Experiment No. 2

Nickel Dimethyl Glyoximate, $Ni(C_4H_7N_2O_2)_2$

Aim: To prepare nickel dimethyl glyoximate by using microscale technique.

Theory: Nickel ions form a complex with dimethyl glyoxime reagent in an alkaline medium. Nickel sulphate salt is thoroughly mixed with sodium salt of dimethyl glyoxime. When the reactants are allowed to react in alkaline medium, scarlet red coloured precipitate/complex forms. Excess of reagent is removed by washing with distilled water.

Requirements: $NiSO_4 \cdot 7H_2O$, disodium salt of dimethyl glyoxime, 1:1 NH_4OH solution, Whatman filter paper No. 1, distilled water, boiling waterbath, electric oven, 150 cm^3 beaker, etc.

Procedure:

(1) Mix *W g* (i.e., 0.3 to 0.6 *g* or *the supplied* quantity) of nickel sulphate salt with 1.0 *g* of sodium salt of dimethylglyoxime reagent in a clean 150 cm^3 beaker.

(2) Add 5-7 cm^3 of distilled water to it and stir well to dissolve it.

(3) Now, add 10 cm^3 of 1:1 NH_4OH solution to the reaction mixture and stir it well till scarlet red coloured precipitate/complex forms.

(4) Stir continuously to ensure that the nickel dimethylglyoxime complex forms completely. (till distinct smell of NH_3).

(5) Digest the complex on a boiling waterbath for about 30 *minutes*.

(6) Filter the complex through Whatman filter paper No. 1 and wash it 2-3 times with distilled water.

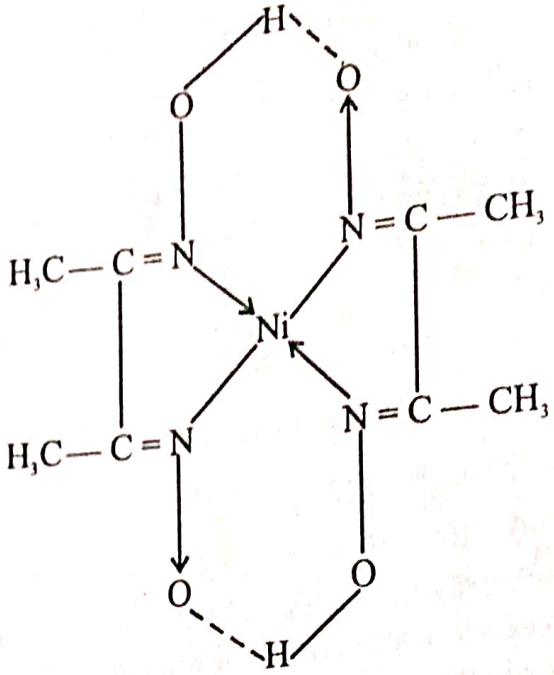
(7) *Dry* the complex in an electric oven at 110°C for about 45 *minutes*.

(8) Weigh the complex to obtain the yield.

eaction:

$$NiSO_4 + 2NaC_4H_7N_2O_2 \rightarrow Ni(C_4H_7N_2O_2)_2 + Na_2SO_4$$

Structure:



Observations and Calculations:

Weight of the complex Ni(*dmg*)$_2$ = *x g*.

Yield of the complex:

(A) Observed Yield of the complex = *x g*.

(B) Theoretical Yield of the complex:

Now, 280.71 *g* of $NiSO_4 \cdot 7H_2O$ gives 288.71 *g* of Ni(*dmg*)$_2$

$$\therefore W\ g \text{ \_\_\_\_\_} = \frac{288.71 \times W}{280.71}$$

$$= 1.028\ W\ g \text{ of Ni}(dmg)_2.$$

(Weight of *W g* will be supplied).

(C) Percentage Yield:

1.0281 *W g* of Ni(*dmg*)$_2$ corresponds to 100% yield

$$\therefore x\ g \text{ \_\_\_\_\_} = \frac{100 \times x}{1.028\ W}$$

$$= Z\ \%\ \text{yield}.$$

Results:

Yield of the complex:

(1) Theoretical yield = 1.028 *W g*.

(2) Observed yield (*x*) = ____ *g*.

(3) Percentage yield (*z*) = ____ %.