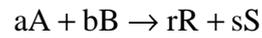


Chap. 2



A

$$-r_A = -\frac{1}{V} \frac{dN_A}{dt} ;$$

R

$$r_R = \frac{1}{V} \frac{dN_R}{dt}$$

$$\frac{-r_A}{a} = \frac{-r_B}{b} = \frac{r_R}{r} = \frac{r_S}{s} ;$$

A 1 B b/a , R r/a , S s/a .

$-r_A$

$$-r_A = f(T, C) = f_1(T) \cdot f_2(C)$$

$f_1(T)$:

Arrhenius

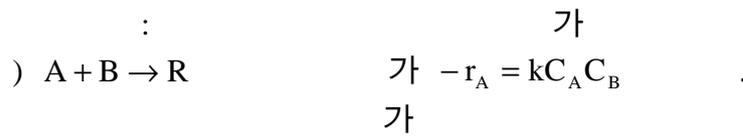
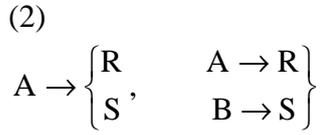
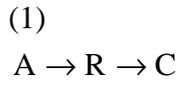
$f_2(C)$:

2.1

:

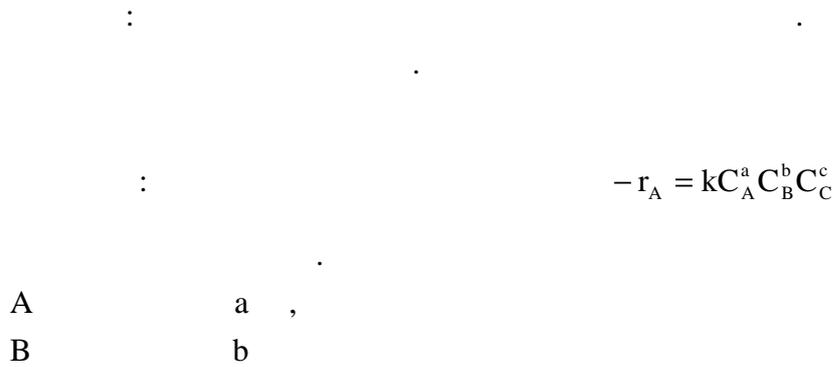
.) $A \rightarrow B$

:



$$r_{HBr} = \frac{k_1 [H_2] [Br_2]^{1/2}}{k_2 + [HBr]/[Br_2]}$$

2



C c ,
 a+b+c .
 , 가 .
 k
 k (n)

$$[k] = (\text{time})^{-1} (\text{concentration})^{1-n}$$

. k () .

2.7. 400K

$$-\frac{dp_A}{dt} = 3.66 p_A^2 \quad \text{atm/hr} \quad (\text{a})$$

(a) 가?

(b)

가

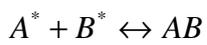
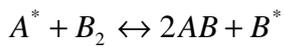
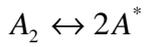
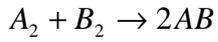
$$-r_A = -\frac{1}{V} \frac{dN_A}{dt} = k C_A^2 \quad \text{mol/m}^3 \cdot \text{s} \quad (\text{b})$$

$$(\text{a}) \frac{[\text{atm}]}{[\text{hr}]} = [?] [\text{atm}]^2 \quad \text{atm}^{-1} \text{hr}^{-1}$$

(b)

$$p_A = \frac{N_A}{V} RT \quad (\text{c})$$

(c) (a)



(*)

(1) , (2) , (3) , (4)

1. 가 (steady-state approximation)

X

X

가

$$[X] = \frac{d[X]}{dt} \cong 0$$

2. 가 (equilibrium assumption)

C_0

가

C,

가

X

$$[C_0] = [C] + [X]$$

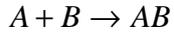
,

X

가

$$\frac{dX}{dt} = 0, \quad K = \frac{[X]}{[A][C]}$$

2.1 가

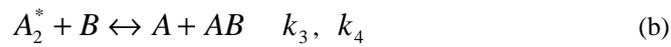


가

$$r_{AB} = kC_B^2$$

: (1) 가
(2)

