Tableau d'avancement:

$$S_2O_8^{2-} + 2I^- \xrightarrow{\text{totale}} I_2 + 2SO_4^{2-}$$

$t=0$	$0,2$	$0,3$	0	0
$t>0$	$0,2-x$	$0,3-2x$	x	$2x$
t_f	$0,2-x_f$	$0,3-2x_f$	x_f	$2x_f$

Réactif limitant et x_{max}:

$0,2 - x_1 = 0 \longrightarrow x_1 = 0,2$ mol.

$0,3 - 2x_2 = 0 \longrightarrow x_2 = 0,15$ mol.

$x_2 < x_1$: I^- : réactif limitant

et $\boxed{x_{max} = 0,15 \text{ mol}}$

R° totale $x_f = x_{max} = 0,15$ mol.

Composition de mélange à t_f.

$n(S_2O_8^{2-}) = 0,05$ mol.

$n(I^-) = 0$ mol

$n(I_2) = 0,15$ mol

$n(SO_4^{2-}) = 0,3$ mol.

Avancement d'une réaction:

nombre de fois que la réaction a marché depuis son état initial

$$C = \frac{n}{V} \longrightarrow \boxed{n = C \cdot V.}$$

$$\hookrightarrow \boxed{x = y \cdot V_{totale}}$$

Taux d'avancement final:

$$\boxed{\tau_f = \frac{x_f}{x_{max}.}}$$

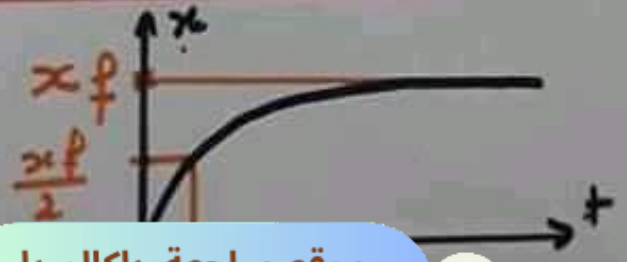
R° totale : $\tau_f = 1.$ $(x_f = x_{max})$

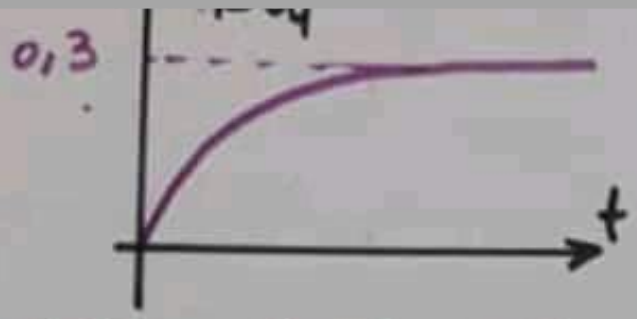
R° limitée : $\tau_f < 1.$ $(x_f < x_{max}).$

