

EX 3:  $A \rightarrow B + C$ ,  $\varphi$  gaz, réaction d'ordre 0



$T = cte$   
 $P = cte$   
 Pas d'inerte

$$r = k c_A^0 = k$$

$$r = k$$

$$r = \frac{r_A}{\nu_A} \Rightarrow \nu_A = \nu_{AR} = -r$$

$$r_A = -r = -k$$

1- montrer que  $V = V_0(1 + X_A)$

usage

$$V = V_0 \beta (1 + \epsilon X_A)$$

$$V = V_0 \beta (1 + \epsilon X_A) \Rightarrow \epsilon_A X_A = \epsilon X_A$$

$$\Rightarrow \epsilon_A = \frac{\epsilon X_A}{X_A}$$

$$\beta = \frac{P_0 T}{P T_0} = 1 \text{ car } P = cte$$

$$T = cte$$

$$n_A = n_A - n_{Ox} \text{ car } n_j = n_{j0} + \nu_{Aj} n_{Ox}$$

$$n_A = n_{A0} - n_{A0} X_A \text{ car } n_j = n_{j0} + \frac{\nu_{Aj} X_A}{-\nu_A}$$

$$\Rightarrow n_{Ox} = n_{A0} X_A$$

$$\epsilon_A = \frac{\epsilon X_A}{X_A} = \epsilon = \frac{\Delta \alpha}{1 + I} = \Delta \alpha$$

$$\frac{X_A}{X_A} = \frac{n_{A0}}{n} = 1 \text{ car } n_{A0} = n_0$$

car A est pur

$$\epsilon_A = \epsilon = \Delta \alpha = 2 - 1 = +1$$

$$I = \frac{n_{I0}}{n_0} = 0 \text{ car pas d'inerte}$$

$$V = V_0 \beta (1 + \epsilon_A X_A) = V_0 \cdot 1 \cdot (1 + 1 \cdot X_A) = V_0 (1 + X_A) = V$$

2- Bilan de matière et  $X_A = f(C_{A0}, k, t)$

B.M.  $\frac{dn_A}{dt} = r_A V$

$$n_A = n_{A0} - n_{A0} X_A \Rightarrow \frac{dn_A}{dt} = -n_{A0} \frac{dX_A}{dt}$$

$$r_A \cdot V = -k \cdot V_0 (1 + X_A)$$

car  $r_A = -k$   
 et  $V = V_0 (1 + X_A)$

B.M.  $\frac{dn_A}{dt} = r_A \cdot V \Rightarrow -n_{A0} \frac{dX_A}{dt} = -k V_0 (1 + X_A)$

$$\frac{dX_A}{(1 + X_A)} = \frac{k V_0}{n_{A0}} dt \Rightarrow \int_0^{X_A} \frac{dX_A}{(1 + X_A)} = \frac{k}{C_{A0}} \int_0^t dt$$

$$\ln(1 + X_A) \Big|_0^{X_A} = \frac{k}{C_{A0}} \cdot t \Rightarrow \ln(1 + X_A) = \frac{k \cdot t}{C_{A0}}$$

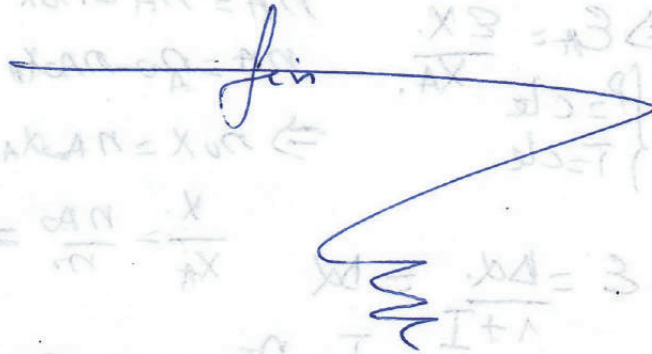
$$1 + X_A = \exp\left(\frac{k}{C_{A0}} t\right) \Rightarrow X_A = -1 + \exp\left(\frac{k}{C_{A0}} t\right)$$

3. de temps de la réaction pour que A disparaisse complètement (X) et pour  $k = 1.5 \text{ mol.l}^{-1}.s$ ,  $C_{A0} = 1.5 \text{ mol.l}^{-1}$ .

A disparaît totalement  $\Rightarrow X_A = 1 \equiv 100\%$  (Conversion total)

$$\Rightarrow \ln(1 + X_A) = \frac{k}{C_{A0}} \cdot t \Rightarrow t = \frac{C_{A0}}{k} \ln(1 + X_A) = \frac{1.5}{1.5} \ln(2) = \ln 2$$

$$t = 0,693 \text{ s}$$



$$V = (X + 1) C_{A0} = (X + 1) C_{A0} = (X + 1) C_{A0}$$

$$\frac{X B}{C_{A0}} = \frac{A B}{C_{A0}} \Rightarrow \frac{X B}{C_{A0}} = \frac{A B}{C_{A0}}$$

$$(X + 1) C_{A0} \cdot \frac{d}{C_{A0}} = V \cdot A$$

$$(X + 1) C_{A0} \cdot \frac{d}{C_{A0}} = \frac{X B}{C_{A0}} \Rightarrow (X + 1) C_{A0} \cdot \frac{d}{C_{A0}} = \frac{X B}{C_{A0}}$$

$$\frac{d}{C_{A0}} = \frac{X B}{(X + 1) C_{A0}^2} \Rightarrow \frac{d}{C_{A0}} = \frac{X B}{(X + 1) C_{A0}^2}$$

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$$\left( \frac{d}{C_{A0}} \right) \Rightarrow \left( \frac{d}{C_{A0}} \right) \Rightarrow \left( \frac{d}{C_{A0}} \right)$$