1: 가 A , A_2^*



가

$$r_{AB} = k_3[A_2^*][B] - k_4[A][AB] \quad (c)$$

$$r_{A_2^*} = \frac{1}{2}k_1[A]^2 - k_2[A_2^*] - k_3[A_2^*][B] + k_4[A][AB] \quad (d)$$

가

$$r_{A_2^*} = 0$$

$$[A_2^*] = \frac{\frac{1}{2}k_1[A]^2 + k_4[A][AB]}{k_2 + k_3[B]} \quad (e)$$

(e) (c)

$$r_{AB} = \frac{\frac{1}{2}k_1k_3[A]^2[B] - k_2k_4[A][AB]}{k_2 + k_3[B]} \quad (f)$$

(f)

k_2 , (a)가 가

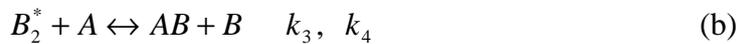
$$r_{AB} = \frac{1}{2}k_1[A]^2 \quad (g)$$

k_4 , (b)가 가

$$r_{AB} = \frac{(k_1k_3/2k_2)[A]^2[B]}{1 + (k_3/k_2)[B]} \quad (h)$$

(g), (h) 1

2: 가 B , B_2^*



가

$$r_{AB} = k_3[B_2^*][A] - k_4[AB][B] \quad (c)$$

$$r_{B_2^*} = \frac{1}{2}k_1[B]^2 - k_2[B_2^*] - k_3[B_2^*][A] + k_4[AB][B] \quad (d)$$

가 $r_{B_2^*} = 0$

$$[B_2^*] = \frac{\frac{1}{2}k_1[B]^2 + k_4[AB][B]}{k_2 + k_3[A]} \quad (e)$$

(e) (c)

$$r_{AB} = \frac{\frac{1}{2}k_1k_3[B]^2[A] - k_2k_4[AB][B]}{k_2 + k_3[A]} \quad (f)$$

(f)

k_2 , (a)가 가

$$r_{AB} = \frac{1}{2}k_1[B]^2 \quad (g)$$

(g) 2 가 가

2-2 (Enzyme)- (Substrate)

A → R

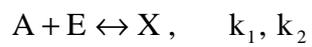
: 1. $[E_0]$.

2. 가

3. 가

:

Michaelis & Menten mechanism



$$[E_0] = [E] + [X]$$

가

$$\frac{dX}{dt} \cong 0$$

R

$$\frac{d[R]}{dt} = k_3[X]$$

X 가

$$\frac{d[X]}{dt} = k_1[A][E] - k_2[X] - k_3[X] = 0$$

$$[E] = [E_0] - [X]$$

$$[X] = \frac{k_1[A][E_0]}{k_2 + k_3 + k_1[A]}$$

$$r_R = \frac{d[R]}{dt} = k_3[X] = \frac{k_3 k_1 [A][E_0]}{(k_2 + k_3) + k_1[A]} = \frac{k_3 [A][E_0]}{M + k_1[A]}$$

$$M = \frac{(k_2 + k_3)}{k_1}$$

$$r_R = [E_0] \cdot$$

$$M \gg k_1[A] \quad , \quad r_R = [A] \cdot$$

$$M \ll k_1[A] \quad , \quad r_R = [A] \cdot$$

가 가
(2.23).

2.2

2.2.1 Arrhenius

$$k = k_0 \exp\left(\frac{-E}{RT}\right)$$

2.2.2.

$$k = k_0' T^m \exp\left(\frac{-E}{RT}\right) \quad 0 \leq m \leq 1$$

m=0 : Arrhenius

m=0.5 :

m=1 :

$$T^m \exp\left(\frac{-E}{RT}\right)$$

Arrhenius

2.2.3 Arrhenius

(1) $\ln(k)$ vs $1/T$

(2) Slope is $-E/R$

: Benzene diazonium chloride

1

k	0.00043	0.00103	0.0180	0.00355	0.00717
T(K)	313.0	319.0	323.0	328.0	333.0

