

Test

Question 1 ____/10 points

Question 2 ____/14 points

Question 3 ____/10 points

Question 4 ____/08 points

Question 5 ____/12 points

Question 6 ____/10 points

Question 7 ____/12 points

Question 8 ____/12 points

Question 9 ____/12 points

Question 10 ____/12 points

Question 11 ____/18 points

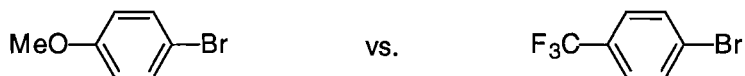
TOTAL ____/130 points

Name _____

There are 11 pages of questions (pages 2-12).

(1) (2 points each, 10 points total) Circle the correct answer.

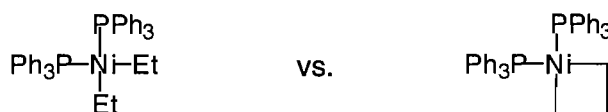
(a) More reactive in palladium-catalyzed coupling reactions:



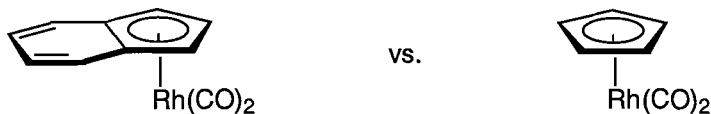
(b) Faster reductive elimination:



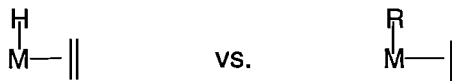
(c) More prone to β -hydride elimination:



(d) More reactive toward ligand substitution by an associative pathway:

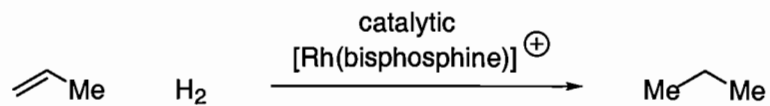


(e) More prone to migrate in a β -migratory insertion:

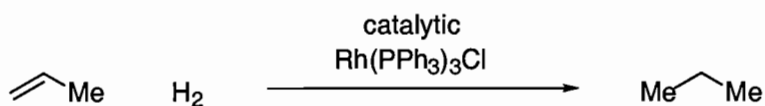


(2) (7 points each, 14 points total)

(a) Draw the mechanism for the hydrogenation of olefins catalyzed by Schrock-Osborn complexes. Please show and name every step, and label the turnover-limiting step.



(b) Draw the mechanism for the hydrogenation of olefins catalyzed by Wilkinson's catalyst. Please show and name every step, and label the turnover-limiting step.

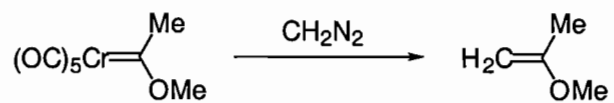


(3) (10 points total)

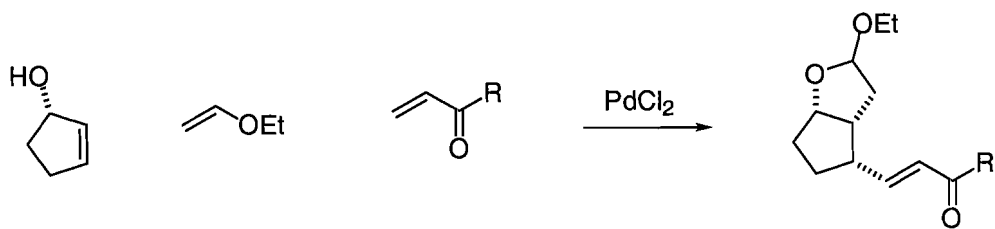
(a) (5 points) Draw a diagram that illustrates the bonding and back-bonding interactions for a metal-H₂ complex.

(b) (5 points) Draw a diagram that illustrates the bonding and back-bonding interactions for a metal-olefin complex.

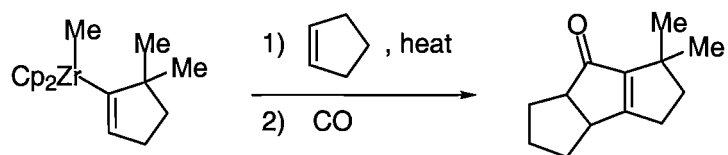
(4) (8 points) Provide the best mechanism for the illustrated reaction. Please explain your reasoning.



