

Determination of Chloride Ions in Water

Your group has been assigned to test the water of a local town that is complaining that their water has somewhat of a salty taste. When your group arrives, you notice that there are many geologists roaming around studying the abundance of sedimentary rock, particularly halite (NaCl). You realize that the abundance of halite in addition to other sedimentary rocks may be the cause of the salty water taste due to the presence of chloride. Take samples of water and test them for chloride ions to see if your hypothesis is correct.

Determine the concentration of Chloride Ions by using the Mohr method:

First make a 0.075M standard AgNO₃ solution by mixing 3.0g of silver nitrate with 250ml of distilled in an Erlenmeyer flask. Set aside for later use.

To determine the concentration of chloride, first pipet 10ml of filtered water sample into a 250ml Erlenmeyer flask and dilute by adding 65ml of distilled water. Test the pH of the diluted water sample with pH test paper. If the pH is not between a pH of 6 and 8, then use nitric acid or sodium hydroxide to bring the pH to an appropriate level. Then add 1ml of 0.25M potassium chromate to the flask. Rinse and fill a buret with the standard AgNO₃ solution. Titrate the environmental water sample by adding the AgNO₃ solution slowly while stirring the sample using a magnetic bar and stir plate. The end point will be indicated by the persistence of a red-brown color through the yellow solution for about 30 seconds. Repeat the titration two more times and average the amount of AgNO₃ used to reach the endpoint.

Then titrate a blank using the same procedure above. For the blank use distilled water in place of the environmental water sample. Subtract the volume of AgNO₃ for the blank from the average used for the sample. This volume will be the one used to determine the concentration of Chloride in the water sample. Keep in mind when doing final calculations that the silver and chloride react in a one-to-one ratio.

Pre-lab Questions:

1. If the pH of your sample has a pH greater than 8 would you add nitric acid or sodium hydroxide?
2. Why is it important to rinse the buret with the titrant before beginning the titration?

Post-lab Questions:

1. What was the average amount of titrant used to reach the endpoint?
2. What is the concentration of chloride in the water sample?