

(24) Today

Section 6.4.6: Halogen Bonds

Section 9.1 - 9.3

Introduction to Coordination Chemistry,
Nomenclature and Ligands

Next Class (25)

Section 9.3 – 9.5

Nomenclature and Ligands, Isomerism,
Coordination Number and Structures

(26) Second Class from Today

Test 2

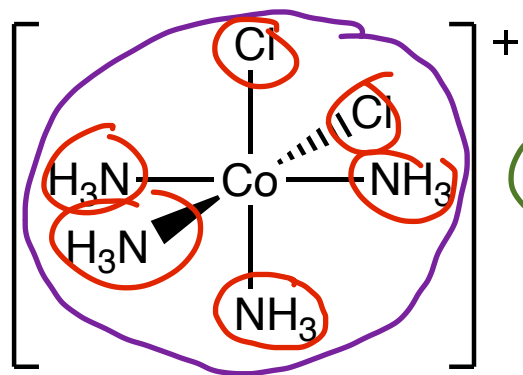
Third Class from Today (27)

9.5 Coordination Number and Structures

Chap 10

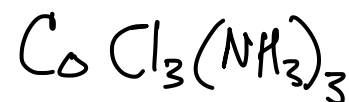
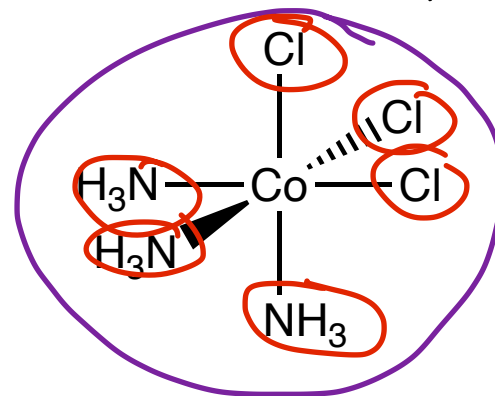
Test 1 Fall 2010: 8, Test 2 Fall 2010: 1, 2, 3, 4, 5, 6, 7 Test 2 Fall 2012: 4, 6, 7
Test 2 Spring 2014: 4 Test 2 Fall 2015: 4 Test 2 Fall 2019: 4 Test 2 Fall
2021: 4, 6 Test 2 Fall 2023: 4, 5, 6, 7 Test 3 Fall 2010: 1, 2, 3, 4, 6 Test 3 Fall
2012: 1, 2, 3, 4, 5 6 (is too long for a test) Test 3 Fall 2015: 1, 2, 3, 4, 5 Test 3 Fall
2019: 1, 2, 3, 4, 5 (we accidentally skipped u and g, so not on our test), 6, * (too long for a
test) Test 3 Fall 2021: 1, 2, 3, 4, 5, 6, 7, 9 Test 3 Fall 2023: (1, 2, 3, 4, 5, 6 same as
Fall 2021) 7 Test 4 fall 2012: 1, 2, 3, 5, Test 4 Spring 2014: 1, 2, 3, 4, 5, 6, 7
Test 4 Fall 2015: 1, 2, 3, 4, 5

