

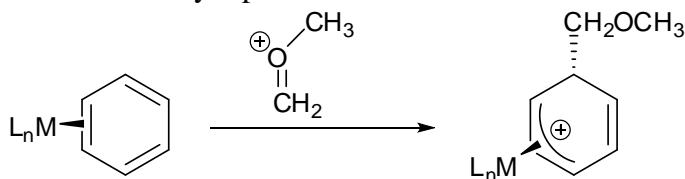
**Organometallic Chemistry**

Name: \_\_\_\_\_

**Problem Set #6**

Due: Nov. 13, 2008

1. The following reaction was recently reported in the literature.



a) What reaction type is shown? (1 pt.)

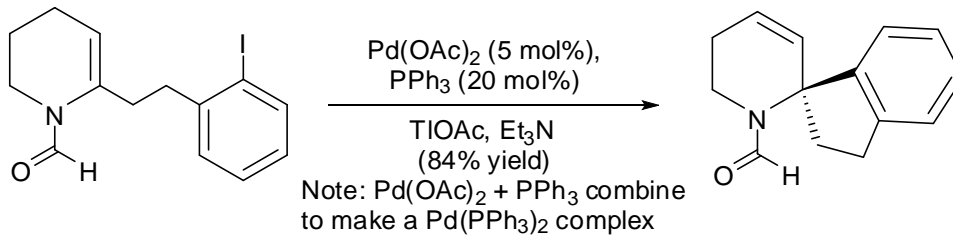
b) The choice of  $ML_n$  was key to the success of the reaction. The authors used  $[Os(NH_3)_5]^{2+}$  as one metal complex that bound tightly to benzene and facilitated the reaction shown above. Suggest characteristics of  $[Os(NH_3)_5]^{2+}$  that make it work well in this reaction. (3 pts.)

c) The authors made  $Re(I)$  and  $W(0)$  complexes with benzene and anticipated that these complexes would be even more stable than the  $Os(II)$  complex. Why do you think they believed this? (3 pts.)

2. The Wacker reaction or process entry on Wikipedia shows two possible mechanisms for the Pd-catalyzed combination of ethylene and water. After viewing the mechanism at the website ([http://en.wikipedia.org/wiki/Wacker\\_process](http://en.wikipedia.org/wiki/Wacker_process)), identify the difference between the two methods. (3 pts.)

3. Propose a mechanism or catalytic cycle for the following reactions. Be sure to identify the reaction type in each step of your mechanism. (5 pts. each)

a)



b)

