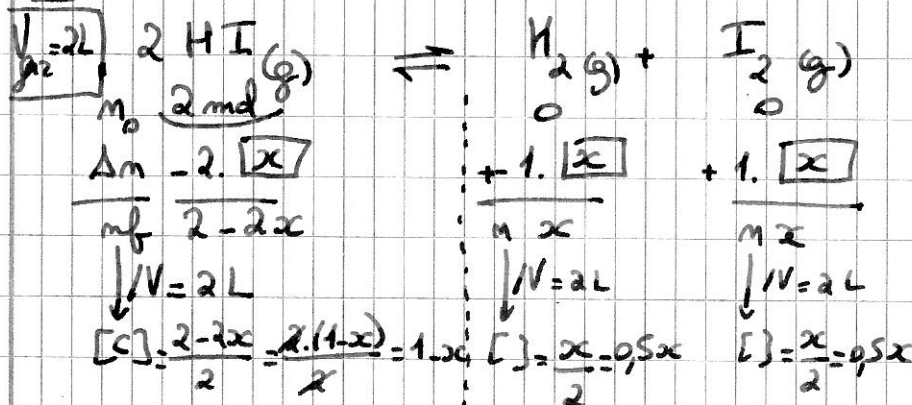


Partie c. exercices chap 7 Equilibre chimique A quantité
 du K_c vers les concentrations à l'équilibre

1) 460°C



1 seule info
 pas suffisant,
 on ne sait pas
 jusqu'où va la
 réaction: INCONNUE
 x

$$K_c = \frac{[H_2] \cdot [I_2]}{[HI]^2} = \frac{0,5x \cdot 0,5x}{(1-x)^2} = \frac{(0,5x)^2}{(1-x)^2}$$

DONC Partir du $K_c = 0,02$
 2^e info

$$K_c = \frac{(0,5x)^2}{(1-x)^2}$$

on prend la racine carrée de chaque côté

$$\sqrt{K_c} = \frac{0,5x}{1-x}$$

on bascule de dénominateur

$$\sqrt{K_c} (1-x) = 0,5x$$

on distribue le K_c

$$\sqrt{K_c} - \sqrt{K_c} \cdot x = 0,5x$$

on rassemble les x

$$\sqrt{K_c} = 0,5x + \sqrt{K_c} \cdot x$$

on met en évidence

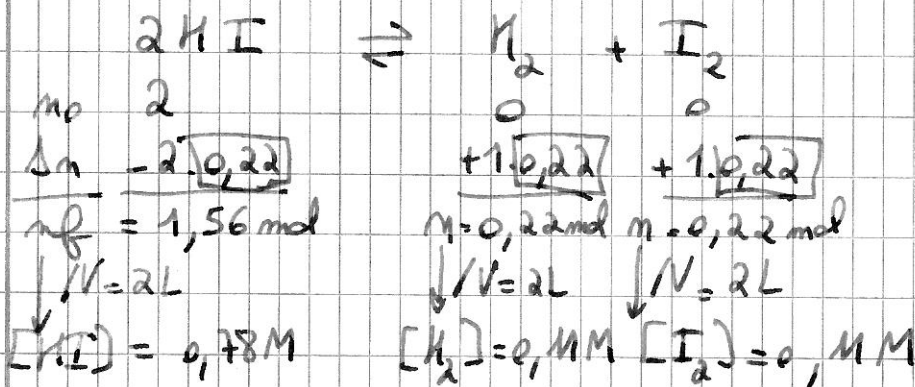
$$\sqrt{K_c} = (0,5 + \sqrt{K_c}) x$$

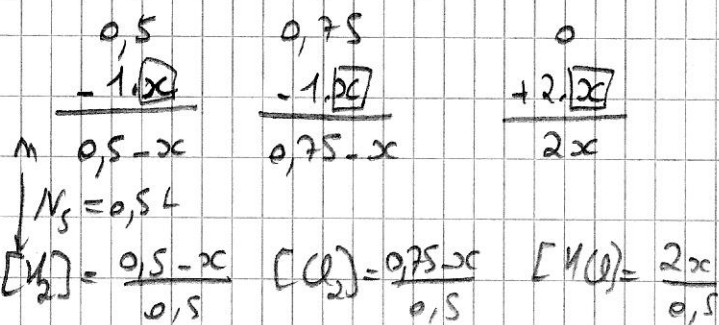
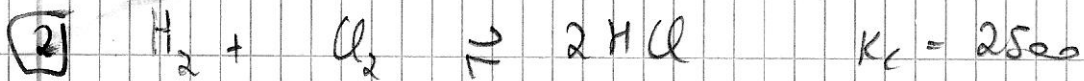
on bascule au dénominateur

