CONCEPT: THE END POINT

Within a redox titration we can utilize indicators and electrodes to determine the end point.

Redox Indicators

When we add a redox indicator to the analyte, the indicator will change colors based on the solution's potential.

The reduction half-reaction for a redox indicator can be seen as:

$$In_{Ox} + ne^- \rightleftharpoons In_{Red}$$

Using the Nernst equation for this half reaction we obtain:

$$E_{Cell} = E^o - \frac{0.05916\ V}{n} \log\left(\frac{[In_{Red}]}{[In_{Ox}]}\right)$$

By assuming that the indicator's color changes from the oxidized state to the reduced form when the ratio changes from 0.1 to 10, then we can locate the end point when the potential of the solution is within the range of:

$$E_{Cell} = \left(E^o \pm \frac{0.05916\ V}{n}\right)$$

The indicator transition range should overlap the portion of the curve that has the sharpest increase in potential.

- You can use a Gran plot where the end point represents the maximum value of first derivative of $\frac{\Delta E}{\Delta V}$.

The titration curve for the titration of 50.0 mL of 0.100 M Fe^{2+} with 0.100 M Ce^{4+} can be seen below: