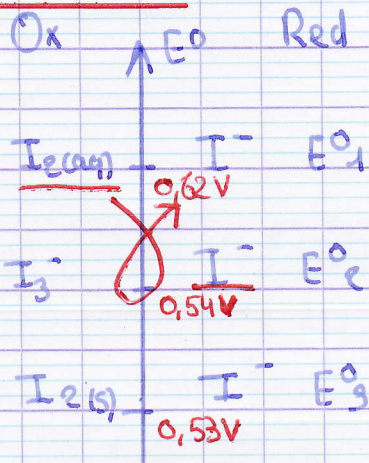
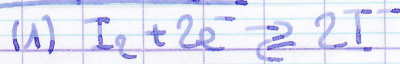


ExSA16 - 19.

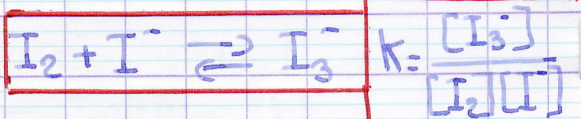
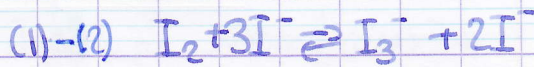
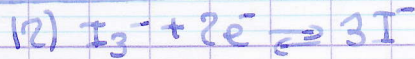
10)



Compte I_2/I^-



Compte I_3^-/I^- :



Pour trouver K : On se place à l'équilibre thermodynamique alors le potentiel en solution est tel que :

$$E = E_1 = E_2 = E(I_2/I^-) = E(I_3^-/I^-)$$

$$\rightarrow E_1^0 + \frac{0,06}{2} \log \frac{[I_2]}{[I^-]^2} = E_2^0 + \frac{0,06}{2} \log \frac{[I_3^-]}{[I^-]^3}$$

$$E_1^0 - E_2^0 = \frac{0,06}{2} \log \left(\frac{[I_3^-]}{[I^-]} \frac{[I^-]^2}{[I_2]} \right) = \frac{0,06}{2} \log K$$

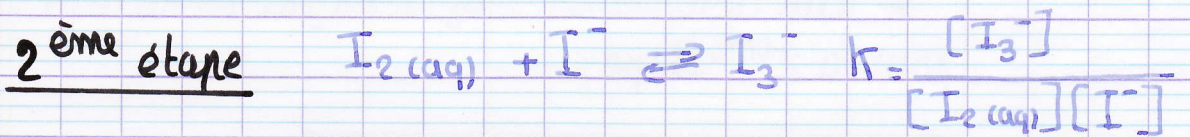
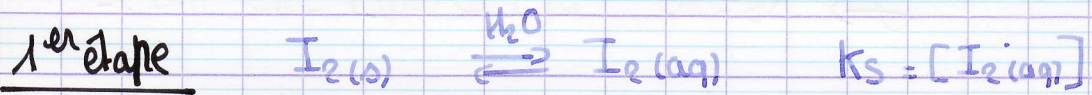
$$\text{d'où } \log K = \frac{2}{0,06} (E_1^0 - E_2^0) = 2,7$$

$$\log K = \frac{E_1^0 - E_2^0}{0,03} = \frac{0,62 - 0,54}{0,03} = 2,7$$

$$\rightarrow K = 10^{\log K} = 464$$

Suite EXSA4-19

20) Calcul de la solubilité du diiode dans une solution de KI à $0,2 \text{ mol} \cdot \text{L}^{-1}$



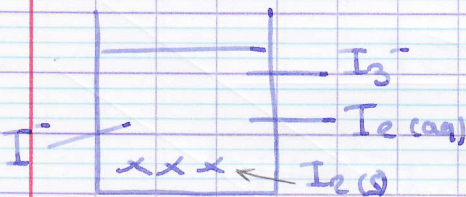
Conclusion la solubilité du diiode est vt

$s = [\text{I}_2(\text{aq})] + [\text{I}_3^-]$ (conservation de la matière)

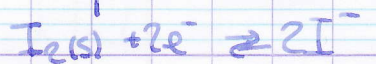
Tant que la solution est saturée en $\text{I}_2(\text{s})$:

$[\text{I}_2(\text{aq})] = s_0 = K_S$

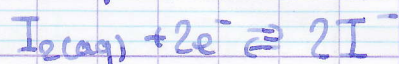
dans la solution saturée (en $\text{I}_2(\text{s})$)



$E_{\text{ox}} = E(\text{I}_2(\text{s})/\text{I}^-) = E_3 = E_3^0 + \frac{0,06}{2} \log \frac{1}{[\text{I}^-]^2}$



$E_{\text{red}} = E(\text{I}_2(\text{aq})/\text{I}^-) = E_1 = E_1^0 + \frac{0,06}{2} \log \frac{s_0}{[\text{I}^-]^2}$



$\rightarrow E_3^0 - E_1^0 = \frac{0,06}{2} \log s_0$

$$\log K_S = \log \alpha = \frac{2}{0,05} (E_3^0 - E_1^0) = -3$$

$$K_S = \alpha = 10^{\frac{E_3^0 - E_1^0}{0,05}} \approx 10^{-3} \text{ mol.L}^{-1}$$

$$\rightarrow K_S = 10^{-3} \text{ et } [I_2(\text{aq})] = 10^{-3} \text{ mol.L}^{-1}$$

* Pour déterminer $[I_3^-]$ on fait un tableau d'avancement pour la 2^{ème} étape :

(mol.L ⁻¹)	$I_2(\text{aq})$	$+ I^-$	\rightleftharpoons	I_3^-
t_i	0,2	0,2		0
$t_f = t_{\text{eq}}$	0,0	0,2 - α		α

$$K = \frac{[I_3^-]}{[I_2(\text{aq})][I^-]} = \frac{\alpha}{0,2(0,2 - \alpha)}$$

$$\rightarrow K \cdot 0,2(0,2 - \alpha) = \alpha$$

$$\alpha(1 + K \cdot 0,2) = K \cdot 0,2 \cdot 0,2$$

$$\alpha = \frac{K \cdot 0,2 \cdot 0,2}{1 + K \cdot 0,2} = 6,3 \cdot 10^{-2} \text{ mol.L}^{-1}$$

$$\rightarrow \Delta = [I_2(\text{aq})] + [I_3^-] = 6,4 \times 10^{-2} \text{ mol.L}^{-1}$$

$$10^{-3}$$

$$6,3 \cdot 10^{-2}$$

Remarque : $\Delta H_2O \text{ pur} = 10^{-3} \text{ mol.L}^{-1}$, $\Delta KI = 64 \Delta H_2O \text{ pure!!}$

La solution d'acrosodure augmente fortement la solubilité du diiode solide.