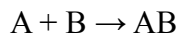


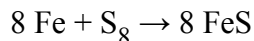
# Types of Chemical Reactions

## **SYNTHESIS: Direct Combination or Synthesis Reaction**

In a synthesis reaction two or more chemical species combine to form a more complex product.

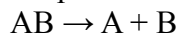


The combination of iron and sulfur to form iron (II) sulfide is an example of a synthesis reaction:

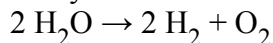


## **DECOMPOSITION: Chemical Decomposition or Analysis Reaction**

In a decomposition reaction a compound is broken into smaller chemical species.

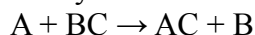


The electrolysis of water into oxygen and hydrogen gas is an example of a decomposition reaction:

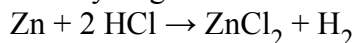


## **SINGLE REPLACEMENT or Substitution Reaction**

A substitution or single displacement reaction is characterized by one element being displaced from a compound by another element.

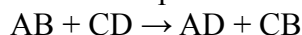


An example of a substitution reaction occurs when zinc combines with hydrochloric acid. The zinc replaces the hydrogen:

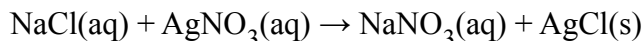


## **DOUBLE REPLACEMENT or Metathesis Reaction**

In a double displacement or metathesis reaction two compounds exchange bonds or ions in order to form different compounds.

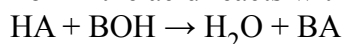


An example of a double displacement reaction occurs between sodium chloride and silver nitrate to form sodium nitrate and silver chloride.

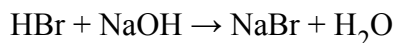


## **Acid-Base Reaction**

An acid-base reaction is type of double displacement reaction that occurs between an acid and a base. The  $\text{H}^+$  ion in the acid reacts with the  $\text{OH}^-$  ion in the base to form water and an ionic salt:



The reaction between hydrobromic acid (HBr) and sodium hydroxide is an example of an acid-base reaction:

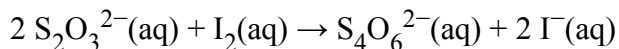


### **Oxidation-Reduction or Redox Reaction**

In a redox reaction the oxidation numbers of atoms are changed. Redox reactions may involve the transfer of electrons between chemical species.

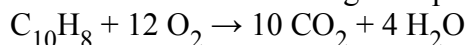
The reaction that occurs when in which  $I_2$  is reduced to  $I^-$  and  $S_2O_3^{2-}$  (thiosulfate anion) is oxidized to

$S_4O_6^{2-}$  provides an example of a redox reaction:



### **Combustion**

A combustion reaction is a type of redox reaction in which a combustible material combines with an oxidizer to form oxidized products and generate heat (exothermic reaction). Usually in a combustion reaction oxygen combines with another compound to form carbon dioxide and water. An example of a combustion reaction is the burning of naphthalene:

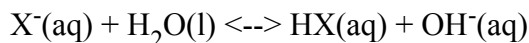


### **Isomerization**

In an isomerization reaction, the structural arrangement of a compound is changed but its net atomic composition remains the same.

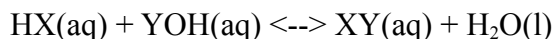
### **Hydrolysis Reaction**

A hydrolysis reaction involves breaking a bond using water. The general form for a hydrolysis reaction is:



### **Dehydration Reaction**

Dehydration is the removal of water. Often a bond is formed. The general form for a dehydration reaction is:



See also

<http://video.about.com/chemistry/What-Are-Types-of-Chemical-Reactions.htm>