## *(Ch. 21)* Types of Chemical Reactions

- Many chemical reactions have defining _____ which allow them to be classified as to type.

## **Types** of Chemical Reactions

The four types of chemical reactions in this unit that you need to know are:

- _____
- _____
- _____
- _____

## **Synthesis** Reactions

Two or more substances _____to form _____.

- The general form is _____

**Example:**

- Magnesium + oxygen → _____

  $2Mg + O_2$ → _____

## Synthesis Reactions Example:

$K + Cl_2$ →

- Write the ions: Balance the charges: _____
- _____
- Balance the equation: ___$K + Cl_2$ → _____

More Synthesis Reactions…

- $SO_2 + H_2O$ →_____
- $BaO + H_2O$ →_____

One Product

## **Decomposition** Reactions

_____ substance reacts to form _____substances.

- The general form is AX → _____

**Example:**

- Water can be decomposed by electrolysis.
- $2H_2O$ → _____

More Decomposition Reactions…

One Reactant

Two Products

$CaCO_3$→ _____

$2KClO_3$ → _____

$H_2CO_3 \rightarrow H_2O + CO_2$

$NH_4OH \rightarrow NH_3 + H_2O$

## **Single Replacement** Reactions

A _____will replace a _____ion in a compound.

- The general form is A + BX → _____

A _____will replace a _____ion in a compound.

- The general form is Y + BX → _____

## Single Replacement Reactions

**Example:**

$Ni + AgNO_3 \rightarrow$

- _____ replaces the metallic ion $Ag^+$.

  $Ni + AgNO_3 \rightarrow$ _____+ _____ $(NO_3)_2$

- Balance the equation:

  $Ni + 2AgNO_3 \rightarrow 2Ag + Ni(NO_3)_2$

Another Example:

- $Al + Fe_2O_3 \rightarrow$

  _____ will replace iron(III).

  $2Al + Fe_2O_3 \rightarrow 2$_____ + _____$_2O_3$

## **Single Replacement** Reactions

An active nonmetal can replace a less active nonmetal.

- The _____ ($F_2$, $Cl_2$, $Br_2$, $I_2$) reactions are good examples.
- _____ is the most active and _____ is the least.
  - $Cl_2 + 2\ NaI \rightarrow 2\ NaCl + I_2$

## **Double Replacement** Reactions

Ions of two compounds _____ with each other.

- The general form is $AX + BY \rightarrow$ _____

## **Double Replacement** Reactions

- $NaOH + CuSO_4 \rightarrow$
- The _____and _____switch places.
- $Na^+$ combines with $SO_4^{2-}$ to form _____.
- $Cu^{2+}$ combines with $OH^-$ to form _____

  $NaOH + CuSO_4 \rightarrow$ _____

  $2NaOH + CuSO_4 \rightarrow$ _____

## **Double Replacement**

- $CuSO_4 + Na_2CO_3 \rightarrow$
- $Cu^{2+}$ combines with $CO_3^{2-}$ to form _____.
- $Na^+$ combines with $SO_4^{2-}$ to form _____.

  $CuSO_4 + Na_2CO_3 \rightarrow$ _____

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- $Na_2CO_3 + HCl \rightarrow$
- $Na^+$ combines with $Cl^-$ to form _____.
- $H^+$ combines with $CO_3^{2-}$ to form _____.

  $Na_2CO_3 + 2HCl \rightarrow$ _____

## Practice

Classify each of the following as to type:

- $H_2 + Cl_2 \rightarrow 2HCl$
- $Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$
- $2CO + O_2 \rightarrow 2CO_2$
- $2KClO_3 \rightarrow 2KCl + 3O_2$
- $FeS + 2HCl \rightarrow FeCl_2 + H_2S$

Complete the equation and classify:

- $Zn + HCl \rightarrow$ ?