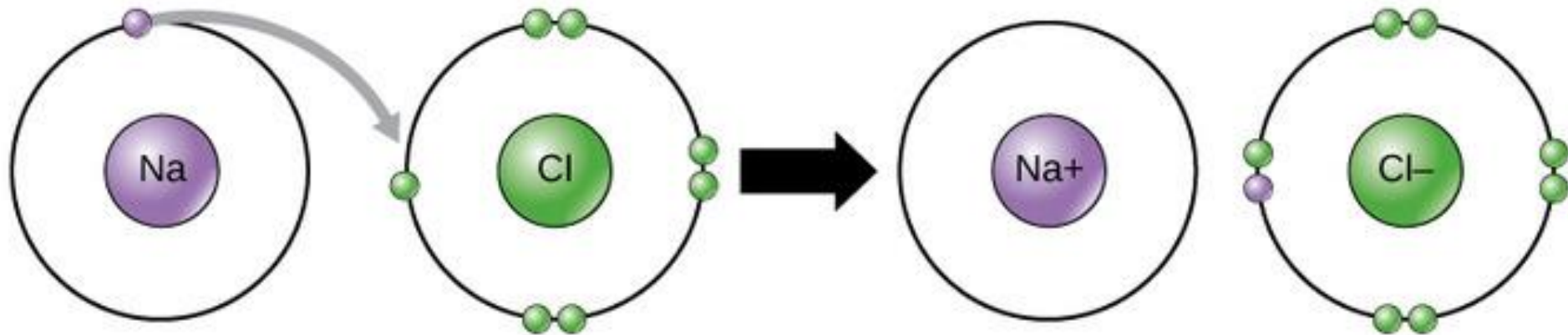
Polar Molecules

- Look at the SHAPE of the molecule
- Ex. WATER!!!!, AMMONIA (NH_3), AND HC
- If **ASYMMETRICAL** it is **POLAR**



Ionic Bonding

- Formed when ions bond together
- Usually between a metal and a nonmetal (or two ions)
- Electrons are transferred



Bonding

Metals

- Lose valence electrons and acquires the octet arrangement of a noble gas
- Results in a smaller radius and a positive charge



