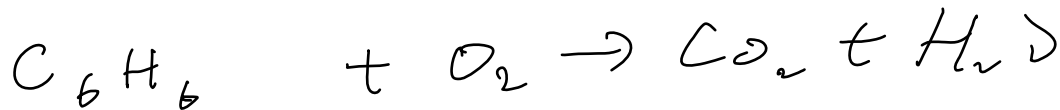


Ch. 14.6 Rx mechanism

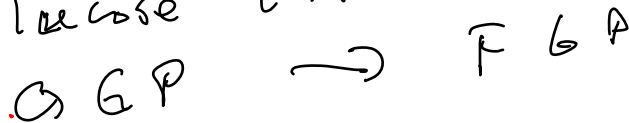
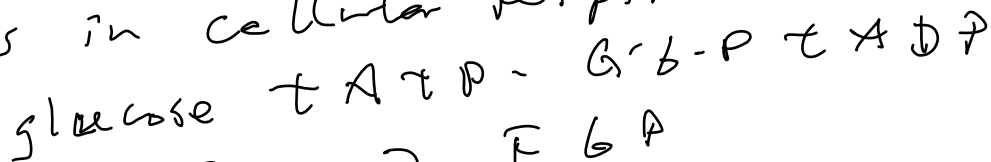
- is the steps in a Rx

ex cellular respiration



(glucose)

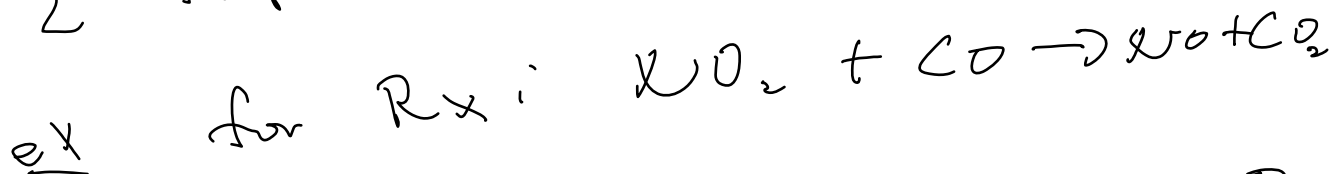
steps in cellular respiration = mechanism



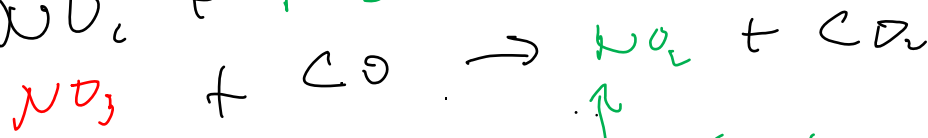
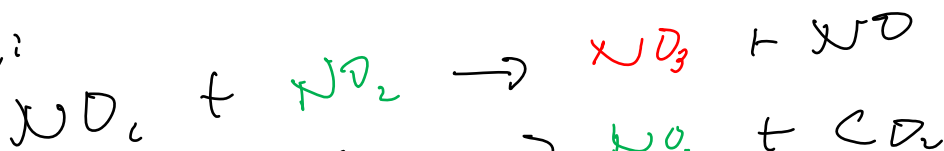
etc

properties of a Rx mechanism

• \sum steps in the mechanism = Rx



mechanism:



↑
intermediate

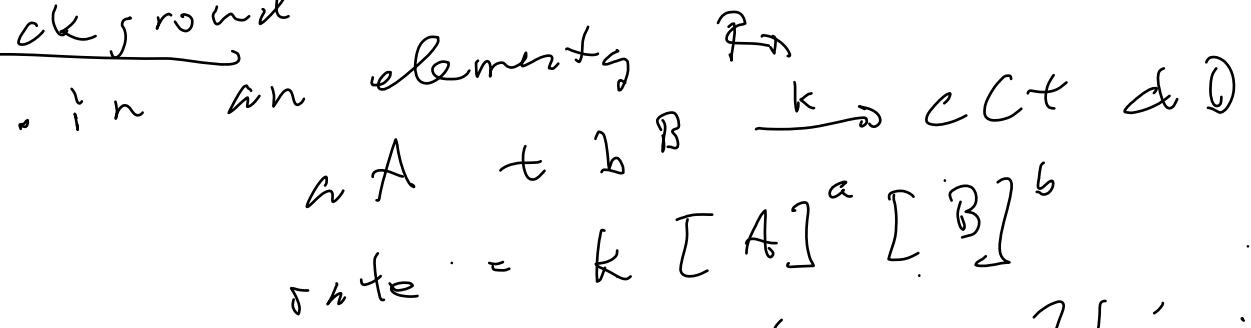
↑
catalyst

↑
consumed then generated

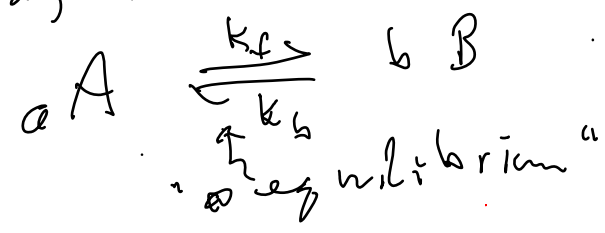
- not a reactant
- not a product
- generated then consumed

