

Rates of reaction

→ Rate is a measure of a change taking place in a reaction per unit time.

⇒ Collision theory

→ the rate of ~~increasing~~ reaction depends on collision of particles

→ for rate to increase, the particles should:-

1. collide more frequently

2. collide more successfully

→ This happens with an increase in concentration of the reactants, an increase in temperature, or the use of a catalyst.

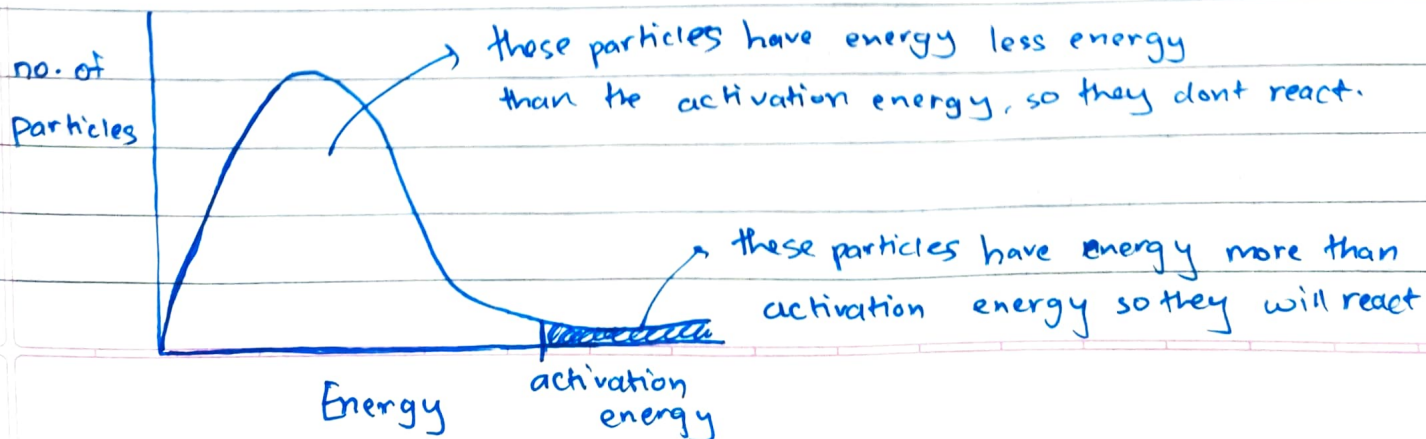
→ in gas phase reactions, the increase in pressure also increases the rate of reaction.

⇒ Activation energy

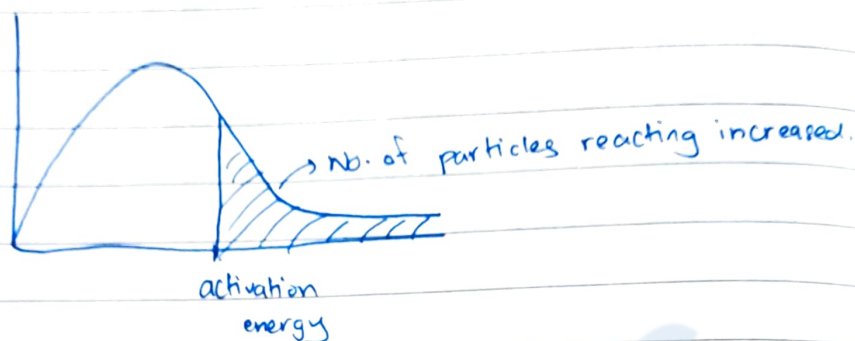
→ the energy needed to initiate a reaction.

→ the lower the activation energy, the faster the reaction because the more the number of molecules that have sufficient energy to collide more frequently and successfully.

⇒ Boltzmann's curve



→ Now if activation energy is lowered more number of particles can react.



⇒ Effect of temperature on the rate of reaction

- as temperature increases, the particles gain energy
- so frequency of collisions and the no. of successful collisions increase
- ∴ Rate of reaction increases.

⇒ Effect of concentration on the rate of reaction.

- As conc increases, the rate of reaction increases
- this is because, there are more particles per unit volume and hence there are more frequent collisions, frequent collisions mean more number of successful collisions

⇒ Effect of pressure on the rate of a gas phase reaction

- As pressure of gas phase reaction increases, rate of reaction increases

⇒ Catalyst

- Catalyst is a substance that provides alternate pathway, with lower activation energy, for a reaction to take place.
- Homogenous catalyst - a catalyst in the same phase as reactants
- Heterogenous catalyst - a catalyst in different phase as reactants
- catalyst remains chemically unchanged after a reaction
- catalyst increases the rate of reaction