

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 ⁻	acetylacetonato
SO_4^{2-}	sulfato

- 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
$\text{C}_5\text{H}_5\text{N}$	pyridine
$(\text{NH}_2)_2\text{CO}$	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

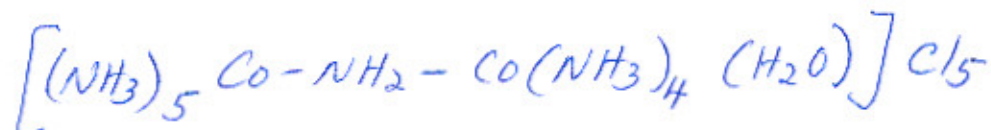
- The prefixes di, tri, tetra, penta ... etc. indicate the number of ligands of that type. If the name of the ligand itself includes a number (eg. ethylenediamine, bipyridyl), then the prefixes used are bis, tris, tetrakis, pentakis, hexakis, etc.
- The oxidation state of the metal is shown in Roman numerals in parenthesis immediately following its name.
- Complex positive ions and neutral molecules have no special ending but complex negative ions end in ate.

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

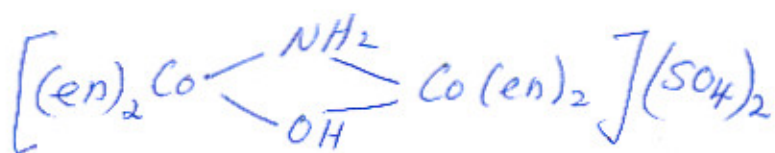
- Coordinated hydrogen salts are named as acids. The word hydrogen is dropped and the word ate is replaced by ic.

eg. $\text{H}_3\text{Fe}(\text{CN})_6$ hexacyanoferric(III) acid
 compared with $\text{Na}_3\text{Fe}(\text{CN})_6$ sodium hexacyanoferrate(III)

- 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 μ .



pentamminecobalt(III) - μ -amido tetrammine aqua cobalt(III)
 Chloride



bis(ethylenediamine)cobalt(III) - μ -amido - μ -hydroxo bis(ethylenediamine)cobalt(III) sulfate

OR

tetrakis(ethylenediamine) - μ -amido - μ -hydroxo cobalt(III)
 sulfate