

Lecture 6.2 Type 2 Reaction Mechanisms

Note Title

9/9/2011

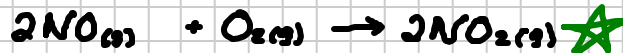
Type 1 Rxn Mechanisms

- 1) El. rxn ... slow ... R.L.S.
- 2) El. rxn ... fast
- 3) El. rxn ... fast

Type 2 Rxn Mechanisms

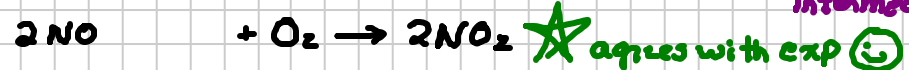
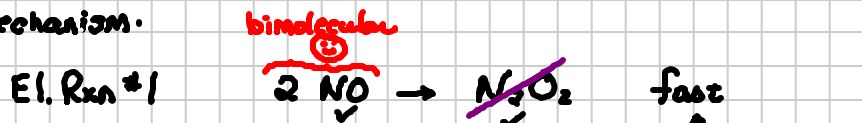
- 1) El. rxn fast
- 2) El. rxn ... slow ... R.L.S.
- 3) El. rxn fast

Example: Experimentally overall rxn



rate equation: $\text{rate} = k[\text{NO}]^2[\text{O}_2]$

Proposed Mechanism:

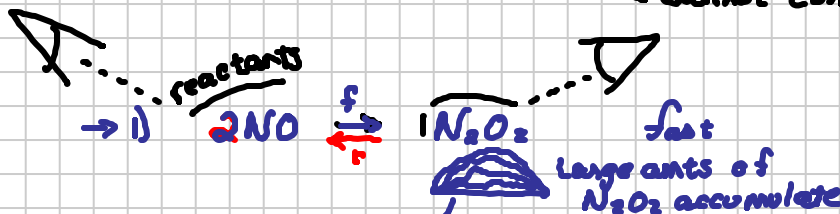


R.L.S.



rate = $k[\text{N}_2\text{O}_2][\text{O}_2]$... doesn't match!

cannot contain intermediate



Dynamic Equilibrium

rate_f = rate_r



El. Rxn #1 $\text{rate}_f = \text{rate}_r$

$\frac{1}{k_r} k_f [\text{NO}]^2 = k_r [\text{N}_2\text{O}_2] \frac{1}{k_r}$

$\frac{k_f}{k_r} [\text{NO}]^2 = [\text{N}_2\text{O}_2]$ intermediate!



intermediate \rightarrow rate = $k[\text{N}_2\text{O}_2][\text{O}_2] = k\left(\frac{k_f}{k_r} [\text{NO}]^2\right)[\text{O}_2] = k[\text{NO}]^2[\text{O}_2]$... agrees with exp