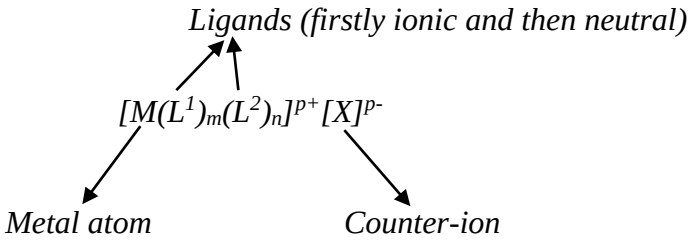
NOMENCLATURE OF COORDINATION COMPLEXES



1. *First cations, then anions*
2. *Sequence of metal atom and ligand names: First ligands in alphabetical order, then the metal atom*

   *Di**c**hloro[di**p**henylphosphine(thiourea)**p**latinum(II)]*
3. *Number of ligands in a coordination entity*

   a) *di, tri, tetra, penta, hexa, hepta…*

   b) *bis, tris, tetrakis, pentakis…*

   Two kinds of numerical prefix are available for indicating the number of each kind of ligand within the name of the coordination entity. The simple di-, tri-, etc., derived from cardinal numerals, are generally recommended. The prefixes bis-, tris-, tetrakis-, derived from ordinals, are used with complex expressions.

   ***D**ibromo<u>bis</u>(**t**rimetilfosfin)platin(II)*

   *<u>Tetrakis</u>(**t**rifenilfosfin)platin(0)*

   Ethylenediamine is a bidentate ligand, the bis- prefix is used instead of di-
4. *Terminations for names of coordination entities*

   a) *All anionic coordination entities take the ending-ate.*

   b) *No distinguishing termination is used for cationic or neutral coordination entities.*

   $[PtCl_4]^{2-}$ *tetrakloroplatinat(II)*

   $[Fe(CO)_4]^{2-}$ *tetrakarbonilferrat(-II)*

   c) *As an exception, some metals have different anionic names.*

Metal	***Name in anionic complex***
Iron (Fe)	*Ferrate*
Copper (Cu)	*Cuprate*
Lead(Pb)	*Plumbate*
Silver (Ag)	*Arjentate*
Gold (Au)	*Aurate*
Tin (Sn)	*Stannate*

5. *Charge numbers, oxidation numbers, and ionic proportions*

When the oxidation number of the metal atom can be defined without ambiguity, it may be indicated by appending a roman numeral to the metal atom name. This number is enclosed in parentheses after the part of the name denoting the metal atom. No positive sign is used.

*Dichloro[diphenylphosphine(thiourea)platinum**(II)**]*

a) *Stock system: Number of oxidation of metal ion is given by a Roman numeral*
b) *Eving-Basset system: Number of oxidation of metal ion is given by an Arabic numeral*

$K_4[Fe(CN)_6]$

Potassium hexacyanoferrate(II) (Stock)

Potassiumhexacyanoferrate(4-) (Eving-Basset)

$[PtCl_4]^{2-}$

Tetrachloroplatinate(II)

Tetrachloroplatinat(2-)

The hapto symbol, η, with a numerical superscript, provides a topological description by indicating the connectivity between the ligand and the central atom. For example, if all the five carbon atoms of a cyclopentadienyl moiety are equidistant from a metal atom, we term it as η^5-cyclopentadienyl.

Examples: η^1-R, η^1-Ar, η^2-C_2R_4, η^1-allyl, η^3-allyl, η^4-Cb, η^5-Cp, η^6-C_6H_6, η^8-C_8H_8, η^2-C_{60}, η^5-R_5C_{60}.

The symbol μ indicates bridging; normally we have μ^2 and rarely μ^3 bridging.

Examples: μ^2-CO, μ^3-CO, μ^2-CH_3, μ^2-H, μ^2-Cl, , μ^3-Cl, μ^2-OR, μ^2-PR_2, μ^2-NR_2

