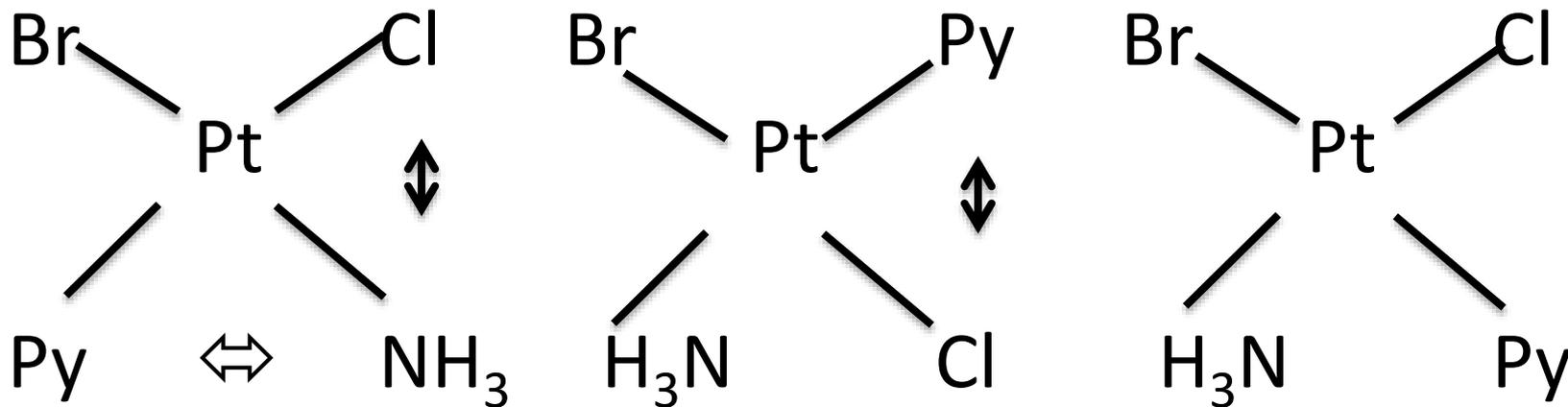


1. Geometrical isomerism

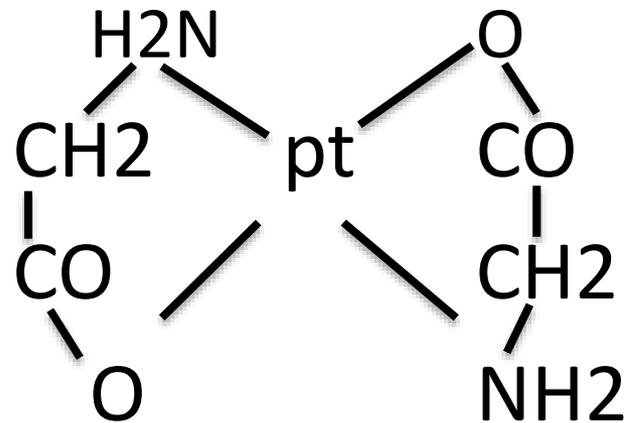
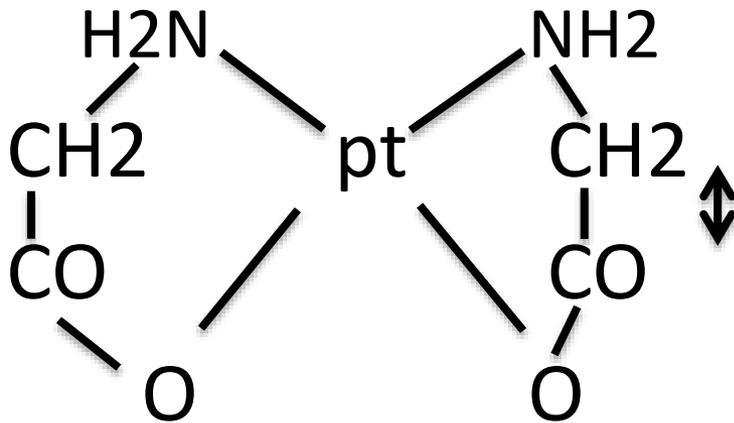
$[\text{Pt}(\text{NO}_2)_2(\text{NH}_3)_2\text{Py}]$ diamminebromo
chloroplatinum(II).

