

Chemical Equilibrium

Collision-Reaction Theory

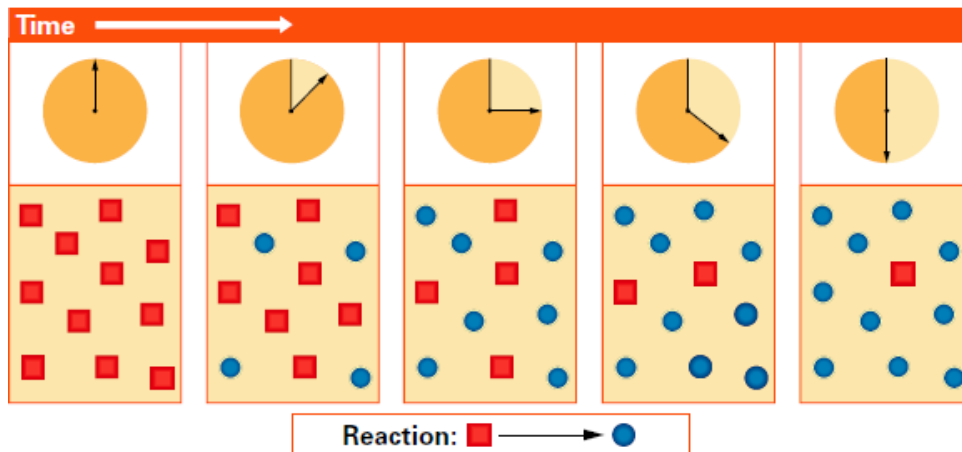
Main principles of the **collision-reaction theory**:

1. all chemical reactions involve collisions between atoms, ions or molecules
2. a certain amount of kinetic energy is required for a reaction to occur
3. a certain orientation of particles is required

Rate of Reaction

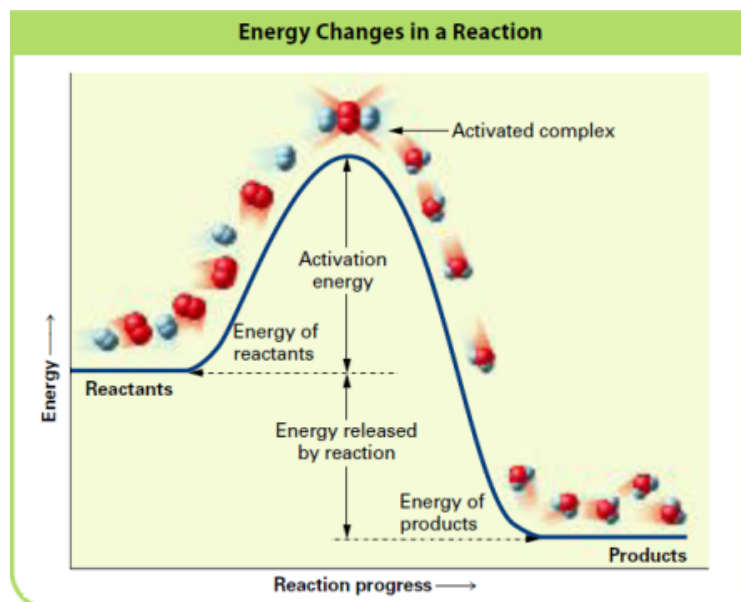
Reaction Rate

Amount of reactant changing per unit time



Activation Energy

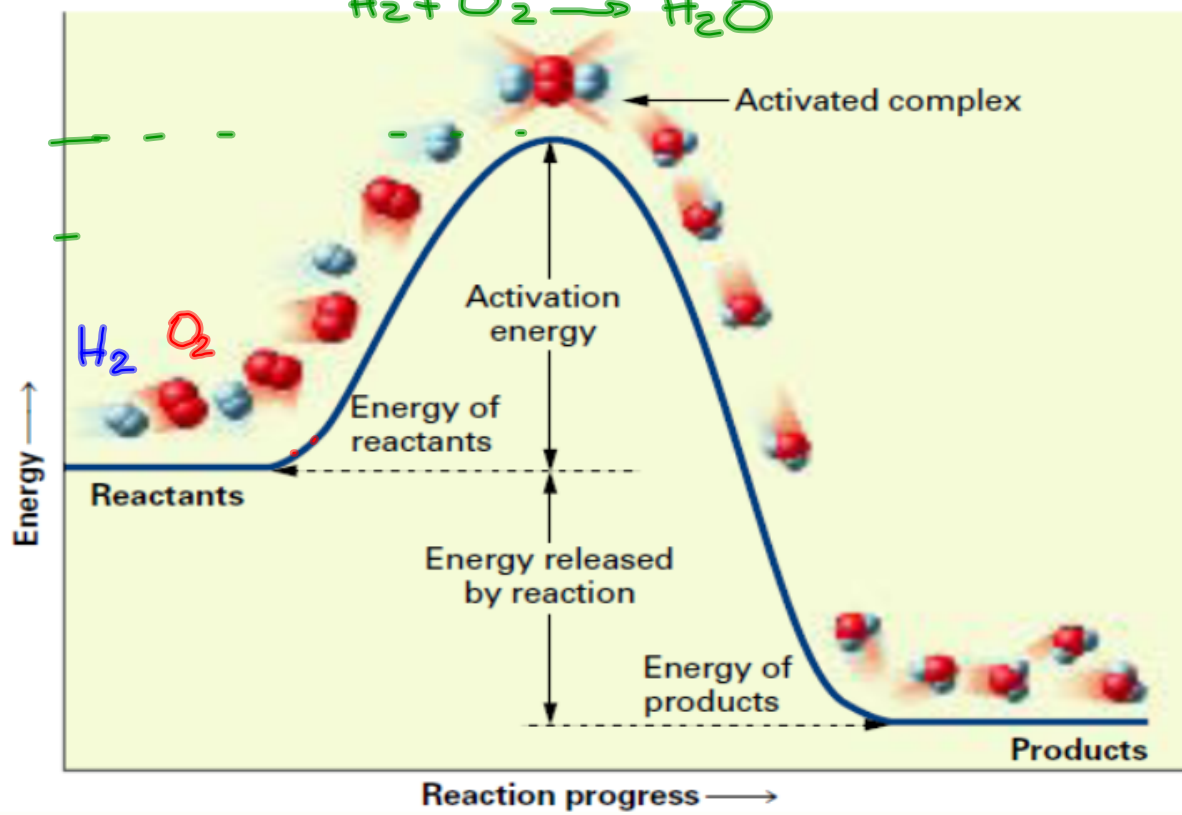
Minimum amount of energy that colliding particles must have in order to react



Activated Complex (Transition State)

Unstable arrangement of atoms that forms at the peak of the activation-energy barrier

Energy Changes in a Reaction



Factors Affecting Reaction Rates

Temperature

Raising the temperature speeds up the rate of reaction

- More collisions, and more particles with enough kinetic energy to overcome activation energy barrier

Ex. burning of charcoal

Concentration

Increased concentration increases rate of reaction

- More particles, more collisions, higher rate of reaction

Ex. glowing splint in pure oxygen

Particle Size

Larger the particle, slower the rate of reaction

- Larger particle, less surface area, less reactant available for collision

Ex. Burning log in a fire

Catalyst

Lowers the activation energy for a reaction, increasing rate of reaction

- Not consumed in chemical reaction

Ex. Enzymes in digestive tract

Inhibitor - substance that interferes with the action of a catalyst, often by reacting with the catalyst

Homework

p. 547 #1-5