

# CHEMICAL REACTIONS

I. Chemical changes are caused by Chemical Reactions.

II. Chemical Reactions involve the outer level of electrons. This is where chemistry occurs.

III. Columns all the same # of electrons. Properties due to position. Halogens. Inert gasses. STABLE! Atoms with full outer rings are stable.

IV. Is Fluorine stable? Is chlorine? Is Sodium? How could they become stable? If F steals an electron from say .. Na... nuc is 11+ and now 10-, so not a neutral atom. No, it is now an ION, +1. F is +9 and -10 so it is an ION and -1. Ions are formed when neutral atoms gain or lose electrons.

V. What do these ions do? Well, opposites charges attract so they slam together and bond to form NaF, Ionic Bonding sticks atoms with opposite charges together after ions are formed by the transfer of electrons.

VI. Examples

A) Na & F

B) K + Cl

C) Na + O

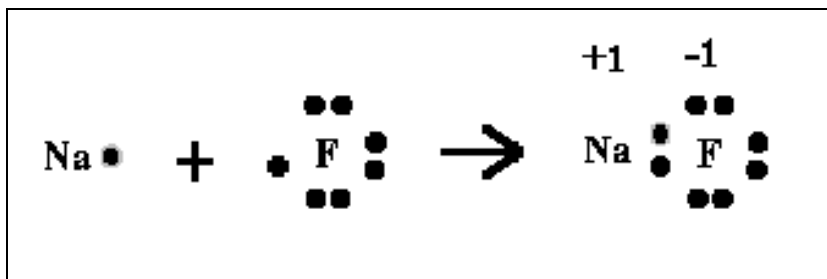
D) Mg + F

F) Ca + Cl

G) Mg + O

E) Na + Cl (optional)

H) Al + Cl optional

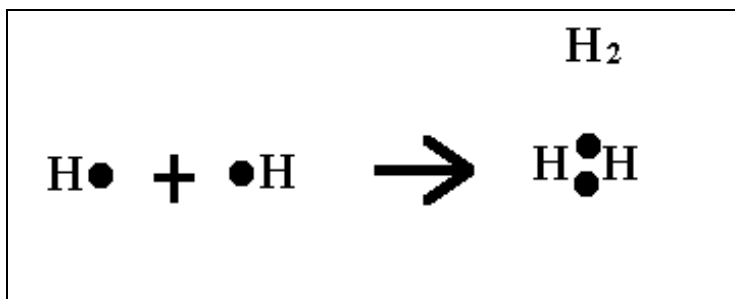


VII. Why do some loose electrons and others gain them? Look at the charge in the nucleus. Li is +3 Be pulls on an outer electron with +4 Ne pulls with +10! More + nucleus pulls with more force. Holds electrons more tightly On Left Givers and takers! On Right

VIII . What happens if there are two atoms that grab an electron with similar or equal force?? Who wins? They both do. They share.

**COVALENT Bonding is when atoms share electrons. They have "full" outer levels and are stable.**

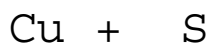
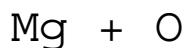
- A) H + H H<sub>2</sub>  
 B) O + O O<sub>2</sub>  
 C) H<sub>2</sub> + O H<sub>2</sub>O  
 \*D) N + I NI<sub>3</sub>



E) Covalent occurs when atoms pull equally on the electrons. Usually when on the same side of the chart or both in the middle it is covalent. Assume ionic unless told differently. Usually when atoms are from opposite sides of the chart. There are two ways to make bonds, but..

### IX. 3 TYPES OF CHEMICAL REACTIONS

A) **Synthesis** [Zn + S] [Zn, S, pad]



B) **DECOMPOSITION** KClO<sub>3</sub> --> KCl + O<sub>2</sub>  
video or [guard,splints,KClO<sub>3</sub>]



C) **REPLACEMENT** single [HCl + Zn] [H<sub>2</sub> generator, HCl]