$(\text{Ma}_2\text{b}_2)^{n+}$



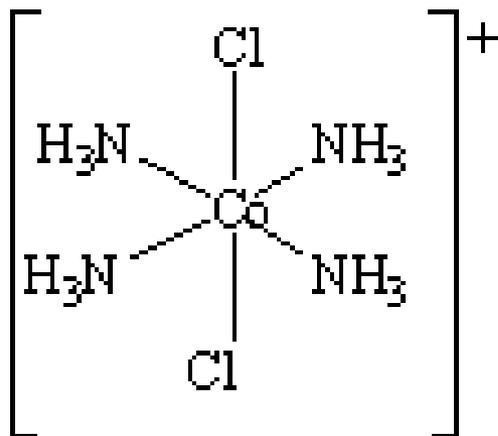
1. Geometrical isomerism

- $[Mabcd]^{n+}$ for eg. $[Pt(gly)_2]$ (glycino)

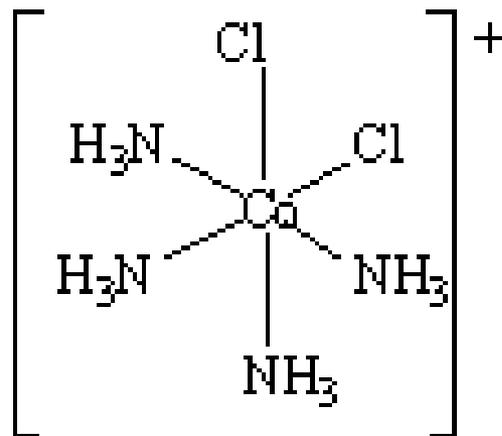


six coordination compounds

- Complexes of the type $[\text{Ma}_4\text{b}_2]^{m+}$



Trans - $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$



Cis - $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$

Six coordination compounds

- **Octahedral complexes** containing only **monodentate** ligands:
- A) $[M(AA)_3]^n$ eg. $[\text{Cr}(\text{C}_2\text{O}_4)_3]^{3-}$
trioxalatochromium (III) anion
- B) $[M(AA)_2a_2]^n$ eg. $[\text{CoCl}_2(\text{en})_2]^+$
cis-Dichlorobis(ethylenediamine)cobalt(III) chloride
- C) $[M(AA)_2ab]^n$ eg. $[\text{CoCl}(\text{en})_2(\text{NH}_3)]^{2+}$

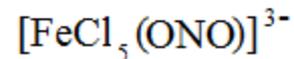
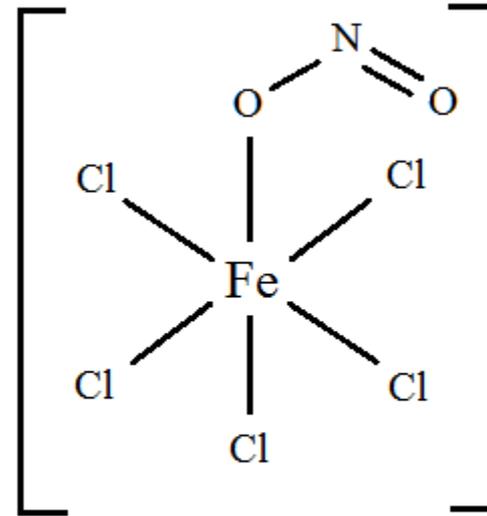
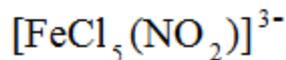
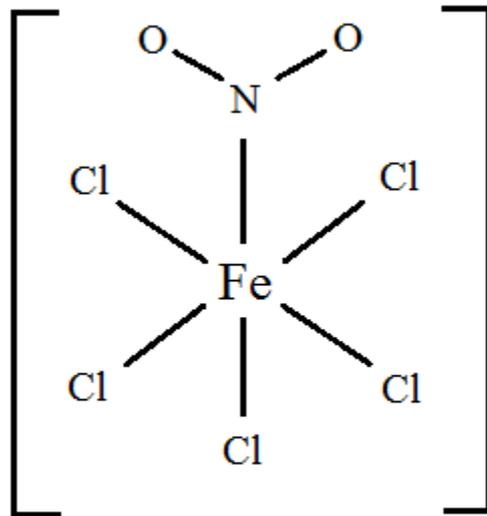
1. Ionisation isomerism

