Experiment NO. 3

Determination of Nickel as Dimethyl glyoxime complex.

Introduction

It is considered one of the most older Organic precipitation and The optimum of them .

It is a weak acid $(CH3C = NOH)_2$ and dissolves slightly in water and gives one ion of hydrogen when ionized:

$$CH_3-C=N-OH \atop CH_3-C=N-OH \rightleftharpoons CH_3-C=N-O^- \atop CH_3-C=N-OH + H^+$$

This Detector is dissolved in alcohol so alcohol solution is used Specially to precipitate nickel quantitatively.

Ni^{+2} is precipitated by unites with two molecules of DMG and releasing two of hydrogen ions that is equivalent with an increase of ammonium hydroxide according to the following reaction:

$$2 \; {CH_3-C=N-OH \atop CH_3-C=N-OH} + Ni^{+2} + NH_4OH \longrightarrow (C_4H_7O_2N_2)_2Ni + 2NH_4^+ + 2H_2O$$
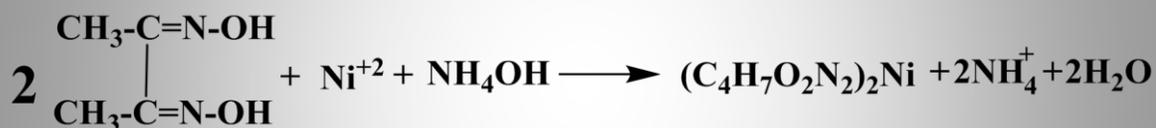
The precipitate is red color and its solubility in water very low.

we can dry it in (110-120 ° C) but is dissolves in dilute mineral acids .

Hydrogen released at the Reagent Union with nickel due to increased solubility of precipitate .

Materials

1- Sample containing nickel.

2 - Dilute ammonia solution.

3 - Dilute hydrochloric acid.

Procedure

1- Carefully weigh (0.1 g) of Nickel in the beaker of 400 ml with a glass rod and Dissolves in the least amount of distilled water and stirring the solution To the dissolve.

2- Add (2 mL) of dilute hydrochloric acid (1: 1) and add distilled water to 75 ml.

3- Heat the solution on the heater and add (25)ml of the precipitate   agent (DMG) hot solution. Add the dilute ammonia solution quickly as a dropes with a continuous stirring until is fully precipitation.

4- Put the beaker with its content on the heater for a quarter of an hour until a red precipitate appears.

5- Prepare filtration device , and weigh the empty filter paper, then filtered the solution and wash it with cold water.

6- Dry the paper with the precipitate and then weigh it and calculate the percentage of Nickel.

Calculation

$$G.F = \frac{(A.Wt.(Ni))}{(M.Wt.Ni(DMG)2)} = 0.20314$$

$$Ni\% = \frac{(wt.Ni(DMG)2 \times G.F)}{(wt.of\ sample)} \times 100$$

Questions of discussion

1- What are DMG properties? And why it is used as a precipitating factor ?

2- What are Ni (DMG) $_2$ specifications?

3- Add dilute hydrochloric acid?

4- Why was a precipitate process of Ni (DMG) 2 in the base medium?

5- What is the chemical composition of the Ni (DMG) $_2$ precipitate?