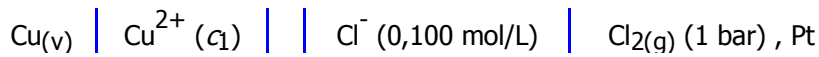


Voor de volgende cel:



	E°
$\text{Cu}^{2+} / \text{Cu}$	+ 0,342 V
$\text{Cl}_2 / \text{Cl}^-$	+ 1,358 V

is de gemeten elektromotorische kracht 1,122 V.

Hoe groot is de concentratie van Cu^{2+} in de linker halfcel?

Oplossing

$$\begin{aligned} (1) \quad \text{Cu}^{2+} + 2 e &\rightleftharpoons \text{Cu} & E^\circ &= + 0,342 \text{ V} \\ E_1 &= E_1^\circ - \frac{0,059 \text{ V}}{2} \log \frac{1}{[\text{Cu}^{2+}]} \\ &= 0,342 \text{ V} - \frac{0,059 \text{ V}}{2} \log \frac{1}{c_1} \end{aligned}$$

$$\begin{aligned} (2) \quad \text{Cl}_{2(g)} + 2 e &\rightleftharpoons 2 \text{Cl}^- & E^\circ &= + 1,358 \text{ V} \\ E_2 &= E_2^\circ - \frac{0,059 \text{ V}}{2} \log \frac{[\text{Cl}^-]^2}{P_{\text{Cl}_{2(g)}}} \\ &= 1,358 \text{ V} - \frac{0,059 \text{ V}}{2} \log \frac{(0,100)^2}{1(\text{bar})} \\ &= 1,417 \text{ V} \end{aligned}$$

$$\begin{aligned} E &= 1,122 \text{ V} \\ &= E_2 - E_1 \\ &= 1,417 \text{ V} - \left(0,342 \text{ V} - \frac{0,059 \text{ V}}{2} \log \frac{1}{c_1} \right) \\ &= 1,075 \text{ V} + \frac{0,059 \text{ V}}{2} \log \frac{1}{c_1} \end{aligned}$$

Dus:

$$\frac{0,059 \text{ V}}{2} \log \frac{1}{c_1} = 1,122 \text{ V} - 1,075 \text{ V} = 0,047 \text{ V}$$

$$\Rightarrow \log \frac{1}{c_1} = 1,593$$

$$\Rightarrow \frac{1}{c_1} = 39,19$$

$$\Rightarrow c_1 = \mathbf{0,026 \frac{\text{mol}}{\text{L}}}$$