

Synthesis Reactions

Synthesis: the combining of two different molecules or atoms to form a single new substance.

General Reaction: $A + B \rightarrow AB$

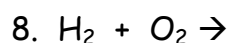
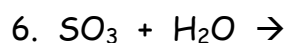
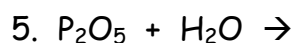
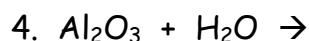
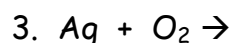
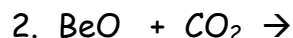
Comments:

1. The direct combining of two elements will produce a binary compound.
2. Metallic oxides and carbon dioxide react to form carbonates.
3. Metallic oxides and water react to produce a base.
4. Nonmetallic oxides and water react to produce an acid.

Sample Reactions:

- a. $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ (Simplest form of syntheses two elements)
- b. $\text{Na}_2\text{O} + \text{CO}_2 \rightarrow \text{Na}_2\text{CO}_3$ (Metal Oxide and Carbon Dioxide - carbonate)
- c. $\text{Na}_2\text{O} + \text{H}_2\text{O} \rightarrow 2\text{NaOH}$ (Metal Oxide in water will make a base)
- d. $\text{N}_2\text{O}_5 + \text{H}_2\text{O} \rightarrow 2\text{HNO}_3$ (Non-Metal Oxide in water will make an acid)

Practice Equations: predict the products and balance each equation.



Decomposition

Decomposition: in a decomposition reaction one compound breaks apart into two or more substances. These substances may be elements or simpler compounds.

General Reaction: $AB \rightarrow A + B$
More Complex $\rightarrow$ Less Complex

Comments:

1. Binary compounds break down into their component elements.
5. Carbonates break into a metal oxide and carbon dioxide.
6. Bases (-OH) break down into a metal oxide and water.
7. Acids break down into a nonmetal oxide and water.

Sample Reactions:

- e. $2\text{NaCl} \rightarrow 2\text{Na} + \text{Cl}_2$
- f. $\text{Na}_2\text{CO}_3 \rightarrow \text{Na}_2\text{O} + \text{CO}_2$
- g. $\text{Ca}(\text{OH})_2 \rightarrow \text{CaO} + \text{H}_2\text{O}$
- h. $2\text{H}_3\text{PO}_4 \rightarrow \text{P}_2\text{O}_5 + 3\text{H}_2\text{O}$

Practice Equations: predict the products and balance each equation.

