

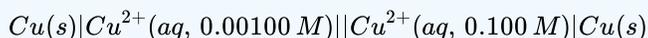
10.5: Concentration Cells

The generation of an electrostatic potential difference is dependent on the creation of a difference in chemical potential between two half-cells. One important manner in which this can be created is by creating a concentration difference. Using the Nernst equation, the potential difference for a concentration cell (one in which both half-cells involve the same half-reaction) can be expressed

$$E = -\frac{RT}{nF} \ln \frac{[\text{oxidizing}]}{[\text{reducing}]}$$

✓ Example 10.5.1

Calculate the cell potential (at 25 °C) for the concentration cell defined by



Solution

Since the oxidation and reduction half-reactions are the same,

$$E_{\text{cell}}^{\circ} = 0 \text{ V}$$

The cell potential at 25 °C is calculated using the Nernst equation:

$$E = -\frac{RT}{nF} \ln Q$$

Substituting the values from the problem:

$$\begin{aligned} E_{\text{cell}} &= -\frac{(8.314 \text{ J/(mol K)})(298 \text{ K})}{2(96484 \text{ C})} \ln \left(\frac{0.00100 \text{ M}}{0.100 \text{ M}} \right) \\ &= 0.059 \text{ V} \end{aligned}$$

This page titled [10.5: Concentration Cells](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Patrick Fleming](#).