

Chem 151 Drilling Question Set #6
Introduction to Coordination Chemistry

1. If the ions/moleculars listed below become ligands in a complex ion, what would be their names as ligands?

- a. OH^- *hydroxo*
- b. NO_2^- *nitrito*
- c. PO_4^{3-} *phosphato*
- d. NH_3 *ammine* (two m in ammine)
- e. CO *carbonyl*
- f. $\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2$ *ethylenediamine* (only one m in amine)

2. Determine the oxidation number of the central metal and name the complex ions in the following

- a. $[\text{Fe}(\text{OH})(\text{H}_2\text{O})_5]^{2+}$ *pentaaquahydroxoiron(III)*
- b. $[\text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})]^{2+}$ *pentaammineaquacobalt(II)*
- c. $[\text{Mn}(\text{CN})_5]^-$ *pentacyanomanganate(IV)*
- d. $[\text{Cr}(\text{NH}_3)_4\text{Cl}_2]^+$ *tetraamminedichlorochromium(III)*

In the prior version, there was a typo (the 2+ charge was mistakenly typed as 2- charge) in this question and the answer was accordingly mistaken. Those in red font now are the corrected version.

3. Name the following coordination compounds

- a. $[\text{Ag}(\text{NH}_3)_2]\text{OH}$ *diamminesilver(I) hydroxide*
- b. $[\text{Co}(\text{NH}_3)_5(\text{SO}_4)]\text{Br}$ *pentaamminesulfatocobalt(III) bromide*
- c. $\text{K}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$ *potassium trisoxalatoferrate(III)* (use tris instead of tri for polydentate ligand)
- d. $\text{Na}_2[\text{Zn}(\text{OH})_4]$ *sodium tetrahydroxozincate(II)*

4. Give chemical formulas for the following:

- a. Tetrachloroferrate(III) ion *FeCl_4^-*
- b. Ammonium dibromobisoxalatocobaltate(III) *$(\text{NH}_4)_3[\text{Co}(\text{C}_2\text{O}_4)_2\text{Br}_2]$*

- c. Potassium tetracyanonickelate(II) $K_2[Ni(CN)_4]$
- d. Tetraaquadichloronickel(IV) sulfate $[Ni(H_2O)_4Cl_2]SO_4$
- e. Tetraamminedichloroplatinum(IV) tetrachloroplatinate(II) $[Pt(NH_3)_4Cl_2][PtCl_4]$