Temps de demi-réaction

$t = t_{1/2}$

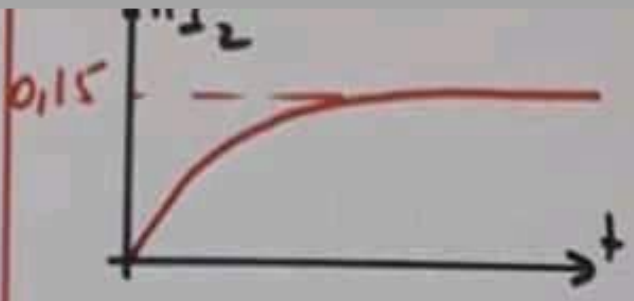
$x = \frac{x_f}{2}.$



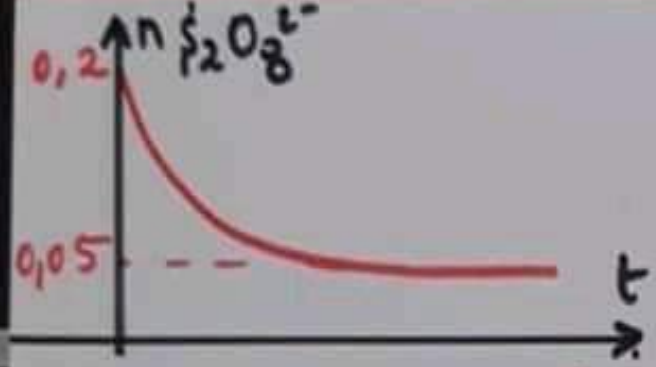


$n_{SO_4^{2-}}/f = 2x_f = 0,3$

$x_f = 0,15 mol$



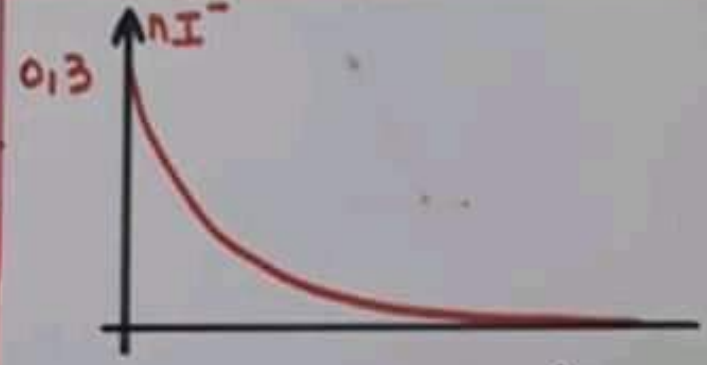
$n_{I_2}/f = x_f = 0,15 mol.$



$n_{S_2O_8^{2-}}/f = 0,2 - x_f$

$= 0,05 mol$

$x_f = 0,15 mol.$



$n_{I^-}/f = 0,3 - 2x_f = 0$

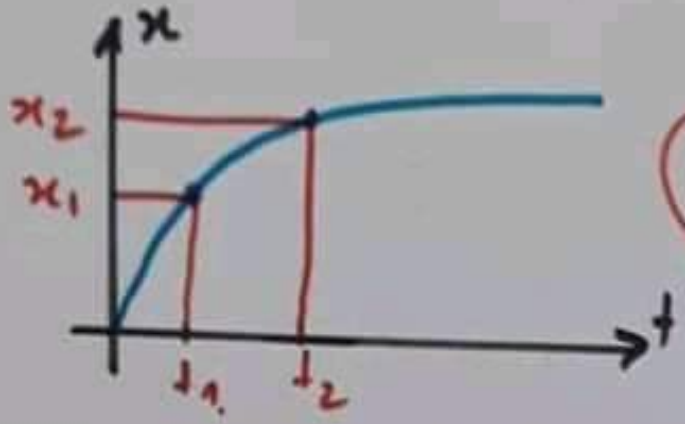
$0,3 = 2x_f$

$x_f = 0,15 mol$

Vitesse d'une réaction chimique:

1 - Vitesse moyenne: entre t_1 = .. min et t_2 = ... min.

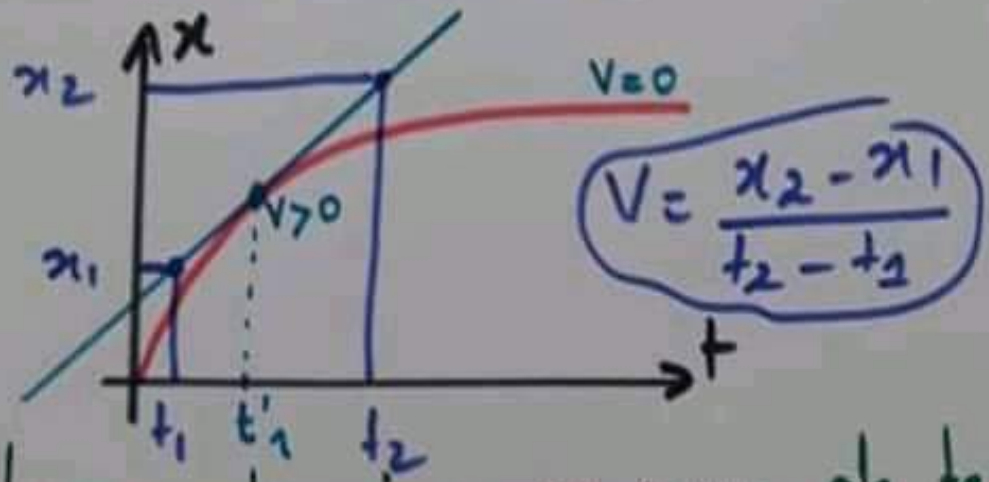
$$V_{moy} = \frac{\Delta x}{\Delta t}$$



$$V = \frac{x_2 - x_1}{t_2 - t_1}$$

2 - Vitesse instantanée : a l'instant t'_1...

$$V = \frac{dx}{dt} = \text{pente de Patg.}$$

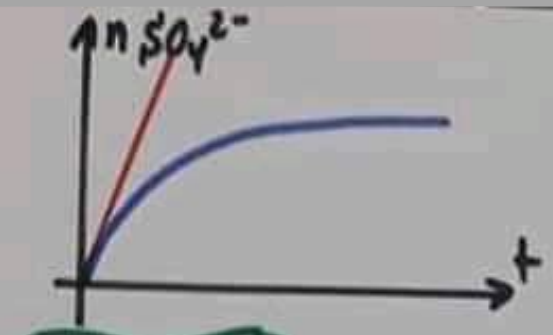


$$V = \frac{x_2 - x_1}{t_2 - t_1}$$

. La vitesse diminue au cours de temps

. facteur : ↓ concentration des réactifs.

La vitesse est maximale à $t = 0$.



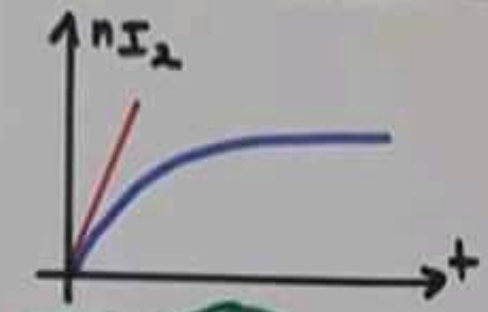
$$V = \frac{dx}{dt}$$

• $t>0 : n_{SO_4^{2-}} = 2x$

$$x = \frac{1}{2} \cdot n_{SO_4^{2-}}$$

$$V = \frac{1}{2} \frac{dn_{SO_4^{2-}}}{dt}$$

$= \frac{1}{2}$. pente de tg.

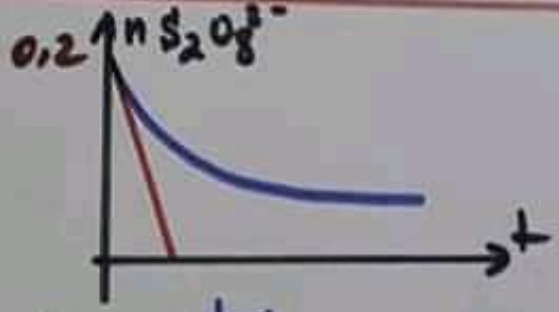


$$V = \frac{dx}{dt}$$

$t>0 : n_{I_2} = x$.

$$V = \frac{dn_{I_2}}{dt}$$

= pente de tg.



