Chemical Bonding and Nomenclature

Dot Structures- Octet Rule

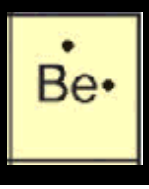
(All atoms want 8 electrons around them.)

Valence electrons are those in the outermost orbitals. They are the ones that can form bonds.

Lewis came up with a way to draw valence electrons so that the bonding could be determined.

Rules to Write Dot Structures

1. Write the element symbol
2. Find the number of electrons you have (valence e^-'s)
3. Starting at the top, place a dot above the element representing one valence e^-
4. Continue to place dots in a clockwise position
5. If needed, make another round of dots.



Chemical Bond

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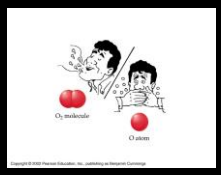
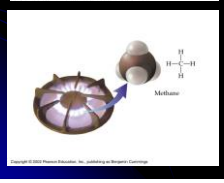
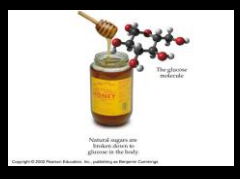
Bonding, the way atoms are attracted to each other to form molecules, determines nearly all of the chemical properties we see. And, as we shall see, the number “8” is very important to chemical bonding.

What are Molecules?



Molecules are a combination of atoms bonded together. Bonding determines the chemical properties of the molecule (compound).



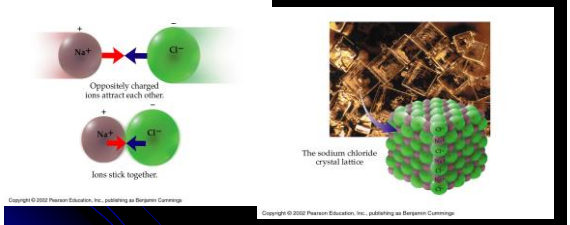


Ionic Bonding

All atoms **want** to have the same number of electrons as the Noble Gases. The Noble Gases have very stable electron configurations.

In order to achieve the same electron configuration as the Noble Gases some atoms will give up electrons to form positive ions (cations) and some atoms will receive or take additional electrons to become negative ions (anions).

Opposites Attract!



Putting Ions Together

$Na^{+} + Cl^{-} = NaCl$

$Ca^{+2} + Cl^{-} = CaCl_2$

$Ca^{+2} + O^{-2} = CaO$

$Na^{+} + O^{-2} = Na_2O$

$Al^{+3} + S^{-2} = Al_2S_3$

$Ca^{+2} + N^{-3} = Ca_3N_2$

Putting Ions Together

You try these!

$Li^{+} + Br^{-} =$

$Mg^{+2} + F^{-} =$

$Al^{+3} + I^{-} =$

$NH_4^{+} + PO_4^{-3} =$

$Sr^{+2} + P^{-3} =$

$K^{+} + Cl^{-} =$

Putting Ions Together

You try these!

$Li^{+} + Br^{-} =$ LiBr

$Mg^{+2} + F^{-} =$ MgF_2

$Al^{+3} + I^{-} =$ AlI_3

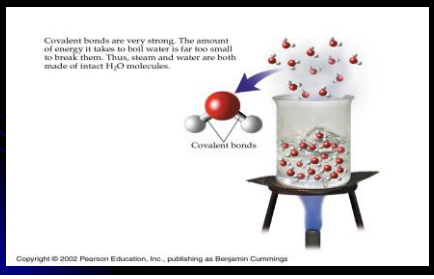
$NH_4^{+} + PO_4^{-3} = (NH_4)_3PO_4$

$Sr^{+2} + P^{-3} =$ Sr_3P_2

$K^{+} + Cl^{-} =$ KCl Not $NH_{43}PO_4$

The Covalent Bond

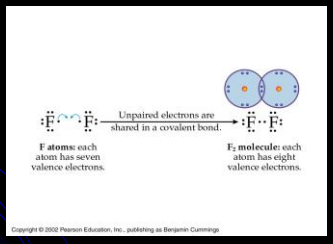
Atoms can form molecules by sharing electrons in the covalent bond. This is done only among non-metal atoms.



Dot Structures- Octet Rule

(All atoms want 8 electrons around them.)

Valence electrons = can form bonds.



Rules to Write Dot Structures

https://www.sophia.org/tutorials/lewis-dot-diagrams-2-simple-molecules