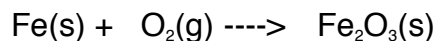
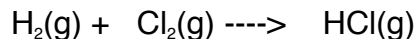


## Notes: The Five Main Types of Chemical Reactions

1. Synthesis: Two or more substances combine to form a new compound.

a. General Form:  $A + X \rightarrow AX$

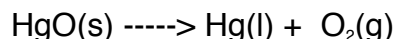
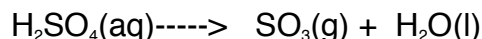
b. Examples:



2. Decomposition: A more complex compound reacts to form two or more less complex compounds.

a. General Form:  $AX \rightarrow A + X$

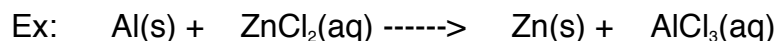
b. Examples:



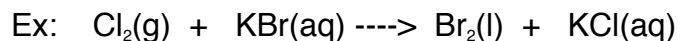
3. Single Displacement (aka Single Replacement): One element replaces a similar element in a compound.

a. Two General Forms:

i.  $A + BX \rightarrow B + AX$  (metal comes in to replace a metal)



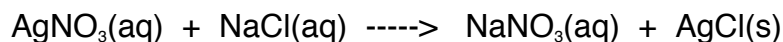
ii.  $Y + BX \rightarrow X + BY$  (nonmetal comes in to replace a nonmetal)



4. Double Displacement (aka Double Replacement): The ions of two compounds trade places in an aqueous solution to form two new compounds, one of which is usually a solid liquid, or gas. [Note: when one of the new compounds is a solid it's called a precipitate.]

a. General Form:  $AX + BY \rightarrow BX + AY$

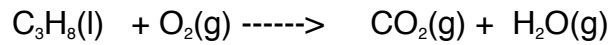
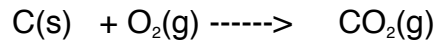
b. Examples:



5. Combustion: A substance combines with oxygen producing heat so rapidly that a flame results.

a. General Form:  $X + O_2(g) \rightarrow$  flame and different kinds of products

b. Examples:



Note: hydrocarbons ( $C_{\text{something}}H_{\text{something}}$ ) always combust to form  $CO_2(g) + H_2O(g)$ . They can be a bit tricky to balance: we'll look at them tomorrow. There are many forms of combustion. We'll be focusing on the combustion of hydrocarbons for our definition of combustion.