Ministry Of Higher Education And Scientific Research

Al-Mustaqbal University

Fuel And Energy Technology Engineering & Chemical Engineering And Petroleum Industries .

Analytical Chemistry Laboratory

Calculation Of Chloride Ion In Tap Water

Supervisor

Ahmed Abbas

Fatima Oday

Rusul Ahmed

Shahad Ammar

Abdullah Mirzah

Introduction

Chloride in the form of chloride (Cl^-) ion is one of the major inorganic anions in water and wastewater. The chloride concentration is higher in wastewater than in raw water becausesodium chloride is a common article of diet and passes unchanged through the digestive system . Along the sea coast chloride may be present in high concentration because of leakage of salt water into the sewage system. It also may be increased by industrial process. In potable water, the salty taste produced by chloride concentration is variable and depends on the chemical composition of water.

when the predominant cations are calcium and magnesium. In addition, a high chloride contents may harm metallic pipes and structures as well as growing plants. The measured chloride ions can be used to know salinity of different water sources. For brackish water or sea water or industrial brine solution , it is an important parameter and indicates the extent of desalting of apparatus required.. Further, chloride ions are used as tracer ions in column studies to model fate of different contaminants in soil and liquid media.

The Mohr Method uses silver nitrate for titration . The silver nitrate solution is standardized against standard chloride solution, prepared from sodium chloride (NaCl). During the titration, chloride ion is precipitated. The indicator (potassium chromate K_2CrO_4) is added to visualize the endpoint, demonstrating presence of excess silver ions. In the presence of excess silver ions, solubility product of silver chromate exceeded and it forms a reddish-brown precipitate This stage is taken as evidence that all chloride ions have been consumed and only excess silver ions have reacted with chromate ions .

$$AgNo_3 + NaCl \longrightarrow AgCl + NaNo_3$$

White Precipitate

$$2AgNO_3 + K_2CrO_4 \longrightarrow Ag_2CrO_4 + 2KNO_3$$

Brown precipitate

Tools And Solutions Used

1. $AgNo_3$
2. K_2CrO_4
3. Water
4. Beaker
5. Burett
6. Pipett
7. Funnel
8. Washing Bottle
9. Conceal Flask
10. Clamp
11. Joins
12. Ring Stand

Procedure

1. Put 50 mL Of Water In The Beaker .
2. After Checking The Volume Of Water In The Beaker, We Put This Amount In The Conical Flask .
3. We Add 3 To 4 Drops Of Potassium Chromate Reagent (K_2CrO_4) .
4. Titrate With Silver Nitrate ($AgNo_3$) Solution (0.02 M) While constantly Rotating The Conical Flask Until A Silver Chromate Precipitate Forms (Ag_2CrO_4), Then Record The Pipette Reading.

Calulations

1- We Must Be Aware Of The Amount Of Silver Nitrate ($AgNo_3$) Present In The Buret Before Starting The Titration Process And After Completing The Titration Process In Order To Extract The Amount Of Silver Nitrate Consumed In The Titration By Subtracting The Two Readings From Each Other. And Extract V_1 .

2- Through The Dilution Law, We Find The Chloride Ion Concentration.

$$M_1V_1 = M_2V_2$$

- Hint : M_1V_1 FOR $AgNo_3$, And M_2 For Chloride Ion (Unknown) , V_2 Volume Of Water .

3- After Finding The Ion Concentration From Step 2 , We Now Find PPM .

$PPM_{[CL^-]} = M_2 * 35.5 * 1000$

Discussion

Q1/ Calculate The Chloride Ion Concentration In The Water If You Know That The Volume Of The Water Sample Used In The Analysis Is Equal To 65 mL. It Was Titrated With 0.03 M Silver Nitrate Using A 50 mL Burett Completely Filled With Silver Nitrate Solution. Then It Was Found That The Volume Of The Burett After Reaching The End Point Of The Reaction And Completing The Titration Was 39.6 mL . Also Calculate PPM .

Q2/ What Are The Harms Of Ionized Chloride Ions In Water?.

Q3/ What Is The Name Of The Method Applied In This Experiment?.

Q4/What Is The Indicator Used In This Experiment ?.