on calcule

$$\frac{\sqrt{K_c}}{(0,5 + \sqrt{K_c})} = x = \frac{0,14}{(0,5 + 0,14)} = 0,22$$

on introduit cette information
 dans le problème stoechio





$$K_c = \frac{[\text{HCl}]^2}{[\text{H}_2][\text{Cl}_2]} = \frac{\left(\frac{2x}{0,5}\right)^2}{\left(\frac{0,5-x}{0,5}\right)\left(\frac{0,75-x}{0,5}\right)} = \frac{4x^2}{\left(\frac{1}{2}-x\right)\left(\frac{3}{4}-x\right)}$$

$$= \frac{4x^2}{\frac{3}{8} - \frac{3}{4}x - \frac{1}{2}x + x^2} = \frac{4x^2}{x^2 - \frac{5}{4}x + \frac{3}{8}}$$

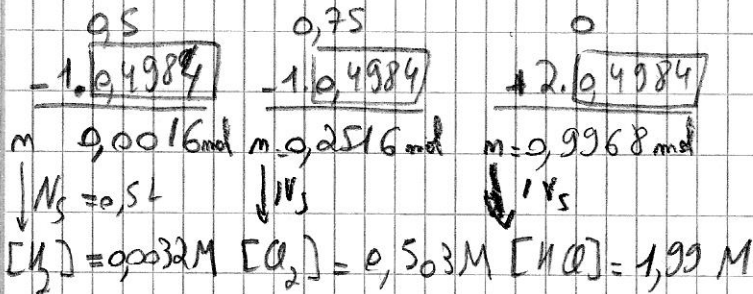
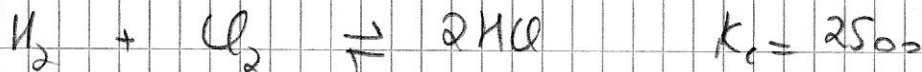
$$\left(x^2 - \frac{5}{4}x + \frac{3}{8}\right) \cdot 2500 = 4x^2$$

$$2496x^2 - 3125x + 937,5 = 0$$

$$p = b^2 - 4ac = (-3125)^2 - 4 \cdot 2496 \cdot 937,5 = 405625$$

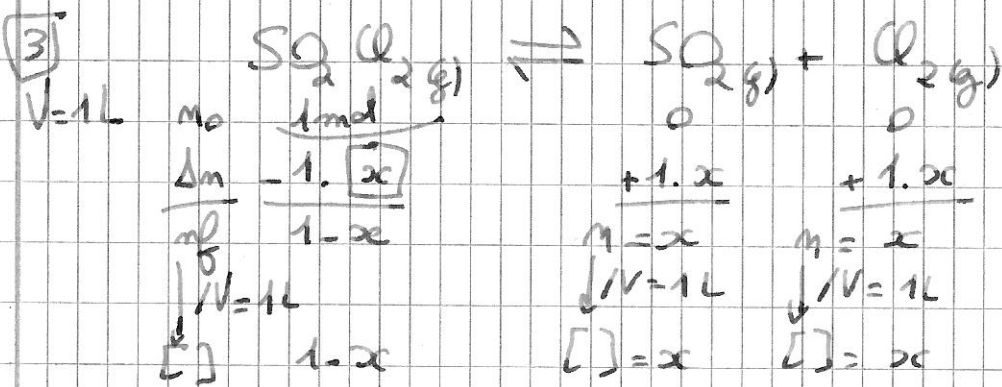
$$x_{1,2} = \frac{+3125 \pm \sqrt{405625}}{2 \cdot 2496} = 0,75 \text{ rejek' can } > \text{ gravitir d'pan}$$

$$= 0,4989$$



5^e p76

3



1 seule info

$$K_c = \frac{[\text{SO}_2] \cdot [\text{O}_2]}{[\text{SO}_2(\text{O}_2)]} = \frac{x \cdot x}{1-x}$$

