

# Chemical kinetics summary

- ❖ Chemical kinetics is the study of the rate and the mechanism of chemical reactions, proceeding under given conditions of temperature, pressure, concentration etc.
- ❖ The change in the concentration of the species involved in a chemical reaction per unit time gives the rate of a reaction.
- ❖ The rate of the reaction, at a particular instant during the reaction is called the instantaneous rate. The shorter the time period, we choose, the closer we approach to the instantaneous rate,
- ❖ The rate represents the speed at which the reactants are converted into products at any instant.
- ❖ The rate constant is a proportionality constant and It is equal to the rate of reaction, when the concentration of each of the reactants in unity
- ❖ Molecularity of a reaction is the total number of reactant species that are involved in an elementary step.
- ❖ The half life of a reaction is defined as the time required for the reactant concentration to reach one half its initial value. For a first order reaction, the half life is a constant i.e., it does not depend on the initial concentration.
- ❖ According to collision theory, chemical reactions occur as a result of collisions between the reacting molecules.

- ❖ Generally, the rate of a reaction increase with increasing temperature. However, there are very few exceptions. The magnitude of this increase in rate is different for different reactions. As a rough rule, for many reactions near room temperature, reaction rate tends to double when the temperature is increased by 10 C 0
- ❖ According to Arrhenius, activation energy of the reaction is the minimum energy that a molecule must have to posses to react.
- ❖ The rate of a reaction is affected by the following factors.
  - i. Nature and state of the reactant
  - ii. Concentration of the reactant
  - iii. Surface area of the reactant
  - iv. Temperature of the reaction
  - v. Presence of a catalyst