Some examples

$[Ru(HSO_3)_2(NH_3)_4]$	*Tetraamminebis(hydrogensulfito)ruthenium(II)*
$[CuCl_2(NH_3)_2]$	*Diamminedichlorocopper(II)*
$[Cu(NH_3)_4]SO_4$	*Tetraamminecopper(II) sulfate*
$K_3[Fe(CN)_6]$	*Potassium hexacyanoferrate(III)*
$[Ti(H_2O)_6][CoCl_6]$	*Hexaaquatitanium(III) hexachlorocobaltate(III)*
$K[PtCl_3(C_2H_4)]$	*Potassium η^2-ethylenetrichloroplatinum(II)*
$[Cr(en)_3]^{3+}$	*Tris(ethylenediamine)chromium(III)*
$K_2[Ni(CN)_4]$	*Potassium tetracyanonickelate(II)*
$[Zn(NCS)_4]^{2-}$	*Tetraisothiocyanatozincate(II)*
$[Co(SCN)_2(NH_3)_4]_2SO_4$	*Tetraamminedithiocyanatocobalt(III) sulfate*
$[Au(CN)_4]^-$	*Tetracyanoaurate(III)*
$[Co(NH_3)_6]Cl_3$	*Hexaamminecobalt(III) chloride*
$[CoCl(NH_3)_5]Cl_2$	*Pentaamminechlorocobalt(2+) chloride*
$[PtCl(NH_2CH_3)(NH_3)_2]Cl$	*Tetraamminechloro(methylamine)platinum(II) chloride*
$[CuCl_2\{O=C(NH_2)_2\}_2]$	*Dichlorobis(urea)copper(II)*
$K_2[PdCl_4]$	*Potassium tetrachloropalladate(II)*
$Na[PtBrCl(NO_2)(NH_3)]$	*Sodium amminebromochloronitrito-N-platinate(II)*
$[Co(OH_2)_2(NH_3)_4]Cl_3$	*Diakuatetraamminecobalt(III) chloride*
$[Pt(NH_3)_5Cl]Br_3$	*Pentaamminechloroplatinum(IV) bromide*
$[Pt(H_2NCH_2CH_2NH_2)_2Cl_2]Cl_2$	*Dichlorobis(ethylenediamine)platinum(IV) chloride*
$[Co(H_2NCH_2CH_2NH_2)_3]_2(SO_4)_3$	*Tris(ethylenediamine)cobalt(III) sulfate*
$Na_2[NiCl_4]$	*Sodium tetrachloronickelate(II)*
$Pt(NH_3)_2Cl_4$	*Diamminetetrachloroplatinum(IV)*
$Fe(CO)_5$	*Pentacarbonyliron(0)*
$(NH_4)_2[Ni(C_2O_4)_2(H_2O)_2]$	*Ammonium diaquabis(oxalato)nickelate(II)*
$[Ag(NH_3)_2][Ag(CN)_2]$	*Diamminesilver(I) dicyanoargentate(I)*
$[Fe(NH_3)_6][Cr(CN)_6]$	*Hexaammineiron(III) hexacyanochromate (III)*
$[CoBr(NH_3)_5]SO_4$	*Pentaamminebromocobalt(III) sulfate*
$[Co(SO_4)(NH_3)_5]^+$	*Pentaamminesulfatocobalt(III) ion*
$[Fe(OH)(H_2O)_5]^{2+}$	*Pentaaquahydroxoiron(III) ion*

Triaquatriamminechromium(III) chloride	$[Cr(NH_3)_3(H_2O)_3]Cl_3$
Diaquabromofloroiodochlorochromate(III)	$[CrBrFICl(H_2O)_2]^-$
Hexaamminechromium(III) hexachloroiridate(III)	$[Cr(NH_3)_6][IrCl_6]$
Potassium amminedioxoperoxodicyanochromate(VI)	$K_2[Cr(CN)_2O_2(O_2)NH_3]$
Tetraamminesulfatocobalt(III) nitrate	$[CoSO_4(NH_3)_4]NO_3$
Lithium tetrahydroaluminate(III)	$Li[AlH_4]$
Potassium pentacyanonitrosilferrate(II)	$K_3[Fe(CN)_5NO]$
Sodium pentachloronitridoosmate(VI)	$Na[OsCl_5N]$
Sodium bis(thiosulfato)arjentate(I)	$Na_3[Ag(S_2O_3)_2]$
Dichlorobis(methylamine)cupper(II)	$[CuCl_2(CH_3NH_2)_2]$
Hexaammineiron(III) nitrate	$[Fe(NH_3)_6](NO_3)_3$
Ammonium tetrachlorocuprate(II)	$(NH_4)_2[CuCl_4]$
Sodium monochloropentacyanoferrate(III)	$Na_3[FeCl(CN)_5]$
Potassium hexafluorocobaltate(III)	$K_3[CoF_6]$