**Synthesis/composition Reactions**

1. Reactions of elements with oxygen and sulfur

ex: 8Ba + S8 🡪 8 BaS

ex: 2Zn + O2 🡪 2 ZnO

2. Reactions of metals with halogens.

ex: 2Al + 3Cl2 🡪 2 AlCl3

3. Synthesis reactions with oxides

a. metallic oxide + water 🡪 metallic hydroxide

ex: CaO + H2O 🡪 Ca(OH)2

b. nonmetallic oxide + water 🡪 acid

ex: SO2 + H2O 🡪 H2SO3

c. metallic oxide + nonmetallic oxide 🡪 salt

ex: CaO + CO2 🡪 CaCO3

**Decomposition Reactions**

1. Binary compounds

ex:

2. Metallic carbonates 🡪 metallic oxide and carbon dioxide

ex:

3. Metallic hydroxides 🡪 metallic oxide and water

ex:

4. Metallic chlorates 🡪 metallic chloride and oxygen

ex:

5. Acids 🡪 nonmetallic oxide and water

ex:

**Single-Replacement Reactions**

1. Replacement of a metal in a compound by another metal

ex:

2. Replacement of hydrogen in water by a metal

a. active metals (Li, K, Ba, Ca, and Na) – produce hydroxides

ex:

b. less active metals (Mg, Al, Mn,Zn,Cr,Fe, and Cd) - produce oxides

ex:

3. Replacement of hydrogen in an Acid by a metal

ex:

4. Replacement of Halogens

ex:

**Double-Replacement Reactions**

ex:

**Combustion Reactions**

1. Organic compound + oxygen 🡪 carbon dioxide and water

ex: C3H8 + 5O2 🡪 3CO2 + 4H2O