complex ion

simple
counter ion

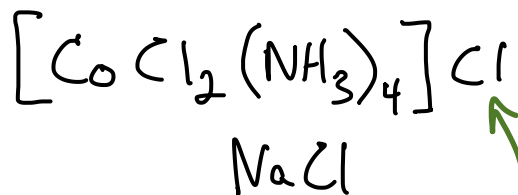
coordination sphere

transition metal complex



atoms + molecules directly bonded to the metal
are called ligands

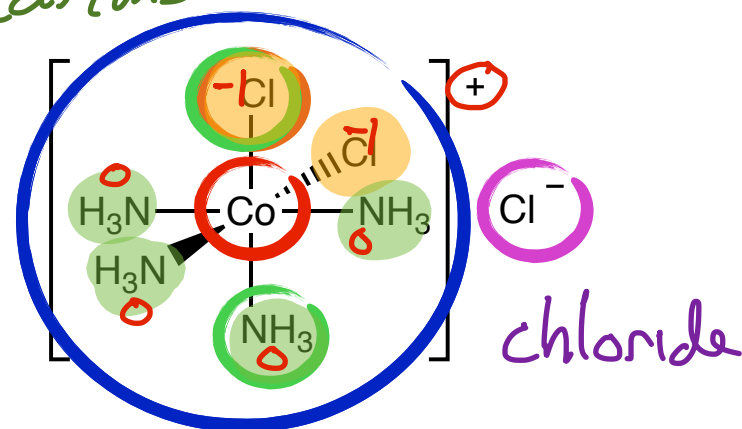
When writing formulas the complex ion is enclosed in
brackets [], metal 1st, followed by ligands



counterion not part of coordination sphere

neutral complexes are named like cations

1. cation followed by anion
2. simple ion
use standard ion nomenclature
3. complex ion



ligands (alphabetically) followed by metal

use prefixes for the number of ligands dichloro
(di, tri, tetra or bis, tris, tetrakis)

negative ligands end in "o", neutral ligand no change

ammonia $\Rightarrow$ ammine tetraammine

indicate oxidation number of metal using Roman numerals in parentheses cobalt(III)

if metal is part of the anion, use "fancy" names and change "um" ending to "ate"

dichlorotetraamminecobalt(III) chloride

“Fancy” names used when the complex ion is the anion

Argentum, Aurum, Cuprum, Ferrum, Plumbum, Stannum

The original name for Tungsten is Wolfram ... Tungstate is used when tungsten is part of an anionic complex ion.

“Fancy” names used when the complex ion is the anion

Argentum^{ate}, Aurum^{um}, Cuprum^{um}, Ferrum^{um}, Plumbum^{um}, Stannum^{ate}

~~Ironate~~
~~irate~~

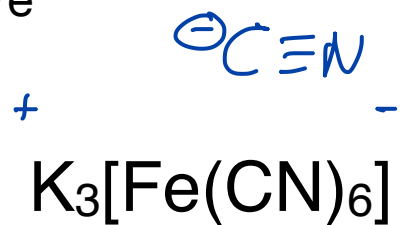
The original name for Tungsten is Wolfram ... Tungstate is used when tungsten is part of an anionic complex ion.

Water bound as a ligand is called “aqua”

Ammonia bound as a ligand is called “ammine”

Cl^- , $\text{Br}^- \Rightarrow \text{ide} \Rightarrow \text{O}$

OH^- , $\text{O}^{2-} \Rightarrow \text{ide} \Rightarrow \text{O}$



potassium hexacyano Ferrate (III)

+3 (-6 +3)

-3

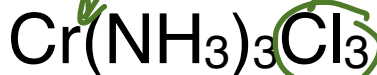
complex cation ionic compound simple anion



+3 0 -3

hexaamminecobalt(III) chloride

neutral complex



+3 0 -3

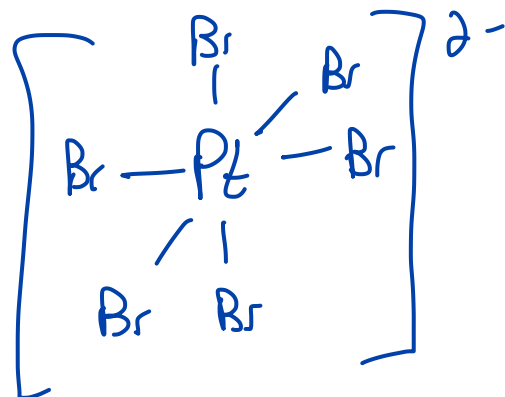
triamminetrichlorochromium(III)

iron(III) chloride

Coordination Compound Nomenclature

Section 9.3

hexabromoplatinate(2-)



Pt is +4

Arabic numerals
↓ refer to
the charge of the
↑ complex ion
alternate way of doing
nomenclature

Roman numerals refer to charge on
metal

hexacarbonylmanganese(I) perchlorate

