

## Types of complexes:

The coordination compounds can be classified into the following types based on (i) the net charge of the complex ion, (ii) kinds of ligands present in the coordination entity.

### Classification based on the net charge on the complex:

A coordination compound in which the complex ion

- i. carries a net positive charge is called a cationic complex. Examples:  $[\text{Ag}(\text{NH}_3)_2]^+$ ,  $[\text{Co}(\text{NH}_3)_6]^{3+}$ ,  $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ , etc
- ii. carries a net negative charge is called an anionic complex. Examples:  $[\text{Ag}(\text{CN})_2]^-$ ,  $[\text{Co}(\text{CN})_6]^{3-}$ ,  $[\text{Fe}(\text{CN})_6]^{4-}$ , etc
- iii. bears no net charge, is called a neutral complex. Examples:  $[\text{Ni}(\text{CO})_4]$ ,  $[\text{Fe}(\text{CO})_5]$ ,  $[\text{Co}(\text{NH}_3)_3(\text{Cl})_3]$ ,

### Classification based on kind of ligands:

A coordination compound in which

- i. the central metal ion/atom is coordinated to only one kind of ligands is called a homoleptic complex. Examples:  $[\text{Co}(\text{NH}_3)_6]^{3+}$ ,  $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ ,
- ii. the central metal ion/atom is coordinated to more than one kind of ligands is called a heteroleptic complex. Example,  $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$ ,  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$