- each step in a Rx mechanism is an elementary Rx
- detect all (proposed) intermediates during the Rx
- correctly predicts the rate law

background



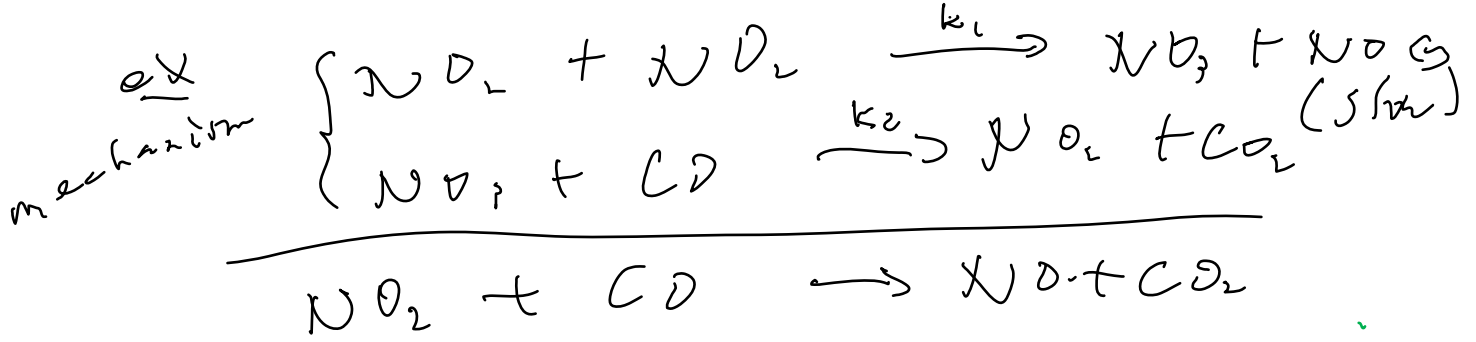
- elementary Rx involve equilibrium



$$k_f [A]^a = k_b [B]^b$$

Determine the rate law based on analyzing a Rx mechanism

- ① [rate-limiting - step = slowest Rx step in the Rx mechanism]
- ↳ determines the rate of the Rx
 - ↳ exactly your test
 - ↳ [no equilibrium step in the Rx mechanism]



rate of Rx = rate of slowest step

$$= k_1 [\text{NO}_2] [\text{NO}_2]$$

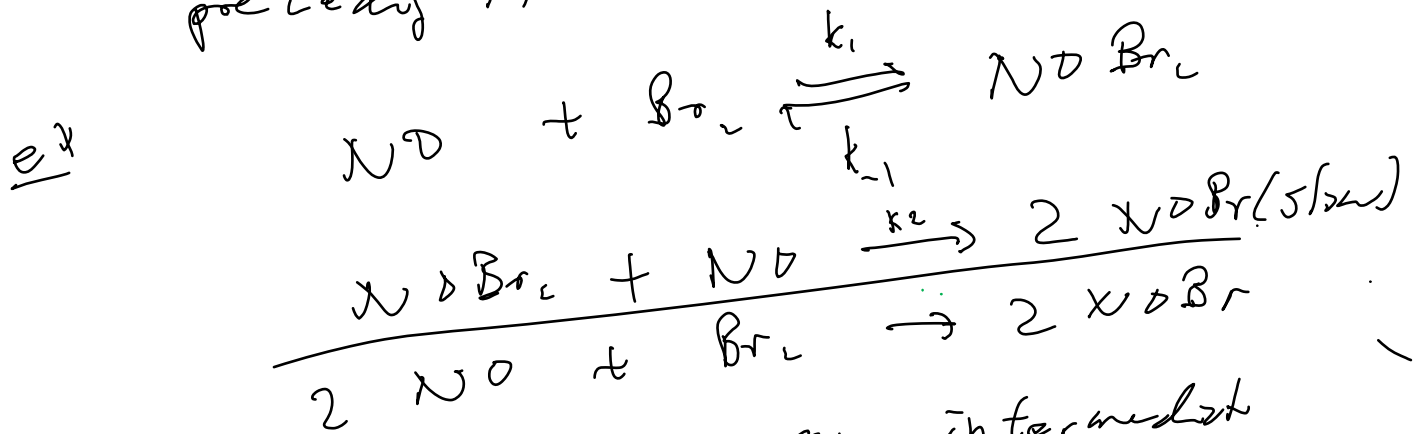
$$= k_1 [\text{NO}_2]^2$$

note: based on rate = $k [\text{NO}_2]^x [\text{CO}]^y$

$$x = 2$$

$$y = 0$$

(2) \exists rate limiting step & equilibrium preceding it



note (as title): NOBr₂ is an intermediate

rate of Rx = rate of the slowest step

$$(\text{step 2}) \Rightarrow = k_2 [\text{NOBr}_2] [\text{NO}] \quad (1)$$

↑
not a reactant

note: step 1: $r_f = r_b$

$$k_1 [NO] [Br_2] = k_{-1} [NOBr]$$

$$[NOBr] = \frac{k_1 [NO] [Br_2]}{k_{-1}} \quad (2)$$

Subst (2) into (1)

$$\text{rate} = k_2 \left(\frac{k_1 [NO] [Br_2]}{k_{-1}} \right) [NO]$$

$$= \frac{k_1 k_2}{k_{-1}} [NO]^2 [Br_2]$$