

Ministry of Higher Education and Scientific Research

Mustansiriyah University

College of Science / Department of Chemistry



Practical Analytical Chemistry

For First Year Students Biology Department

Nabih M. Abdulnabi

2018

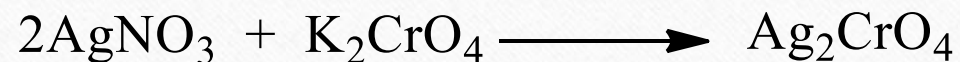
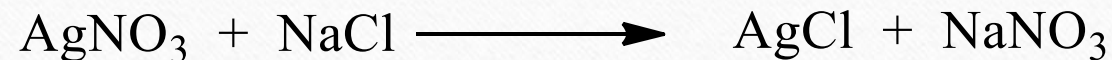
Precipitation Titration

Precipitation titrations are based on the reactions that yield ionic compounds of limited solubility to form slightly soluble precipitate. The most important precipitating agent used in precipitation titration is silver nitrate (AgNO_3), these titrations are called argentometric titrations, which is used for the determination of the halogens, CN^- and SCN^- .

Titrimetric Analysis

A. Mohr Method:

In this method chromate ion used as an indicator in the titration of chloride ion with silver nitrate. Silver ions react with chromate to form the (brick-red) silver chromate (Ag_2CrO_4) precipitate in the equivalence-point region.

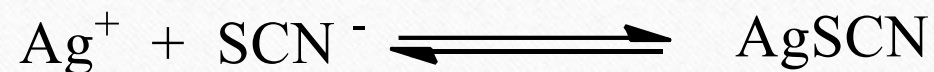


The pH must be between (6.5–10) to avoid the precipitation of silver hydroxide.

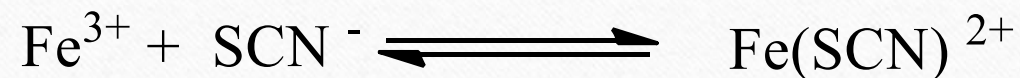
Titrimetric Analysis

B. Volhard Method:

In this method, silver ions are titrated with a standard solution of thiocyanate ion to yield a sparingly soluble silver thiocyanate :



Using an acidic solution of Iron (III) Fe^{3+} (Iron (III) ammonium sulphate ($\text{NH}_4\text{Fe}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$) as an indicator, which reacts with titrant (excess thiocyanate (KSCN)) to form a red complex in solution:



Titrimetric Analysis

The titration must be carried out in an acidic solution to prevent the precipitation of Fe^{3+} as $\text{Fe}(\text{OH})_3$.

The most important application of the Volhard method is the indirect determination bromide and iodide solution. A measured excess of standard silver nitrate solution is added to the sample, and the excess silver is determined by back-titration with a standard thiocyanate solution.

Titrimetric Analysis

C. Fajans method: In this method, an adsorption indicator (fluorescein is a weak organic acid) was used to determine the end point of precipitation titration of chloride with silver ion. An organic compound that adsorbs onto or desorbs from the surface of the solid in a precipitation titration. Ideally, the adsorption or desorption occurs near the equivalence point and results not only in a color change, but also in the transfer of color from the solution to the solid.