

PRECIPITATION TITRATIONS

SDSU CHEM 251

PROBLEM

- A 20 mL solution containing 15 mM NaF is titrated with a solution of 10 mM CaCl₂.
- Determine the concentrations of fluoride and calcium free in solution at the following titration volumes.
 - a) 8.65 mL
 - b) 15.00 mL
 - c) 21.82 mL

BEFORE THE EQUIVALENCE POINT

- As the K_{sp} values are small, the reaction can be considered to proceed completely to the formation of the precipitate.
- The analyte is in excess (titrant is limiting) at this stage of the titration.
- The analyte concentration can be determined directly.
- The concentration of titrant (which will be very small) can be determined based on the K_{sp} value.

PROBLEM

- A 20 mL solution containing 15 mM NaF is titrated with a solution of 10 mM CaCl_2 .
- Determine the concentrations of fluoride and calcium free in solution at the following titration volumes.

a) 8.65 mL

b) 15.00 mL

c) 21.82 mL

AT THE EQUIVALENCE POINT

- The titrant and analyte have been combined in stoichiometrically equal amounts.
- The only free analyte or titrant will be due to the reverse reaction (solubilization) of the precipitate.
- The K_{sp} will dictate the concentration of analyte and titrant free in solution.

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 - a) 8.65 mL
 - b) 15.00 mL**
 - c) 21.82 mL

AFTER THE EQUIVALENCE POINT

- The titrant is in excess (analyte is exhausted) at this stage of the titration.
- The titrant concentration can be determined directly.
- The concentration of analyte (which will be very small) can be determined based on the K_{sp} value.

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