

Synthesis and Decomposition Reactions

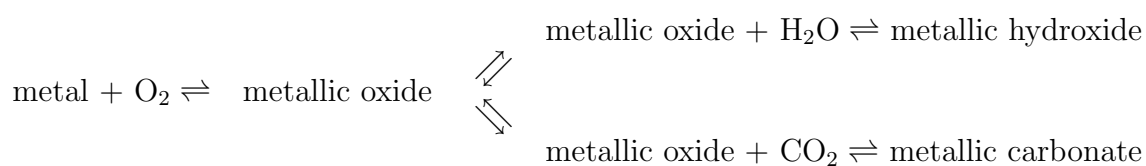
For each of the following reactions, the left-to-right reaction is the synthesis and the right-to-left reaction is the decomposition.

General

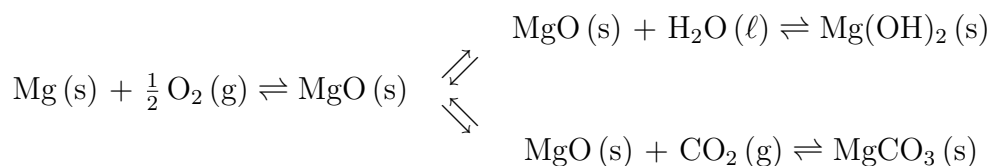
element + element \rightleftharpoons binary compound

Example: $2 \text{P (s)} + 3 \text{Cl}_2 \text{ (g)} \rightleftharpoons 2 \text{PCl}_3 \text{ (g)}$

Ionic Compounds



Example:



metal + nonmetal \rightleftharpoons “____ide” salt + $\text{O}_2 \rightleftharpoons$ “____ate” compound

Example: $2 \text{Na (s)} + \text{Cl}_2 \text{ (g)} \rightleftharpoons 2 \text{NaCl (s)} + 3 \text{O}_2 \text{ (g)} \rightleftharpoons 2 \text{NaClO}_3 \text{ (s)}$

Molecular Compounds

nonmetal + $\text{O}_2 \rightleftharpoons$ nonmetallic oxide + $\text{H}_2\text{O} \longrightarrow$ acid

Example: $\text{C (s)} + \text{O}_2 \text{ (g)} \rightleftharpoons \text{CO}_2 \text{ (g)} + \text{H}_2\text{O (l)} \rightleftharpoons \text{H}_2\text{CO}_3 \text{ (aq)}$

ammonia compounds

$\text{N}_2 \text{ (g)} + 3 \text{H}_2 \text{ (g)} \rightleftharpoons 2 \text{NH}_3 \text{ (g)} + 2 \text{H}_2\text{O (l)} \rightleftharpoons 2 \text{NH}_4\text{OH (aq)}$