CONCEPT: REDOX TITRATION CURVES

A redox titration curve follows the change in either the analyte's or titrant's concentration as a function of the titrant's volume.

Equivalence Volume (V_e)

The titration of 50.0 mL of 0.100 M NaCl with 0.100 M $AgNO_3$ would produce the following precipitation reaction:

$$Ag^+(aq) + Cl^-(aq) \rightleftharpoons AgCl(s) \qquad K = 5.6 \times 10^9$$

Before Equivalence Point

The titration of 50.0 mL of 0.100 M NaCl with 20.0 mL of 0.100 M $AgNO_3$

$$[Cl^-] = \frac{\text{Initial moles of analyte} - \text{moles titrant added}}{\text{Total Volume}}$$

At Equivalence Point

The titration of 50.0 mL of 0.100 M NaCl with 20.0 mL of 0.100 M $AgNO_3$

$$K_{sp} = [Ag^+][Cl^-] \quad \therefore \quad 1.8 \times 10^{-10} = (x)(x)$$

After Equivalence Point

The titration of 50.0 mL of 0.100 M NaCl with 70.0 mL of 0.100 M $AgNO_3$ e

$$[Ag^+] = \frac{\text{moles titrant added} - \text{initial moles of analyte added}}{\text{Total Volume}}$$

$$K_{sp} = [Ag^+][Cl^-]$$

PRACTICE: REDOX TITRATION CURVES CALCULATIONS 1

EXAMPLE: Calculate the [F^-] from the titration of 130.0 mL of 0.120 M KF with 150.0 mL of 0.100 M $BaCl_2$. The solubility product constant of BaF_2 is 1.5×10^{-6}.

PRACTICE: Calculate the pCN from the titration of 40.0 mL of 0.060 M NaCN with 20.0 mL of 0.050 M $AgC_2H_3O_2$. The solubility product constant of AgCN is 2.2×10^{-16}.

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