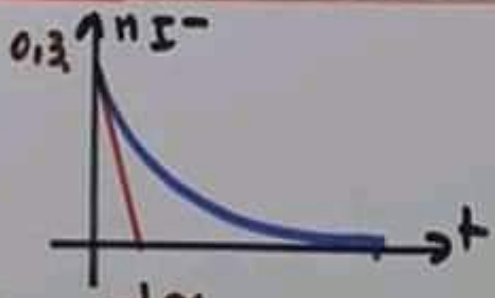
$$V = \frac{dx}{dt}.$$

$t>0 : n_{S_2O_8^{2-}} = 0,2 - x$

$$x = 0,2 - n_{S_2O_8^{2-}}$$

$$V = -\frac{dn_{S_2O_8^{2-}}}{dt}$$

= − pente de tg.



$$V = \frac{dx}{dt}.$$

$t>0 : n_{I^-} = 0,3 - 2x$.

$$x = 0,15 - \frac{1}{2} n_{I^-}$$

$$V = -\frac{1}{2} \frac{dn_{I^-}}{dt}$$

$= -\frac{1}{2}$. pente de tg.

Remarque

$$C = \frac{n}{V}$$

$$n = C \cdot V$$

$$x = y \cdot V_{tot}$$

$$\frac{dx}{dt} = \frac{dy}{dt} \cdot V_{tot}$$

$$V_{inst} = V_{vol} \cdot V_{tot}$$

V_{inst} : x ; n

V_{vol} : vitesse volumique

V_{tot} : volume totale

y : $[\ ]$.

Tableau d'avancement volumique:

$KI \begin{cases} C_1 \\ V_1 \end{cases}$ $\quad [I^-] = C'_1 = \dfrac{C_1 \cdot V_1}{V_1 + V_2}$.

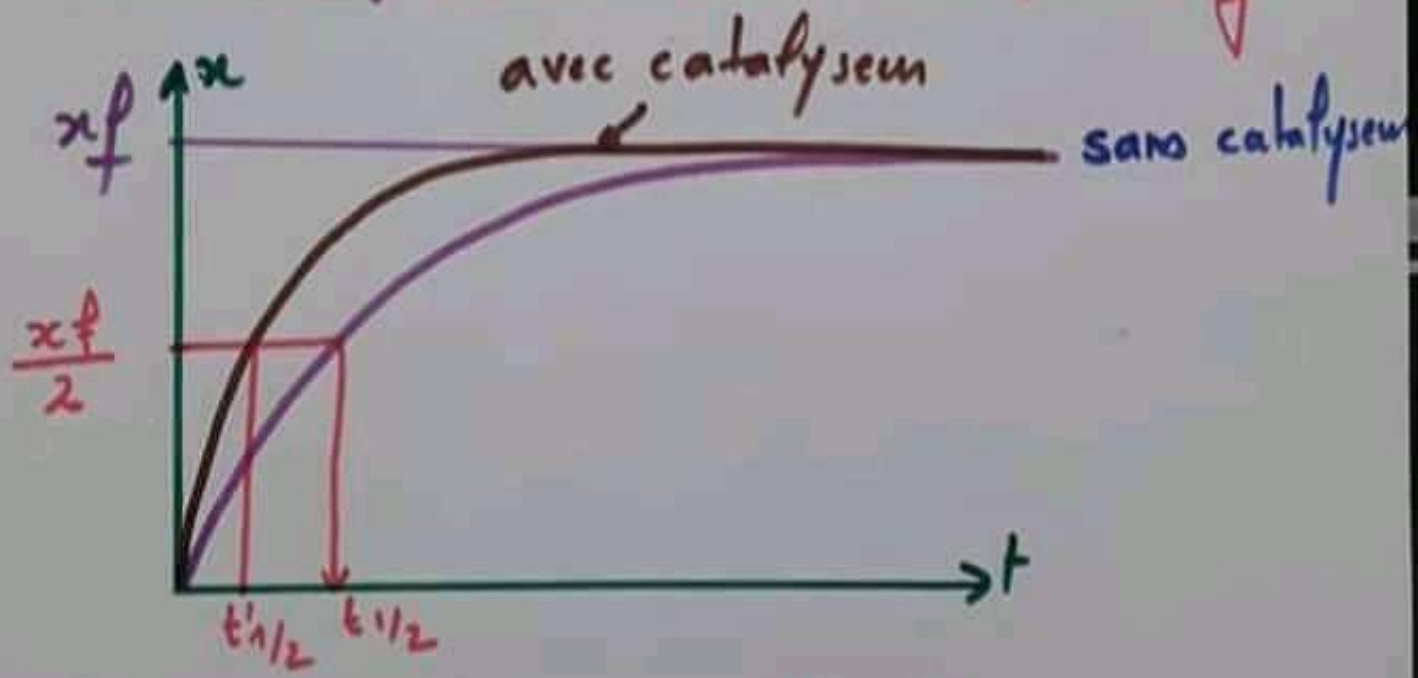
$K_2S_2O_8 \begin{cases} C_2 \\ V_2 \end{cases}$ $\quad [S_2O_8^{2-}] = C'_2 = \dfrac{C_2 \cdot V_2}{V_1 + V_2}$.