on utilise
 $K_c = 1$

$$K_c = \frac{x^2}{1-x}$$

$$K_c(1-x) = x^2$$

$$K_c - K_c x = x^2$$

$$1 - x = x^2$$

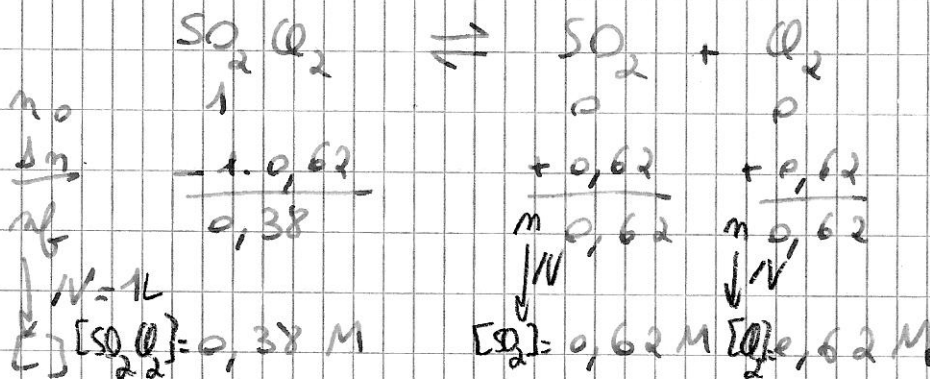
$$x^2 + x - 1 = 0$$

$$\Delta = b^2 - 4a \cdot c = 1^2 - 4 \cdot 1 \cdot (-1)$$

$$= +5$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-1 \pm \sqrt{5}}{2} = 0,62$$

~~-1,62~~

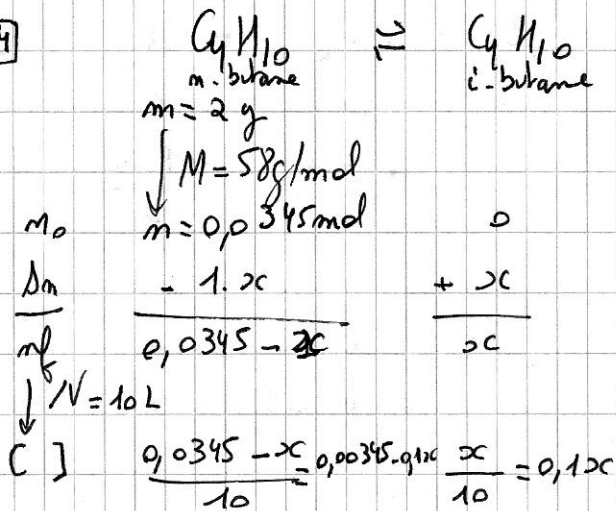


$$[\text{SO}_2] = 0,38 \text{ M}$$

$$[\text{O}_2] = 0,62 \text{ M}$$

$$[\text{O}_2] = 0,62 \text{ M}$$

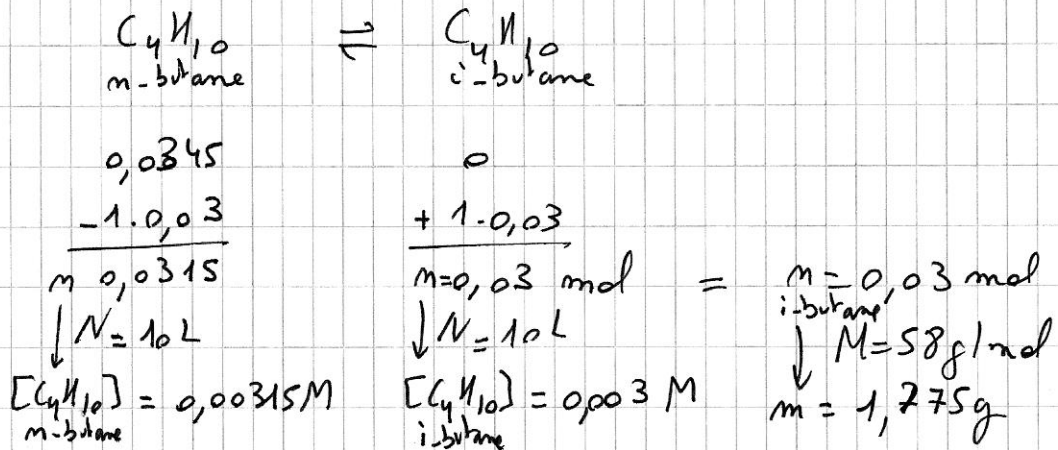
5^e 7^e 4

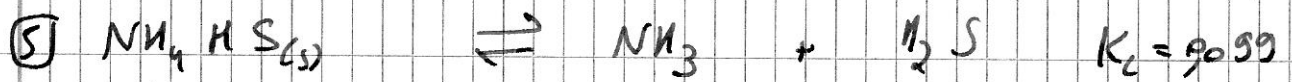


$$K_c = 7,94 \quad K_c = \frac{[\text{i-but}]}{[\text{m-but}]} = \frac{0,12x}{0,00345 - 0,12x}$$

$$0,00345 \cdot K_c - 0,1K_c \cdot x = 0,12x \rightarrow$$

$$\begin{aligned}
 0,00345 K_c &= 0,12x + 0,1K_c x \\
 (0,1 + 0,1K_c) x &= 0,00345 K_c \\
 x &= \frac{0,00345 K_c}{(0,1 + 0,1K_c)} = 0,03
 \end{aligned}$$





$$m = 100 \text{ g}$$

↓ M

m_0

$$\frac{\Delta m}{m_0} = 1 \cdot x$$

↓

$V_0 = 5 \text{ L}$
 $[]$ pas de conc.

