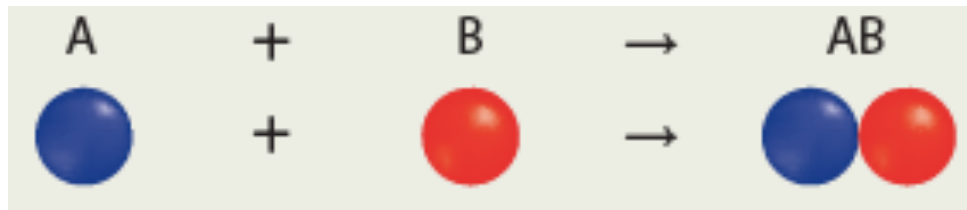


Synthesis & Decomposition Reactions

synthesis reaction
a chemical reaction
in which two or more
reactants combine
to produce a single
compound



Only 1 product is formed!

1. Element + Element : $S(s) + O_2(g) \rightarrow SO_2(g)$
2. Compound + Element : $2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$
3. Compound + Compound : $SO_3(g) + H_2O(l) \rightarrow H_2SO_4(aq)$

1. Element + Element Synthesis Reactions

Ex) Solid sodium and chlorine gas react to produce sodium chloride.

a. Write a balanced chemical equation for this reaction. Include state signs.

b. What main characteristic of this chemical reaction causes it to be classified as a synthesis reaction?

Ex) Carbon and oxygen gas can produce a carbon dioxide in a synthesis reaction.

a. Write a balanced chemical equation for this reaction

Ex) Solid copper and chlorine gas produce 2 different solid products.

a. Predict the product(s) of this reaction.

b. Write a balanced chemical equation for BOTH reactions.

2. Compound + Element Synthesis Reactions

Ex) Gaseous sulfur dioxide reacts with oxygen gas to make sulfur trioxide gas.

a. Write a balanced chemical equation.

Ex) Solid phosphorous pentachloride is produced from liquid phosphorous trichloride and chlorine gas.

a. Write a balanced chemical equation.

3. Compound + Compound Synthesis Reactions

Metal oxides react with water to form a base

Ex) When sodium oxide is placed in water, a solution of sodium hydroxide is formed.

Ex) Magnesium hydroxide is produced when magnesium oxide is placed in water.

Non-metal oxides react with water to form an acid

Ex) When gaseous carbon dioxide is bubbled through water, carbonic acid is produced.

Ex) Sulfuric acid is produced by bubbling sulfur trioxide in water.