

CONCEPT: NAMING COORDINATION COMPOUNDS

- Naming Coordination compounds uses a systematic set of rules: _____.

Ligand Naming

- Ligands can either be anions or _____ molecules.

Common Anionic Ligands		Neutral Ligands	
Ligand	Ligand Name	Ligand	Ligand Name
Bromide, Br^-	Bromo	_____	Aqua
Oxide, O^{2-}	_____	_____	Ammine
Hydroxide, OH^-	Hydroxo	_____	Carbonyl
Cyanide, CN^-	Cyano	_____	Nitrosyl
Azide, N_3^-	_____	_____	Ethylenediamine
Nitrite, NO_2^-	Nitro	_____	
Oxalate, $\text{C}_2\text{O}_4^{2-}$	Oxalato	_____	
Carbonate, CO_3^{2-}	Carbonato		

EXAMPLE: Write names of all ligands in complex ion: $[\text{Ag}(\text{en})_2\text{Cl}_2]^-$.

STEP 1: Name ligands in alphabetical order.

a) If ligand is an **anion**: change ending to _____.

b) If ligand is **neutral**: name as molecule, with **exceptions**.

c) When more than 1 identical ligand, use prefixes: di- 2, tri- 3, tetra- 4, etc.

- If ligand has a **prefix** in the name, place ligand in parenthesis, use prefixes: _____ 2, _____ 3, _____ 4.

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Complex Ion Naming

- We are now ready to name the complex ion by adding name of the _____ metal.

Common Anionic Complexes			
Transition Metal	Metal Name	Transition Metal	Latin Name
Chromium	Chromate	Iron (Fe)	_____
Cobalt	Cobaltate	Copper (Cu)	_____
Manganese	Manganate	Silver (Ag)	_____
Molybdenum	Molybdate	Tin (Sn)	_____
Platinum	Platinate	Gold (Au)	_____
Vanadium	Vanadate	Lead (Pb)	_____
Zinc	Zincate		

EXAMPLE: Write full name of complex ion: $[\text{Ag}(\text{en})_2\text{Cl}_2]^-$.

STEP 1: Name ligands in alphabetical order.

STEP 2: Name transition metal after ligands. Remove spaces from all names.

a) If complex ion is **cation**: metal's name is _____ modified.

b) If complex ion is **anion**: change ending to _____.

- **NOTE:** some transition metals use **Latin names**.

c) Add Roman numeral for oxidation number in parenthesis after metal name.

d) Overall charge of the complex ion is not named.

PRACTICE: Provide name of complex ion $[\text{Fe}(\text{CN})_5\text{NO}]^{3-}$.

Coordination Compound Naming

- _____ ion
- $\text{K}[\text{Pt}(\text{NH}_3)\text{Cl}_5]$
- _____ ion
- $[\text{Rh}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$
- _____ ion

STEP 1: Name ligands in alphabetical order.

- STEP 2:** Name transition metal after ligands. Remove spaces from all names.

- STEP 3:** Name counter ion.

- STEP 4:** Write full name of coordination compound.

- a) Name **cation** before **anion** and add _____ in between.

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PRACTICE: Provide a systematic name for $\text{K}_2[\text{Mo}(\text{O})\text{Cl}_4]$.

PRACTICE: Provide name for the following coordination compound: $[\text{Ag}(\text{H}_2\text{O})_2]\text{NO}_3$.

PRACTICE: What is the systematic name of $[\text{Co}(\text{en})_2(\text{NH}_3)\text{CN}]\text{Cl}_2$.