

Cinética Química

13.6

a) ~~Rapidez~~ Rapidez de la desaparición de los reactivos:

$$V = -\frac{1}{2} \cdot \frac{\Delta[H_2]}{\Delta t} = -\frac{\Delta[O_2]}{\Delta t}$$

* Rapidez de la aparición de los productos

$$V = \frac{1}{2} \cdot \frac{\Delta[H_2O]}{\Delta t}$$

b) ~~Rapidez~~ Rapidez de la desaparición de los reactivos:

$$V = -\frac{1}{4} \cdot \frac{\Delta[NH_3]}{\Delta t} = -\frac{1}{5} \cdot \frac{\Delta[O_2]}{\Delta t}$$

* Rapidez de la aparición de los productos

$$V = \frac{1}{4} \cdot \frac{\Delta[NO]}{\Delta t} = \frac{1}{6} \cdot \frac{\Delta[H_2O]}{\Delta t}$$



$\cdot V_{H_2}^+ = 0,0247 \text{ M/s} = \frac{\Delta[H_2]}{\Delta t}$

a).

$$V_{NH_3} = \frac{1}{2} \frac{\Delta[NH_3]}{\Delta t} = +\frac{1}{3} \frac{\Delta[H_2]}{\Delta t}$$

$$\frac{1}{2} \frac{\Delta[NH_3]}{\Delta t} = -\frac{1}{3} \cdot \frac{0,0247}{1000} \cdot \frac{M}{s} = -0,004116 \text{ M/s}$$

$\cdot V_{N_2} = \frac{1}{2} \frac{\Delta[NH_3]}{\Delta t} = 0,0247 \text{ M/s} \rightarrow \frac{\Delta[NH_3]}{\Delta t} = -0,0493 \text{ M/s}$

b) $V_{N_2} = -\frac{1}{3} \frac{\Delta[N_2]}{\Delta t} = -\frac{1}{3} \frac{\Delta[H_2]}{\Delta t}$

$$\frac{\Delta[N_2]}{\Delta t} = -\frac{0,0247}{3} \cdot \frac{M/s}{1000} = 0,0247 \text{ M/s}$$

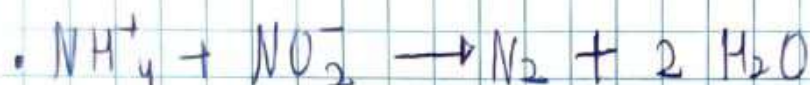
13.13) $V = K [NH_4^+] [NO_2^-]$. $K = 3,0 \cdot 10^{-4}$

• V

• $[NH_4^+] = 0,26 M$ $[NO_2^-] = 0,0080 M$

• $V = (3,0 \cdot 10^{-4}) (0,26) (0,0080)$

$V = 6,24 \cdot 10^{-6} M/s$



13.14)

• $[F_2] = 0,010 M$. $[ClO_2] = 0,020 M$

• $V = K [F_2] [ClO_2]$

$1,2 \cdot 10^{-3} = K (0,10) (0,010)$

$\frac{1,2}{1000} = K \cdot \frac{1}{10} \cdot \frac{1}{1000} \Rightarrow K = 1,2$

Usando los datos

• $V = (1,2) (0,010) (0,020) = 12 \cdot (1,0 \cdot 10^{-2}) (2,0 \cdot 10^{-2})$

$= 2,4 \cdot 10^{-4} M/s$

13.15) • $V_1 = K_1 [A]_1 [B]_1$

$3,20 \cdot 10^{-1} = K_1 (1,50) (1,50)$

• Orden rxn = 2

$\frac{3,2}{100} = K_1 \left(\frac{3}{2} \cdot \frac{3}{2} \right) \Rightarrow K_1 = \frac{128}{9 \cdot 100} \Rightarrow K_1 = 14,2$

$K_1 = 1,42 \cdot 10^{-1}$

• $V_2 = K_2 [A]_2 [B]_2$

$3,20 \cdot 10^{-1} = K_2 (1,50) (2,50) \Rightarrow \frac{3,2}{100} = K_2 \left(\frac{3}{2} \cdot \frac{5}{2} \right) \Rightarrow K_2 = \frac{128}{15 \cdot 100} \Rightarrow K_2 = 0,0853$

• Orden rxn = 2

$K_2 = 8,53 \cdot 10^{-2}$

$$V_3 = K_3 [A]_3 [B]_3$$

• Orden rxn = 2

$$6,44 \cdot 10^{-1} = K_3 (3,00) (1,50)$$

$$\frac{644}{100} = K_3 \left(3 \cdot \frac{3}{2}\right) \Rightarrow K_3 = \frac{32}{9,25} \Rightarrow K_3 = 0,149 \Rightarrow K_3 \leq 1,42 \cdot 10^{-1}$$

13.16 a) Orden de rxn = 2

$$b) [X] = 0,3 \quad [Y] = 0,4$$

$$* V = K [X] [Y]$$

$$0,053 = K \cdot (0,10) \cdot (0,50)$$

$$\frac{53}{1000} = K \cdot \frac{1}{10} \cdot \frac{5}{10} \Rightarrow K = 1,06$$

$$* V_r = (1,06) (0,3) (0,4) = 0,1272 = 1,272 \cdot 10^{-1}$$

13.17 a) Dos

c) Tres

b) Cero

d) Tres

$$13.18 \cdot V = 1,6 \cdot 10^{-2} \quad [A] = 0,35$$

$$A \rightarrow B \Rightarrow V = K[A]^0 = K$$

$$1,6 \cdot 10^{-2} = K [0,35]^0$$

$$K = 1,6 \cdot 10^{-2}$$

$$a) V = K[A]^2$$

$$1,6 \cdot 10^{-2} = K (0,35) \rightarrow K \cdot 35 = 160 \rightarrow K = 0,457 \rightarrow K = 4,57 \cdot 10^{-1}$$

$$b) V = K[A]^2$$

$$1,6 \cdot 10^{-2} = K (0,35)^2 \rightarrow K \left(\frac{7}{20}\right)^2 = \frac{16}{1000} \rightarrow K = 0,1306 \rightarrow K = 1,306 \cdot 10^{-1}$$