

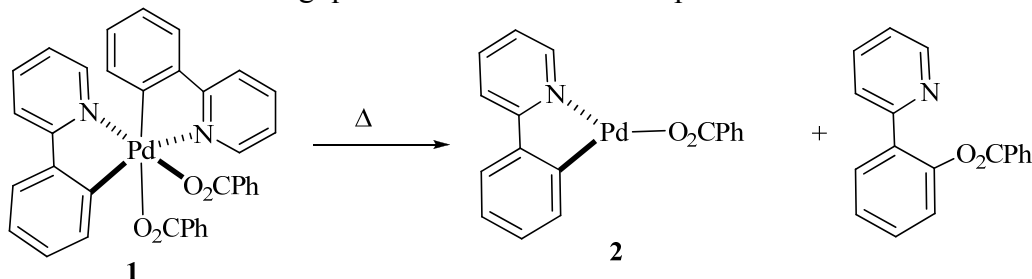
Organometallic Chemistry

Name: _____

Problem Set #2

Due: Sept. 23, 2008

1. Answer the following questions about the Pd complexes shown in the reaction below.

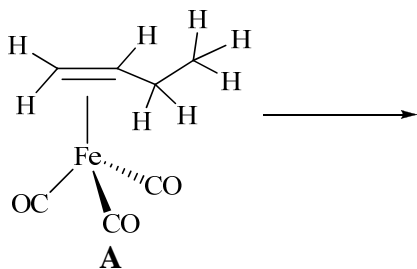


- a) What is the oxidation state of Pd in complex **1** and **2**? (1 pt.)
- b) What type of transition metal reaction is occurring to Pd? (1 pt.)
- c) What about Pd complex **1** makes this reaction favorable? (2 pts.)
- d) One of the most common reactions for alkyl-metal complexes is beta-elimination. Why does the aryl Pd complex **1** not undergo a beta-elimination? (2 pts.)

2. Draw the most stable structure for the metal-hydride complex $\text{RuH}_2(\eta^2\text{-H}_2)_2(\text{PCyp}_3)_2$, (Cyp=cyclopentyl). List the total electron count, oxidation state, dn configuration and coordination number of this complex. (4 pts.)

3. The iron complex **A** below undergoes a reaction with the attached alkene ligand to become an iron-hydride complex **B** with a η^3 -allyl ligand. The hydride comes from the allylic position of the alkene ligand on **A**.

a) Draw the structure of this iron-hydride product. (2 pts.)



B

b) Determine the total electron count, oxidation state, d^n configurations and coordination number (CN) of both structures **A** and **B**. (2 pts.)

c) Based on your answers to part b, what changes to the iron complex make this a favorable process? (1 pt.)

4. Suggest an organic compound and a transition metal reagent that could be combined to make the palladium-aryl complex shown below. What type of reaction have you shown? (5 pts.)

