

## Steady-state Principle

- In many many reactions side rxn along with main reaction also takes place.
- Such rxn are not completed in single step but occurs in a number of well defined.

steps

- In these cases, the rate law is inconsistent with stoichiometric equation for the reaction.

- In order to derive kinetics of such reaction, a steady-state principle is applied.

- In such rxn the concentration of some intermediate grows up due to some reaction and also falls down due to some other reaction and finally concentration attains a fixed value.

At this stage, the rate of formation of intermediate and its disappearance are equal i.e.

$$\frac{d[\text{intermediate}]}{dt} = 0.$$

This fact of constant concentration of an unstable intermediate species, is called principle of steady-state approximation.

By using this principle, the overall rate equation of a complex reaction is easily obtained

## Complex Reactions (or) Complicated (or) Composite Reaction:-

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→ A  $r_n$  is complex when several reaction occurs at the same time.

→ Interpretation of velocity data becomes quite difficult due to several other reactions taking place simultaneously along with the main reaction.

→ due to which smooth progress of the  $r_n$  is disturbed.

Some of the main type of complex  $r_n$  are discussed below:-

- (1) Oppositing or reversible  $r_n$
- (2) Parallel or competing or side reaction
- (3) Consequitive reactions
- (4) Chain Reactions