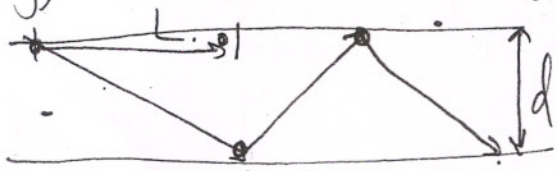
⇒ Knudsen Diffusion :- / Knudsen Transport. Lecture-(5)




Depends upon:

→ Velocity of molecule
→ Diameter of pore. → Related.
→ Mean free path

MFP → More, Diameter - small → KD ⇒ More Wall Collision
— n → less. — n — → large → ND → More Gaseous Collision

⇒ Activity of Catalyst: 'a'

$-l_A = k' C_A^n a^d$

$-\frac{da}{dt} = k_d' C_A^m a^d$ → order of Deactivation
→ Chemistry.

| |
|---|
| $a = 1$ , $t = 0$ |
| $a < 1$ , $t = t$ |

$a = \frac{\text{Rate of Rxn with Catalyst at time } t}{\text{Rate of Rxn with Catalyst at time } t=0}$

⇒ How Catalyst get Deactivated :-

① Decay Reaction ② Pore diffusion ③ Temperature / Op. Conditions → Independent

→ Parallel → Byproduct $A \rightarrow R + P\downarrow$
→ Series → Product Decomposition $A \rightarrow R \rightarrow P\downarrow$.
→ Side by side → Inerts. $A + P \rightarrow R + P\downarrow$.

P → Poisoning Element. Occupying Active surface Area of Catalyst.

② Pore diffusion :-

Effect of pore diffusion is neglected

$\phi < 0.3 \rightarrow \eta = 1 \rightarrow$ Uniform distribution. → Parallel Rxn.
$\phi > 3 \rightarrow \eta = \frac{1}{\phi} \rightarrow$ At exterior → slowly Penetrate with time.

$\phi < 0.3 \rightarrow \eta = 1 \rightarrow$ Uniform distribution
$\phi > 3 \rightarrow \eta = \frac{1}{\phi} \Rightarrow A \rightarrow (R) \rightarrow P$ R is high in → Series Rxn