solide

0

$$+ 1 \cdot x$$

m = x

$$V = 5 \text{ L}$$

$$[\text{NH}_3] = \frac{x}{5}$$

0

$$+ \frac{1 \cdot x}{2}$$

m = x

$$V = 5 \text{ L}$$

$$[\text{H}_2\text{S}] = \frac{x}{5}$$

$$K_c = [\text{NH}_3] \cdot [\text{H}_2\text{S}] = \left(\frac{x}{5}\right)^2 = \frac{x^2}{25}$$

$$x = \sqrt{25K_c} = \sqrt{25 \cdot 9099} = 47,5732$$



$$m = 100 \text{ g}$$

$$M = 51 \text{ g/mol}$$

$$n = 1,9608 \text{ mol}$$

$$- 1 \cdot 1,5732$$

$$\hline 0,3876$$

solide

0

$$+ 1 \cdot 1,5732$$

$$n = 1,5732 \text{ mol}$$

$$V = 5 \text{ L}$$

$$[\text{NH}_3] = 0,31464 \text{ M}$$

0

$$+ \frac{1 \cdot 1,5732}{2}$$

$$n = 0,7866 \text{ mol}$$

$$V = 5 \text{ L}$$

$$[\text{H}_2\text{S}] = 0,15732 \text{ M}$$

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V = 8L



V = 8L

C

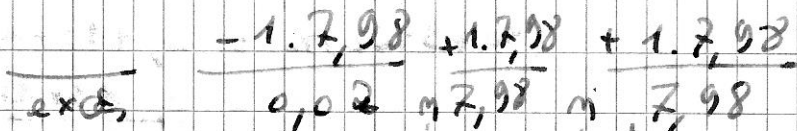
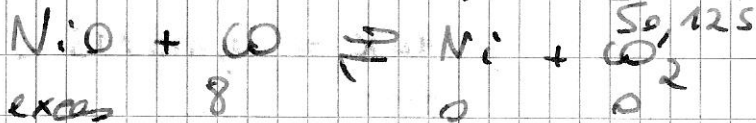


$$K_c = \frac{[\text{NiCO}_2]}{[\text{CO}]} = \frac{0,125x}{(1-0,125x)} = 400$$

$$0,125x = 400 - 50x$$

$$50,125x = 400$$

$$x = \frac{400}{50,125} = 7,98$$



$M_{\text{Ni}} = 59$
 $m = 470,25 \text{ g}$
 $V = 8L$
 $[\text{CO}_2] = 0,9975 \text{ M}$

7



$$C = 0,00133 M$$

$$V_s = 0,025 L$$

$$m = 3,325 \cdot 10^{-5} mol$$

$$m \begin{array}{r} - 1 \cdot x \\ \hline 3,325 \cdot 10^{-5} - x \end{array}$$

$$\begin{array}{r} 0 \\ + x \\ \hline m \cdot x \end{array}$$

$$V_s = 0,025 L$$

$$V_s = 0,025 L$$

Si 50 mL
0,05 L

$$[I_2]_{aq} = \frac{3,325 \cdot 10^{-5} - x}{0,025} = 1,33 \cdot 10^{-3} - 40x$$

$$[I_2]_{oy} = \frac{x}{0,025} = 40x \quad 20x$$

$$K_c = \frac{[I_2]_{oy}}{[I_2]_{aq}} = \frac{40x}{1,33 \cdot 10^{-3} - 40x} = 85,5$$

$$\frac{40x}{20x} = 0,113715 - 3420x$$

$$(40 + 3420)x = 0,113715$$

$$x = \frac{0,113715}{3460} = 3,28656 \cdot 10^{-5}$$



$$m = 3,325 \cdot 10^{-5}$$

$$- 1 \cdot 3,28656 \cdot 10^{-5}$$

$$m \begin{array}{r} \hline 3,844 \cdot 10^{-7} \end{array}$$

$$0$$

$$+ 1 \cdot 3,28656 \cdot 10^{-5}$$

$$\hline 3,28656 \cdot 10^{-5}$$

$$V_s = 0,025 L$$

$$0,025 L$$

$$[I_2] = 1,5376 \cdot 10^{-5} M$$

$$1,3446 \cdot 10^{-3} M$$

$$K_c = \frac{[I_2]_{oy}}{[I_2]_{aq}} = 85,5 \quad \checkmark$$

≠ si 50 mL