Day 2: Coordination Chemistry: History & Electron Counting

TODAY'S TOPICS

- organometallic history
-18-election rule
- electron counting / oxidation state assignment

CHEMIST OF THE DAY

name?
institution
known for?

QUOTE OF THE DAY

Between the idea
And the reality
Between the motion
And the act
Falls the Shadow

- T.S. Elliot

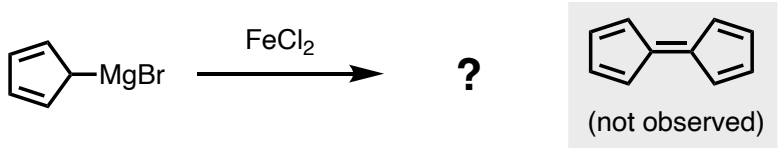
READING

Hartwig: Ch. 1.1–1.3
Crabtree: Ch. 1–2

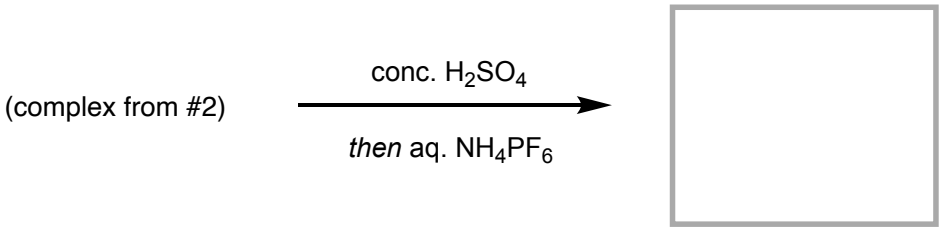
PROBLEMS OF THE DAY

#1 Cobalt(III) coordination complexes, so-called "Werner complexes" played an important role in the historical development of the fields or inorganic and organometallic chemistry. **Provide the 3D structrure of the coordination complex $CoCl_3 \cdot 4(NH_3)$.**

#2 In 1951, Paulson and Kelly attempted to synthesize fulvalene under the conditions shown below. Instead they obtained an unexpected product. **Provide as many possible connectivities as possible for this unexpected product and propose how to rule out alternatives using techniques available in the 1950s.**



#3 Reaction between the complex obtained in Problem #2 and concentrated sulfuric acid followed by dilution with water and addition of NH_4PF_6 solution generates a deep blue precipitate. The product is widely used as a single-electron oxidant. **Provide the structure, coordination number, metal oxidation state, d-electron count and overall electron count for the starting material and product.**



#4 For the structures below, **provide the coordination number, metal oxidation state, d-electron count, and overall electron count.**