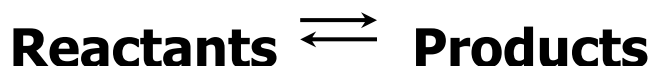


Chemical Equilibrium

- Not all reactions go to completion or use up all of the reactants. Some instead reach a balance or equilibrium.

At equilibrium, the forward rate of reaction (Reactants forming Products) equals the reverse rate of reaction (Products forming Reactants).



LeChâtelier's Principle

- Any stress applied to a system at equilibrium causes the system to adjust to offset the stress until equilibrium is re-established.
 - Types of stresses studied in this exp.:
 1. Adding or removing reactants & products
 2. Adding or removing heat
1. a) If adding a reactant, the equilibrium will shift to the right (\rightarrow) to "use up" the excess reactants and "make more" products.
 - b) If removing a reactant, the equilibrium will shift to the left (\leftarrow) to "*make more*" reactants to replace the loss of reactants.
 - c) Adding (or removing) products, is just the opposite of adding (or removing) reactants.

2. a) **Exothermic**: Heat is released, it can be considered as a product.

If heated, the equilibrium will shift to the **LEFT**. When adding heat (a product), the equilibrium shifts away from the heat to "use up" reactants.

If cooled, the equilibrium will shift to the **RIGHT**. When removing heat (a product), the equilibrium shifts toward heat to "make more" products.

b) **Endothermic**: Heat is absorbed, it can be considered as a reactant.

If heated, the equilibrium will shift to the **RIGHT**. When adding heat (a reactant), the equilibrium shifts away from heat to "use up" the products.

If cooled, the equilibrium will shift to the **LEFT**. When removing heat (a reactant), the equilibrium shifts toward heat to "make more" reactants.