

Organometallic Chemistry - 4571

HW # 3 Due: April 10, 2008 (by 2 PM)

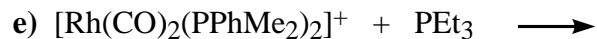
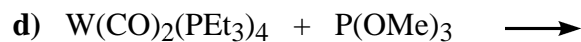
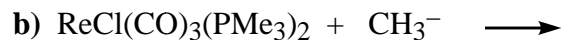
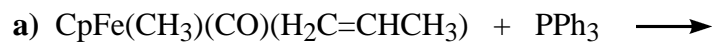
Name: _____

Signature: _____

Group: _____

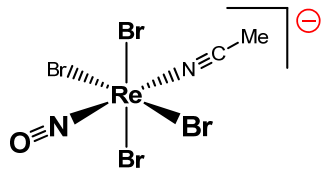
Check the box to the right if you want your graded homework to be placed out in the public rack outside Prof. Stanley's office. Otherwise you will have to pick up your homework from Prof. Stanley in person:

1. (30 pts) Predict and sketch out the structure for the transition-metal containing product for the following substitution reactions using one equivalent of each the reactants. State whether the mechanism is most likely **associative** or **dissociative** and reason(s) for your choice.

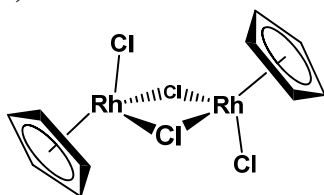


2. (25 pts) Circle the ligand on the following complexes that will most easily dissociate. Briefly state the reason(s) for your choice.

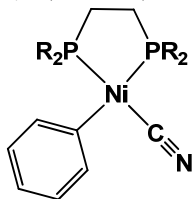
a)



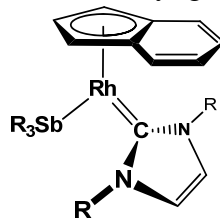
c)



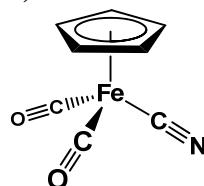
e) (R = Ph)



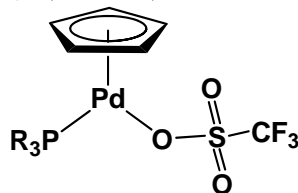
b) (R = alkyl groups)



d)

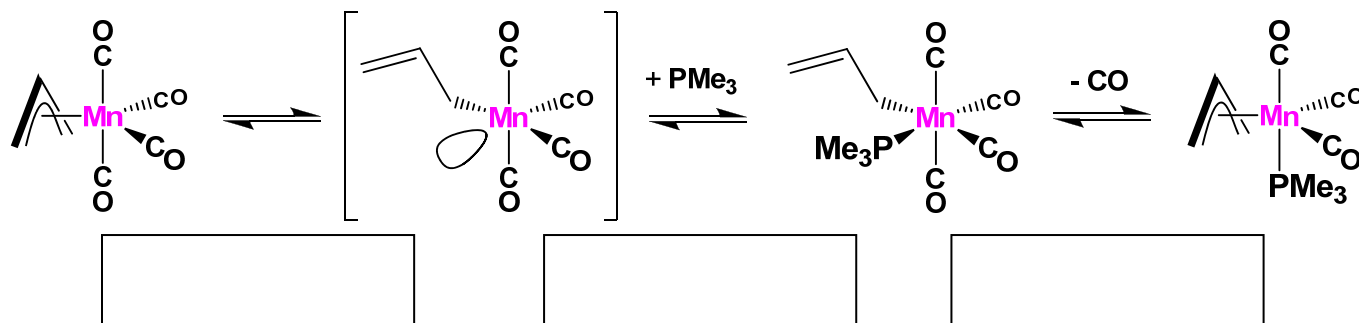


f) (R = Me)



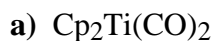
3. (10 pts) $\text{Re}(\text{O})(\text{CO})_4[\text{P}(\text{OMe})_3]$ reacts extremely quickly with one equivalent of PMe_3 to do a CO ligand substitution. $\text{Mn}(\text{OMe})(\text{CO})_3(\text{dmpe})$, however, reacts far more slowly with PMe_3 to do a CO ligand substitution. Clearly state the reason(s) for this.

4. (15 pts) Consider the following allyl-mediated substitution reaction:



- a) (8 pts) Label each forward-going reaction step in the boxes provided below the reaction (there may be more than one fundamental reaction occurring in each step, if so, label in the correct order).
- b) (7 pts) Of the last two compounds, the final product is the most stable. Clearly state the reason(s) for this.

5. (20 pts) To which of the following intact (no ligand dissociations) complexes can H_2 do an oxidative addition reaction to make a dihydride complex. Please circle **Yes** or **No** for each complex and clearly state the reason(s) for this.



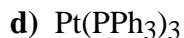
Yes -or- No



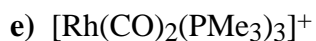
Yes -or- No



Yes -or- No



Yes -or- No



Yes -or- No