$$S_2O_8^{2-} + 2I^- \longrightarrow I_2 + 2SO_4^{2-}$$

$t=0$	C'_2	C'_1	0	0
$t>0$	$C'_2 - x$	$C'_1 - 2x$	x	$2x$
t_f	$C'_2 - x_f$	$C'_1 - 2x_f$	x_f	$2x_f$

Les facteurs cinétiques:

- Catalyseur.
- Température.
- Concentration des réactifs



. La vitesse ↑ et $t_{1/2}$ ↓.

Equation de dosage.

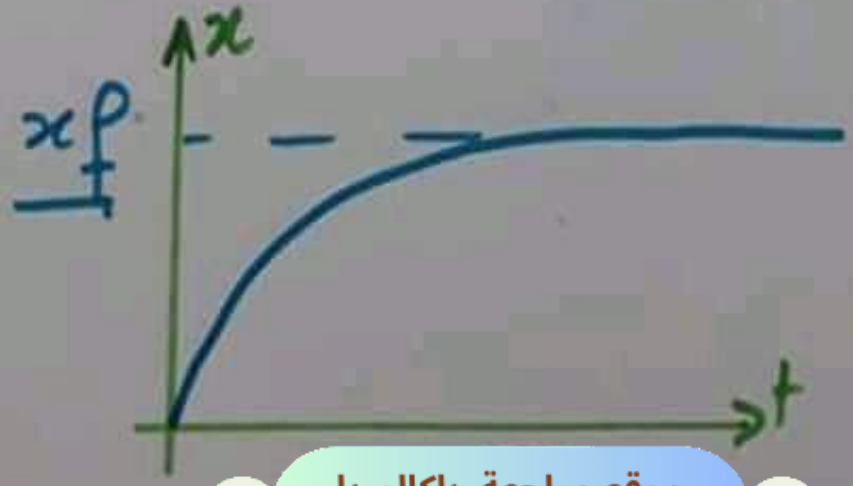
$$I_2 + 2\,S_2O_3^{2-} \xrightarrow[\text{rapide}]{\text{totale}} 2\,I^- + S_4O_6^{2-}$$

Equivalence d'oxydo-réduction:

