# IUPAC Nomenclature of Coordination Compounds

Rules

1. The positive ion is named first, followed by the negative ion.
2. Ligands are listed first, the metal last.
3. Ligands are listed in alphabetical order. Some ligands have special names.

- Negative ligand names always end in o

| ligand | name |
|---|---|
| $CN^-$ | cyano |
| $Cl^-$ | chloro |
| $NO_2^-$ | nitro |
| $ONO^-$ | nitrito |
| $OH^-$ | hydroxo |
| $CO_3^{2-}$ | carbanato |
| $CNO^-$ | cyanato |
| $acac^-$ | acetylacetanato |
| $SO_4^{2-}$ | sulfato |

$Cl_2$ is named "dichlorine" but when considering alphabetical order, "c" is used instead of "d".

- Neutral ligands have no special endings but some of them have special names.

| ligand | name |
|---|---|
| $NH_3$ | ammine |
| $H_2O$ | aqua |
| CO | carbonyl |
| NO | nitrosyl |
| $N_2$ | dinitrogen |
| $O_2$ | dioxygen |
| $C_5H_5N$ | pyridine |
| $(NH_2)_2CO$ | urea |

- Organic radicals are given their usual names.

| | |
|---|---|
| $CH_3$ | methyl |
| $C_2H_5$ | ethyl |
| $C_6H_5$ | phenyl |

- Positive ligands end in ium

Example : $NH_2NH_3^+$ hydrazinium
$NH_4^+$ ammonium

4. The prefixes di, tri, tetra, penta ….etc. indicate the number of ligands of that type. If the name of the ligand itself includes a number (eg. ethylenediamine, bypyridyl), then the prefixes used are bis, tris, tetrakis, pentakis, hexakis, ….etc.

5. The oxidation state of the metal is shown in Roman numerals in parenthesis immediately following its name.

6. Complex positive ions and neutral molecules have no special ending but complex negative ions end in ate.

   eg. $Fe(CN)_6^{3-}$ hexacyanoferrate (III)

7. Coordinated hydrogen salts are named as acids. The word hydrogen is dropped and the word ate is replaced by ic.

   eg. $H_3Fe(CN)_6$ hexacyanoferric(III) acid
   compared with $Na_3Fe(CN)_6$ sodium hexacyanoferrate(III)

8. If a complex contains two or more metal atoms it is a polynuclear complex. The ligands that link the metal atoms are called bridging groups. These bridging groups are separated from the rest of the complex name by hyphens and denoted by the prefix $\mu$.