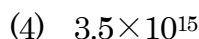
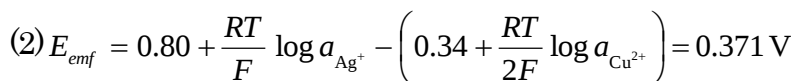
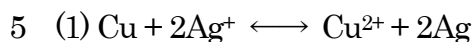
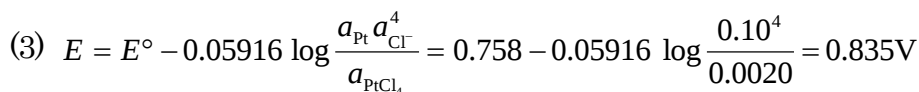
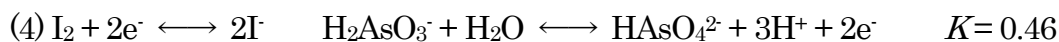
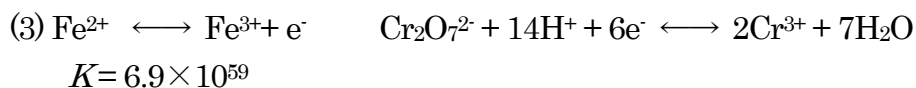
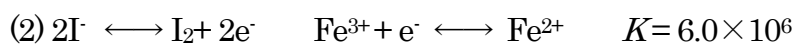
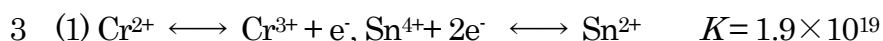
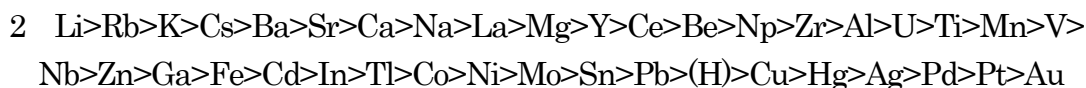
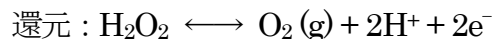
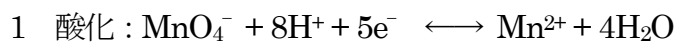
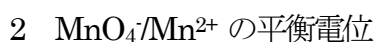
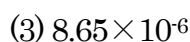
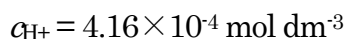
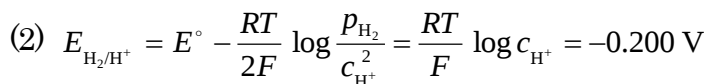
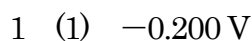


第 11 章

基本問題



発展問題



$$E = 1.51 - \frac{0.05916}{5} \log \left(\frac{a_{\text{MnO}_4^-}}{a_{\text{Mn}^{2+}}} \right) - 0.05916 \times \frac{8}{5} \text{pH}$$

Cl_2/Cl^- の平衡電位

$$E = 1.36 - \frac{0.05916}{2} \log \left(\frac{a_{\text{Cl}^-}^2}{a_{\text{Cl}_2}} \right)$$

この二つの平衡電位が一致するとき, $\text{pH} = 1.14, E = 1.39 \text{ V}$.

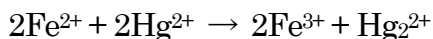
3 $\text{Hg}_2^{2+}/\text{Hg}^{2+}$ のみが生じるときの平衡電位

$$E = 0.91 - \frac{0.05916}{2} \log \left(\frac{a_{\text{Hg}_2^{2+}}}{a_{\text{Hg}^{2+}}^2} \right) = 0.821 \text{ V}$$

$\text{Fe}^{2+}/\text{Fe}^{3+}$ のみが生じるときの平衡電位

$$E = 0.77 - 0.05916 \log \left(\frac{a_{\text{Fe}^{2+}}}{a_{\text{Fe}^{3+}}} \right) = 0.77 \text{ V}$$

$\text{Hg}_2^{2+}/\text{Hg}^{2+}$ の反応が正極 (還元反応) となるので,



が進行する.

x 倍に希釈したとき反応が進行しなくなったとすると, $\text{Fe}^{3+}/\text{Fe}^{2+}$ の平衡電位は変わらないので

$$E = 0.91 - \frac{0.05916}{2} \log \left(\frac{a_{\text{Hg}_2^{2+}} / x}{(a_{\text{Hg}^{2+}} / x)^2} \right) = 0.77 \text{ V} \quad \underline{x = 53 \text{ 倍}}$$

4 (1) $a_{\text{I}^-} = 0.009 \text{ mol dm}^{-3}$, $a_{\text{I}_3^-} = 0.001 \text{ mol dm}^{-3}$

$$E = 0.545 - \frac{0.05916}{2} \log \left(\frac{a_{\text{I}^-}^2}{a_{\text{I}_3^-}} \right) = 0.577 \text{ V}$$

(2) $a_{\text{I}^-} = 9 \times 10^{-4} \text{ mol dm}^{-3}$, $a_{\text{I}_3^-} = 10^{-4} \text{ mol dm}^{-3}$

$$E = 0.607 \text{ V}$$