$$\frac{n(I_2)}{1} = \frac{n_{S_2O_3^{2-}}}{2}.$$

$$n(I_2) = \frac{C \cdot V_E}{2}.$$

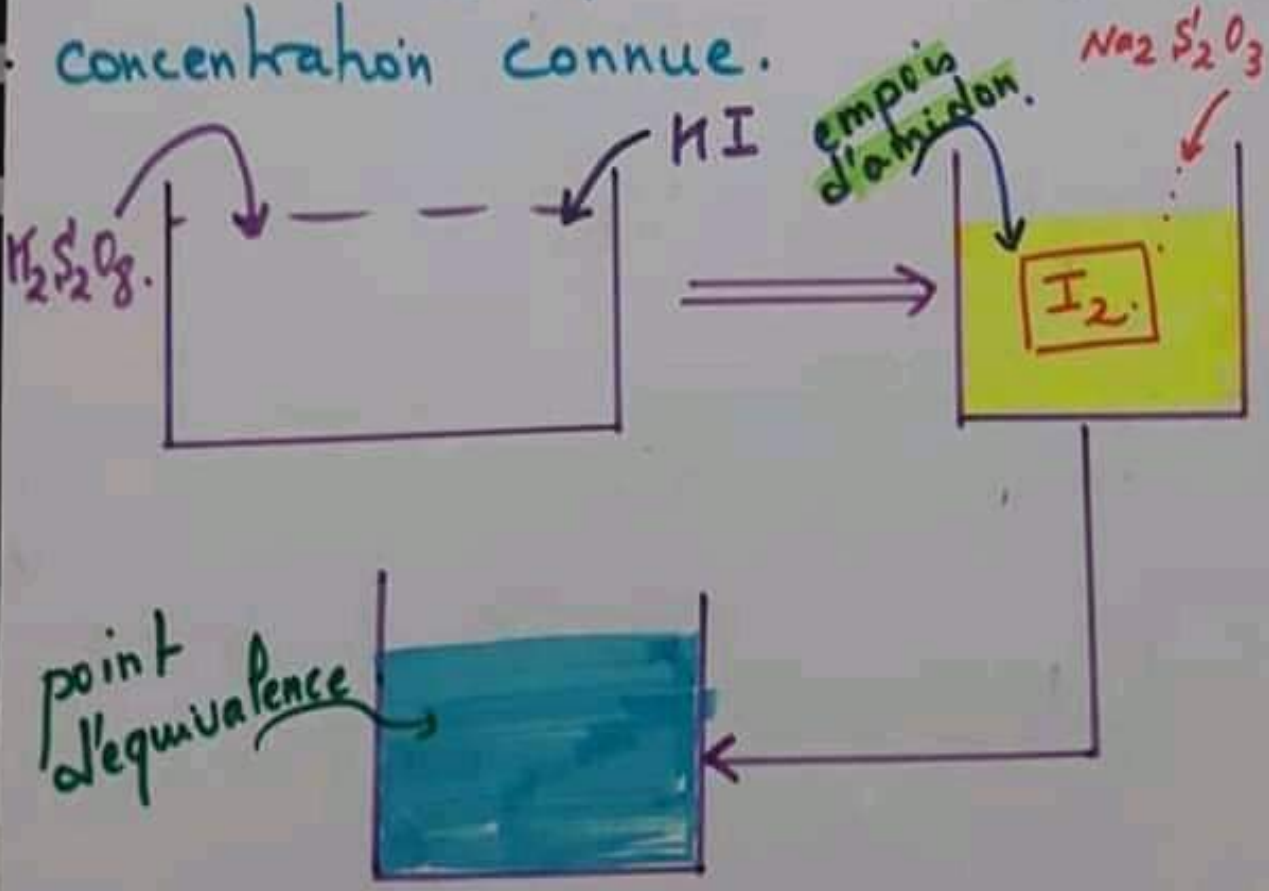
$$\longrightarrow \boxed{x = \frac{C \cdot V_E}{2}.}$$



$$S_2O_8^{2-} + 2I^- \longrightarrow I_2 + 2SO_4^{2-}$$

$t=0$	n_{o1}	n_{o2}	0	0
$t>0$	$n_{o1}-x$	$n_{o2}-2x$	x	$2x$
t_f	$n_{o2}-x_f$	$n_{o3}-2x_f$	x_f	$2x_f$

Dosage de I_2 formé par une solution de $Na_2S_2O_3$ ($2Na^+$, $S_2O_3^{2-}$) de concentration connue.



$V_{S_2O_3^{2-}} =$