Co-ordination Compounds

Degree-II (H) , Paper-III , Group-B

Lecture-11 ,By-Dr.Rinky ,30/09/2020

Nomenclature of Coordination Compounds Continues..

Naming of Coordination Compounds having Cation & Anion both as complex

If an ionic complex compound contains both the cation and anion as complex ions, the metal cation in complex cation has its usual name but in complex anion, the metal name ends in -ate. Though, it is difficult to calculate the oxidation states of two metals into two complex ions yet, for calculation of oxidation number of metals, the hit and trial method is used. For this it is to be known the common oxidation number of the two relevant metals.

Example, $[Pt(NH_3)_4]$ $[PtCl_4]$

In complex of platinum, the common (or stable) oxidation states are +2 and +4. Thus the positive and negative charges on complex cation and complex anion should satisfy one of these two oxidation states or both.

To decide whether Pt in both the complex ion has +2 or +4 or +2 in one complex ion and +4 in the other, we calculate the oxidation states of Pt in both complex ions by considering the following points.

① If we consider -1 charge on anion, then charge on the cation will be +1

Complex cation

$[Pt(NH_3)_4]^+$

$x + 0 = +1$

$\therefore x = +1$

Complex anion

$[PtCl_4]^-$

$x - 4 = -1$

$x = 4 - 1 = +3$

* Thus, Oxidation states of Pt are +1 and +3 which are not shown by Pt. Therefore it is wrong.

(ii) If we consider −2 charge on complex anion, then charge on complex cation will be +2.

Complex cation

$[Pt(NH_3)_4]^{+2}$

$x + 0 = +2$

$\therefore x = +2$

Complex anion

$[PtCl_4]^{-2}$

$x - 4 = -2$

$x - 4 = -2$

$x = 4 - 2$

$\therefore x = +2$

Thus, Oxidation state of Pt in both the complex ions is +2 which is a stable Oxidation states.

(iii) If we consider −3 charge on anion, then charge on complex cation will be +3

Complex cation

$[Pt(NH_3)_4]^{3+}$

$x + 0 = +3$

$\therefore x = +3$

complex anion

$[PtCl_4]^{3-}$

$x - 4 = -3$

$x = 4 - 3$

$x = +1$

Therefore oxidation state of Pt are +1 and +3.

To be continued in next lecture..

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