- **Ions** present in **coordination compound**.
- $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$ **red violet** $[\text{Co}(\text{NH}_3)_5\text{SO}_4]^+ + \text{Br}^-$
- $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$ **Red** $[\text{Co}(\text{NH}_3)_5\text{Br}]^{2+} + \text{SO}_4^{2-}$

2. Linkage isomerism

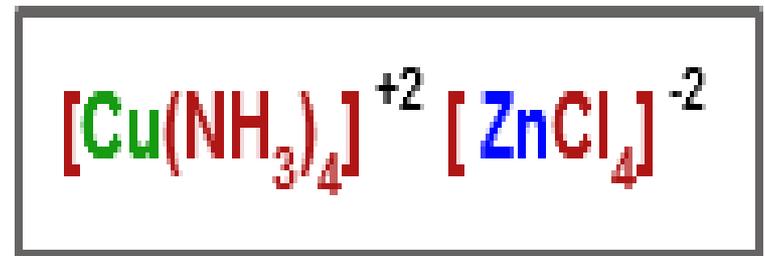
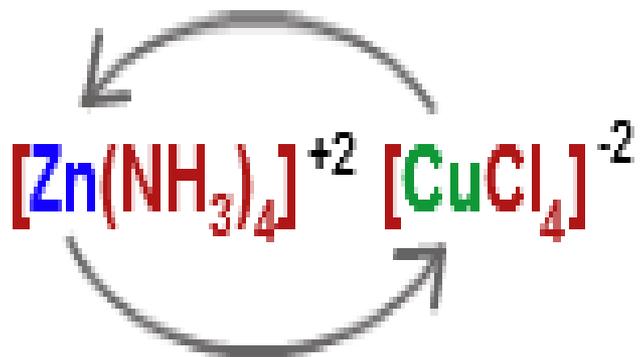
- Same **M.F** but **differ in linkage** of the ligand.

LINKAGE ISOMERS



3. Coordination isomerism

- Interchange of ligand.



TetraamineZinc(II)
TetraamineCuprate(II)

Tetraamine Copper(II)
Tetraamine Zincate(II)

4. hydrate isomerism

- Same M.F but differ in water molecule inside and **outside**.
- Ex: $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$



Bonding in coordination compound

1. **Valence bond theory(VBT)**
2. **Crystal field theory(CFT)**
3. **Ligand field theory(LFT)**
4. **Molecular orbital theory(MOT)**

1. Valence bond theory (VBT)

- Linus Pauling 1931.
- The **valence bond theory** satisfactorily **explains** the **structure and magnetic properties** of a large number of **coordination compounds**

Salient features of the theory:

- The **central metal** atom (or) ion **has the required number of vacant orbitals** for **accommodating** the **electrons donated by the ligands**. The number of **vacant orbitals is equal to the coordination number** of the metal ion for a particular complex.

Vacant orbital **s, p, d, f**.

Salient features of the VBT theory:

- This **vacant orbital goes hybridization** to form same no. of **hybrid orbitals**.
- Each **ligand has at least one orbital containing lone pair** of electrons.
- **Vacant hybrid orbital filled with ligand** to form **coordination bond**.
- Coordinate **bond is stronger if the overlapping between the orbitals is greater**.