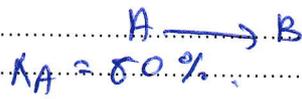


Exercice 3:



$-r_A = k \cdot c_A^{1/2} = r$

1) Le temps de séjour: R_T

Bilan:

$$d_A \cdot r \cdot V = \frac{d n_A}{dt}$$

$$\int_0^{t_s} dt = \int_{c_{A0}}^{c_A} \frac{d c_A}{-r} = \int_{c_{A0}}^{c_A} \frac{d c_A}{-k \cdot c_A^{1/2}}$$

$$t_s = \frac{2}{k} [c_A^{1/2} - c_{A0}^{1/2}]$$

$$t_s = \frac{2 \cdot 22}{k} [(1 - X_A)^{1/2} - 1]$$

calcul de $c_{A0} = \frac{P}{R_T} = \frac{r}{0,082 \cdot (215 + 273)} = 0,124 \frac{\text{mol}}{\text{l}}$

$$t_s = (0,124)^{1/2} \cdot \frac{22}{10^{-2}} [(1 - 0,8)^{1/2} - 1]$$

$$t_s = 38,93 \text{ s}$$

2) Le temps de Passage RAC

phase gazeuse.

Bilan

$$F_{Ae} + d_A \cdot P \cdot V_R = F_{As}$$

$$V_R = \frac{F_{As} - F_{Ae}}{d_A \cdot P}$$

on pose que $X_{As} = 0$
 $X_{As} = X_A$

$$V_R = \frac{F_{A0}(1 - X_A) - F_{A0}(1 - X_{Ae})}{d_A \cdot k \cdot c_{A0}^{1/2} \cdot (1 - X_A)^{1/2}}$$

$$V_R = \frac{Q_0 \cdot c_{A0}^{1/2} \cdot X_A}{k \cdot (1 - X_A)^{1/2}}$$

$$\tau = \frac{V_R}{Q_0} = \frac{c_{A0}^{1/2} \cdot X_A}{k \cdot (1 - X_A)^{1/2}}$$

$$= 62,9 \text{ s}$$

3) Le temps de passage RP

Bilan:

$$F_A + d_A \cdot r \cdot dV = F_A + dF_A \Rightarrow dV = \frac{dF_A}{-r}$$

$$\int_0^{V_R} dV = \frac{-F_{A0}}{-k} \int_0^{X_A} \frac{dX_A}{(1 - X_A)^{1/2}} \Rightarrow V_R = \frac{2 \cdot Q_0 \cdot c_{A0}}{k \cdot c_{A0}^{1/2}} ((1 - X_A)^{1/2} - 1)$$

$$\tau = \frac{V_R}{Q_0} = \frac{2 \cdot c_{A0}^{1/2}}{k} ((1 - X_A)^{1/2} - 1)$$

$$\Rightarrow \tau_{RP} = t_s$$