Chemical-kinetics

A Branch of Physical Chemistry which deals rate of Chemical reactions and various factors which affects rate is k/a Chemical kinetics.

On the Basis of rate Chemical reactions are Brodly divided into three Categories.

(1) Very fast Reactions

Those Reactions which are completed in Nano sec (10^{-9}), μ-Sec (10^{-6}) & millisec (10^{-3}). is k/a Very fast Rexn.

(2) Very Slow Reactions

(3) Moderate Reactions

ex÷ Neutralisation Reactions [Acid-Base]

$HCl + NaOH \longrightarrow NaCl + H_2O$

$H^+ + Cl^-$ $Na^+ + OH^-$ $Na^+ + Cl^-$

Rate Can't be determined.

(1) Very fast Reactions

Those Reactions which are completed in Nanosec (10^{-9}), μ-Sec (10^{-6}) & millisec (10^{-3}). it's a very fast Rexn.

(2) Very Slow Reactions

which are completed in days, month's & year's.

ex÷ Rusting of Iron

Rate x y

(3) Moderate Reactions

which are completed in a finite time/ measurable time interval (Sec, min's, Hr's)

ex÷ molecular Reaction's

$N_2 + 3H_2 \longrightarrow 2NH_3$

$(N \equiv N)$ $H - H$ $H-\underset{\underset{H}{|}}{N}-H$

Rate will determined.

Rate of Reaction ÷ Change in Concentration/Pressure of reactants / products with respect to time is kla rate of reaction. (γ.o.r.)(γ)

$$\gamma = \frac{\text{Change in Concentration/Pressure}}{\text{time taken.}}$$

$$\gamma = \pm \frac{\Delta C/\Delta P}{\Delta t}$$

$$\because C = \frac{n}{V_{(lt\gamma)}}$$

Unit of rate ÷

$$\gamma = \pm \frac{\Delta C}{\Delta t}$$

$$\gamma = \pm \frac{\Delta P}{\Delta t}$$

Unit ÷ mol/ltr.

÷ mol. ltr^{-1}

Pressure ⇒ atm.

** $\gamma \Rightarrow$ mol. ltr^{-1} sec^{-1}

γ = atm. sec^{-1}

Ex: $A \longrightarrow B$

	A	B
$t=0$	10 mol	—
$t=10$ min	$10-2=8$	2

let $V = 1\,l + r$

$$r_A = \frac{\Delta[A]}{\Delta t}$$

$$r_A = \frac{[A]_{t=10} - [A]_{t=0}}{t_2 - t_1}$$

$$r_A = \frac{8-10}{10-0} \Rightarrow \boxed{r_A = -\frac{2}{10}}$$

{ Conc. of reactant disappearance /decreases }

	A	B
$t=0$	10 mol	— ✓
$t=10$	$10-2$	2
	8	2

$$r_B = \frac{\Delta[B]}{\Delta t} \Rightarrow r_B = \frac{2-0}{10-0}$$

$$\boxed{r_B = +\frac{2}{10}}$$

Conc. of product appearance /formation

rate always +ve.