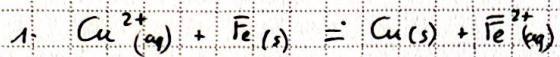
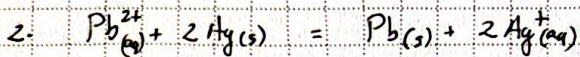


7. Equilibres d'oxydoréduction - Corrigé.

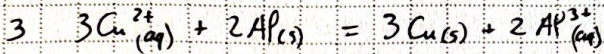
Exercice 1



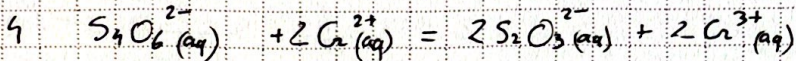
$$K = 10^{\frac{2}{0,06} (0,34 - (-0,44))} = 10^{26} > 1 \Rightarrow \text{sens spontané} = \text{sens direct.}$$



$$K = 10^{\frac{2}{0,06} (-0,13 - 0,80)} = 10^{-31} < 1 \Rightarrow \text{sens spontané} = \text{sens indirect}$$



$$K = 10^{\frac{6}{0,06} (0,34 - -1,66)} = 10^{200} > 1 \Rightarrow \text{sens spontané} = \text{sens direct.}$$



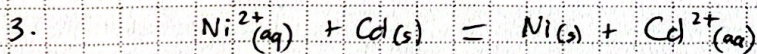
$$K = 10^{\frac{2}{0,06} (0,08 - -0,42)} = 4,6 \times 10^{16} > 1 \Rightarrow \text{sens spontané} = \text{sens direct.}$$

Exercice 2

1. $E_{\text{Cd}^{2+}/\text{Cd}} = E_{\text{Cd}^{2+}/\text{Cd}}^{\circ} + \frac{0,06}{2} \log([\text{Cd}^{2+}]) = -0,40 + 0,03 \times \log(0,10) = -0,43 \text{ V}$

$$E_{\text{Ni}^{2+}/\text{Ni}} = E_{\text{Ni}^{2+}/\text{Ni}}^{\circ} + \frac{0,06}{2} \log([\text{Ni}^{2+}]) = -0,26 + 0,03 \times \log(0,10) = -0,29 \text{ V}$$

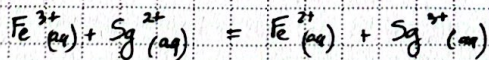
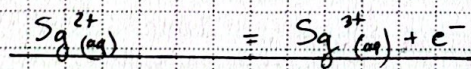
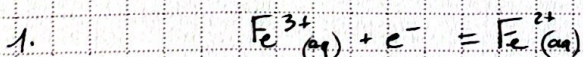
2. $E_{\text{Ni}^{2+}/\text{Ni}} > E_{\text{Cd}^{2+}/\text{Cd}} \Rightarrow K < 1 \Rightarrow \text{évolution spontanée sens indirect}$



$$K = 10^{\frac{2}{0,06} (-0,26 - -0,40)} = 4,6 \times 10^4$$

4. $Q_{\text{r},i} = \frac{[\text{Cd}^{2+}]_i}{[\text{Ni}^{2+}]_i} = 1 < K \Rightarrow \text{évol}^{\circ} \text{ direct} \Rightarrow \text{ok}$

Exercice 3

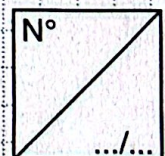


2. $K = 10^{\frac{1}{0,06} (0,77 - 0,734)} = 4,0$

3. on fait une dilution par 4 $\Rightarrow [\text{Fe}^{3+}] = [\text{Fe}^{2+}] = [\text{Sg}^{3+}] = [\text{Sg}^{2+}] = 0,1 \text{ mol.L}^{-1}$

4. $Q_{\text{r},i} = \frac{[\text{Fe}^{2+}][\text{Sg}^{3+}]}{[\text{Fe}^{3+}][\text{Sg}^{2+}]} = 1$

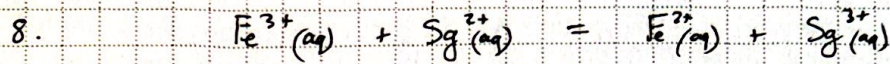
5. $Q_{\text{r},i} < K \Rightarrow \text{sens évolution} = \text{sens direct.}$



$$6. E_{\text{Sg}} = E_{\text{Sg}}^{\circ} + 0,06 \log(1) = E_{\text{Sg}}^{\circ} = 0,734 \text{ V}$$

$$E_{\text{Fe}} = 0,77 \text{ V}$$

$$7. Q_n = K = 4,0$$



$$0,1 \quad 0,1 \quad 0,1 \quad 0,1$$

$$0,1-x \quad 0,1-x \quad 0,1+x \quad 0,1+x$$

$$0,067 \quad 0,067 \quad 0,133 \quad 0,133$$

$$K = 4,0 = \frac{(0,1+x)^2}{(0,1-x)^2} \Rightarrow x = 0,033 \text{ mol}$$

$$\text{ou } x = 0,3 \text{ mol } \times$$

$$9. \left. \begin{aligned} E_{\text{Sg}} &= E_{\text{Sg}}^{\circ} + 0,06 \log\left(\frac{0,133}{0,067}\right) = 0,752 \text{ V} \\ E_{\text{Fe}} &= E_{\text{Fe}}^{\circ} + 0,06 \log\left(\frac{0,067}{0,133}\right) = 0,752 \text{ V} \end{aligned} \right\} \text{potentiels \u00e9gaux}$$

10. Les 2 couples ont le m\u00eame potentiel $\rightarrow$ on parle de potentiel unique

ne rien
\u00e9crire
dans

la
partie
barr\u00e9e