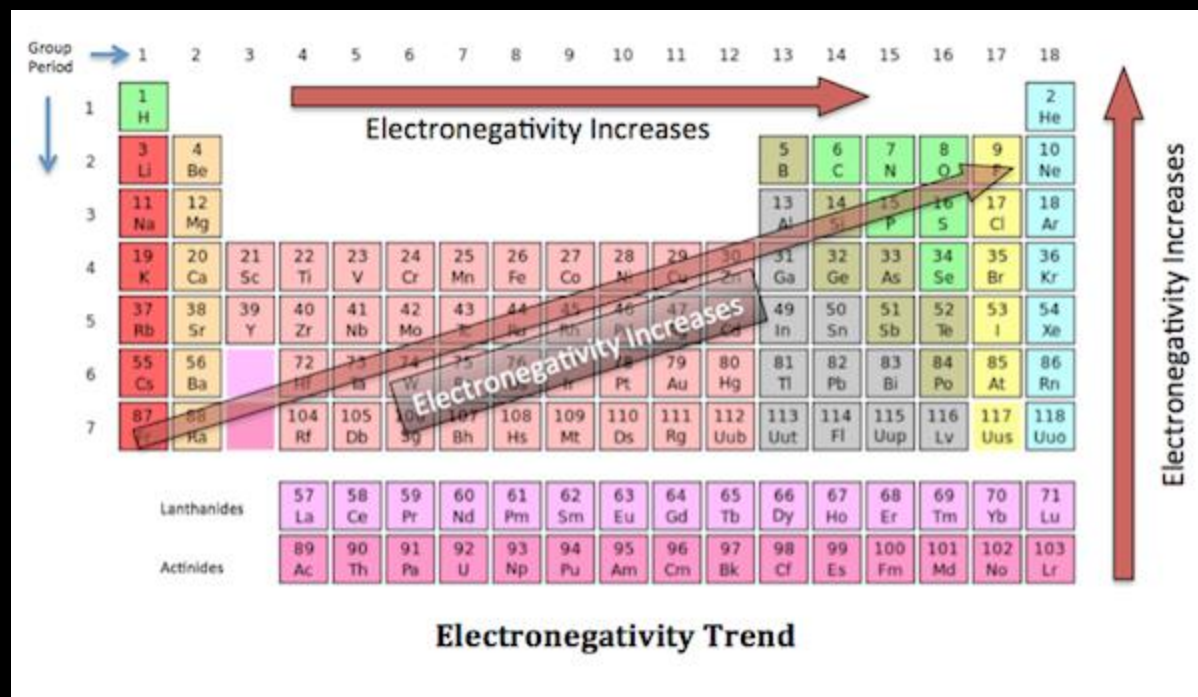
Nonmetals

- Gain valence electrons and acquires the octet arrangement of a noble gas.
- Results in a larger radius and negative charge



Electronegativity

- As the electronegativity difference between atoms increases, the ionic character increases.
- Difference of 1.7 or more is generally considered ionic



Polyatomic Ions

- All compounds with polyatomic ions contain

BOTH IONIC

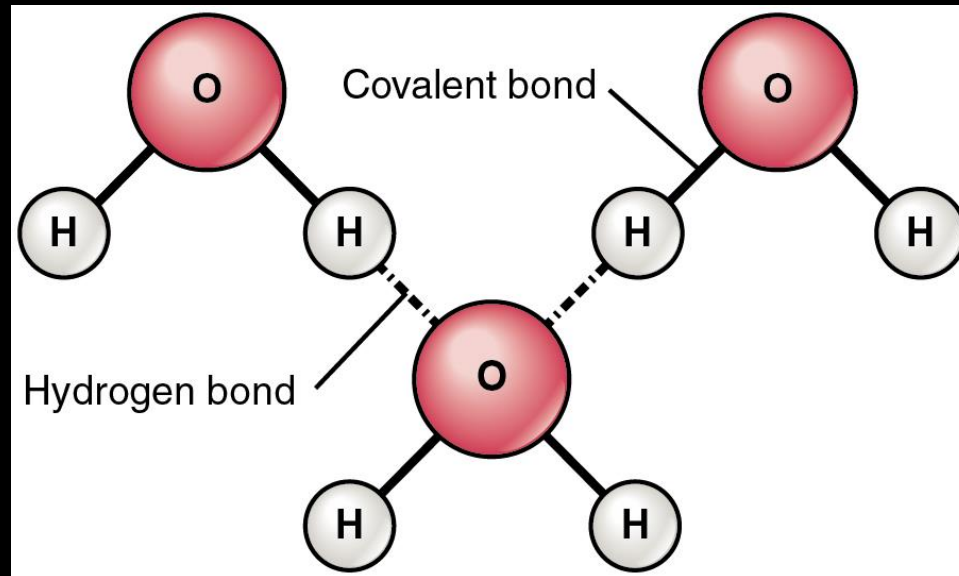
AND COVALENT

BONDS

Bond Type	Melting Point and Boiling Point	Hardness	Conductivity		
			Solid	Liquid	Aqueous
Metallic	High	Hard	Yes	Yes	Yes
Covalent	Low	Soft	No	No	No
Ionic	High	Hard	No	Yes	Yes

Hydrogen Bond

- Type of intermolecular force between Hydrogen and either Fluorine, Oxygen, or Nitrogen (FON).
- This is the reason why water's boiling point is so high.



- 12/21 Chemistry
- Exam
- Aim: How can we illustrate our knowledge of chemistry?
- Obj: SWBAT answer Regents style questions
- Do Now: Clear Desk
- If you finish early, write your plans for your holiday break on the back.

- 12/22 Chemistry
- Exam
- Aim: How can we illustrate our knowledge of chemistry?
- Obj: SWBAT answer Regents style questions
- Do Now: Clear Desk
- If you finish early, write your plans for your holiday break on the back.

Exit Ticket

- Compare and contrast the different forms of bonding