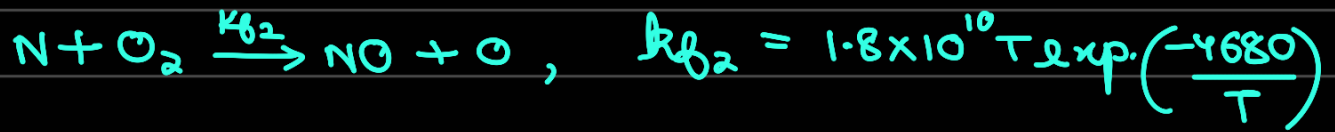
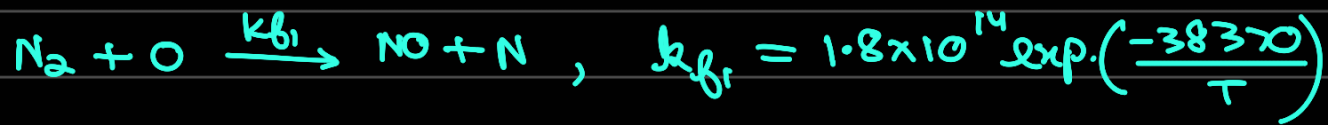


Day-15

→ Thermal NO formation -



$$\frac{d[\text{N}]}{dt} = k_{f1} [\text{N}_2][\text{O}] - k_{f2} [\text{N}][\text{O}_2]$$

Using steady-state approximation,

$$\frac{d[\text{N}]}{dt} = 0 \Rightarrow [\text{N}] = \frac{k_{f1}}{k_{f2}} \frac{[\text{N}_2][\text{O}]}{[\text{O}_2]}$$

$$\begin{aligned} \frac{d[\text{NO}]}{dt} &= k_{f1} [\text{N}_2][\text{O}] + k_{f2} [\text{N}][\text{O}_2] \\ &= 2k_{f1} [\text{N}_2][\text{O}] \end{aligned}$$

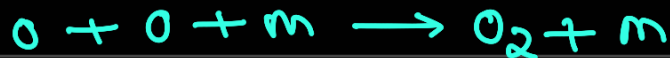
Partial equilibrium $> 1800 \text{ K}$: $\text{O}_2 \rightleftharpoons 2\text{O}$

$$[\text{O}] = \sqrt{k_p [\text{O}_2] \left(\frac{R_u T}{P_0}\right)^{-1}}$$

$$\begin{aligned} \text{So } \frac{d[\text{NO}]}{dt} &= 2k_{f1} [\text{N}_2] \sqrt{k_p [\text{O}_2] \left(\frac{R_u T}{P_0}\right)^{-1}} \\ \Rightarrow \frac{d[\text{NO}]}{dt} &\propto k_{f1} [\text{N}_2][\text{O}_2]^{1/2} \end{aligned}$$

→ H_2 - O_2 reaction mechanism -





mass diffusion $\propto \frac{1}{P}$

