Parts of an Equation

A generic reaction: 
$$A(s) + B(l) \rightarrow C(g) + D(aq)$$
  
Reactants "yields" Products

(1) = liquid

(aq) = aqueous = in water

Anything written "over the

arrow is a condition needed for

reaction (ex:  $\Delta$  = heat)

## Types of Reactions

1. Synthesis reactions (also called addition reactions) – characterized by having only 1 product

Generic: A + B + C....  $\rightarrow$  Z

Real examples:  $2 H_2(g) + O_2(g) \rightarrow 2 H_2O(g)$ 

 $2 \text{ Al (s)} + 3 \text{ S(s)} \rightarrow \text{Al}_2\text{S}_3(\text{s})$ 

2. Decomposition reactions – characterized by having only 1 reactant Generic:  $A \rightarrow B + C + D....$ 

 $\Delta$ 

Real example:  $2 \text{ KClO}_3(s) \rightarrow 2 \text{ KCl}(s) + 3 \text{ O}_2(g)$ 

3. Combustion reaction – characterized by always forming carbon dioxide and water

Examples:  $2 C_8 H_{18}(l) + 25 O_2(g) \rightarrow 16 CO_2(g) + 18 H_2O(g)$ 

 $2 \text{ CH}_3\text{OH}(1) + 3 \text{ O}_2(g) \rightarrow 2 \text{ CO}_2(g) + 4 \text{ H}_2\text{O}(g)$ 

4. Single Replacement (or displacement) reactions – recognized by having a single element on each side "switching"

Generic:  $A + BC \rightarrow AC + B$ 

Real examples:  $2 \text{ AgNO}_3(\text{aq}) + \text{Cu(s)} \rightarrow \text{Cu(NO}_3)_2(\text{aq}) + 2 \text{ Ag(s)}$ 

 $Cl_2(g) + 2 \text{ NaBr}(s) \rightarrow 2 \text{ NaCl}(s) + Br_2(g)$ (Note: In the first example, Cu a metal replaces Ag, another metal. In the second example, Cl, a nonmetal, replaces another nonmetal, Br.)

5. Double Replacement (or displacement) reactions (also called Ionic reactions) – recognized by two "partners" switching

Generic:  $AB + CD \rightarrow AD + CB$ 

Real examples:  $AgNO_3(aq) + NaCl(aq) \rightarrow NaNO_3(aq) + AgCl(s)$ 

 $HCl(aq) + NaOH(aq) \rightarrow NaCl(aq) + H_2O(1)$ (Note: To see the "switches" in the second example, consider  $H_2O$  to be written as H-OH)