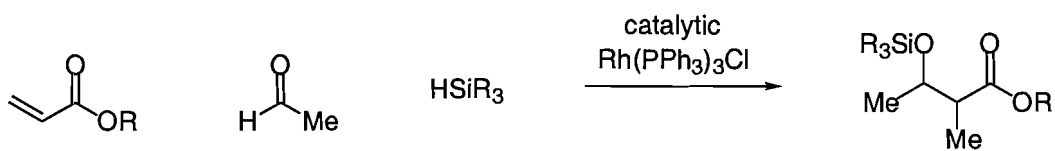
(5) (12 points) Provide the best mechanism for the illustrated reaction. Please name each elementary step (e.g., oxidative addition, reductive elimination...).



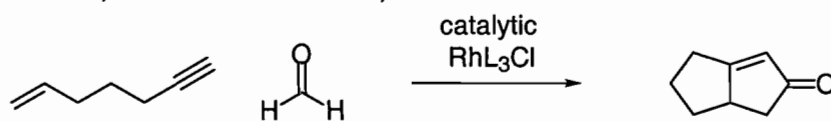
(6) (10 points) Provide the best mechanism for the illustrated reaction. Please name each elementary step (e.g., oxidative addition, reductive elimination...).



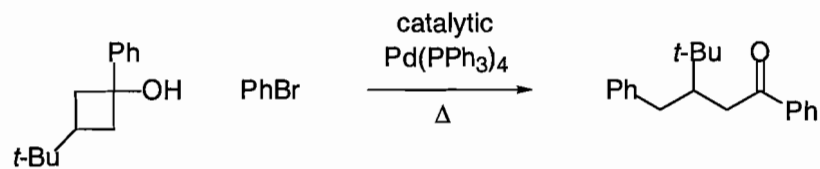
(7) (12 points) Provide the best mechanism for the illustrated reaction. Please name each elementary step (e.g., oxidative addition, reductive elimination...).



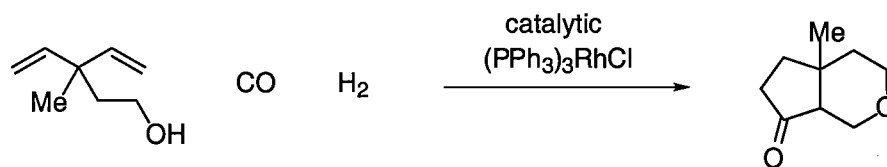
(8) (12 points) Provide the best mechanism for the illustrated reaction. Please name each elementary step (e.g., oxidative addition, reductive elimination...).



(9) (12 points) Provide the best mechanism for the illustrated reaction. Please name each elementary step (e.g., oxidative addition, reductive elimination...).

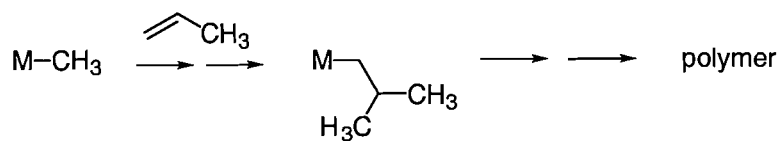


(10) (12 points) Provide the best mechanism for the illustrated reaction. Please name each elementary step (e.g., oxidative addition, reductive elimination...).

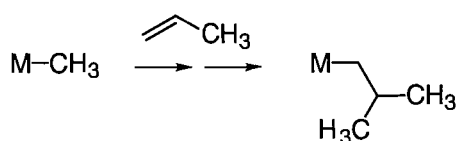


(11) (18 points total) In class, we discussed two possible mechanisms for Ziegler-Natta polymerizations.

(a) (5 points) Please draw the direct-insertion mechanism for propylene polymerization (just show the reaction of one propylene molecule).



(b) (5 points) Please draw the Green-Rooney mechanism for propylene polymerization (just show the reaction of one propylene molecule).



(c) (8 points) A ^{13}C -labeled catalyst ($M-^{13}\text{CH}_3$) was used in order to distinguish between the two mechanisms. Please explain how the use of this catalyst can help to distinguish between the two mechanisms.

