

Problem Set No. 9 (21.1.2013)

1. a) React propargylic alcohol with $\text{Co}_2(\text{CO})_8$!

b) The resulting product reacts with 1,1-dimethylcyclohexanone in the presence of HBF_4 ! Present a brief mechanism for the second reaction. How can the metal unit be removed from the product?

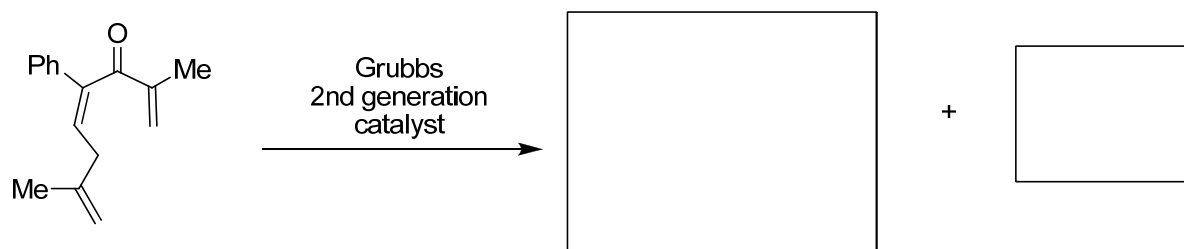
c) The product of a) can also be treated with allyl(trimethyl)silane and $\text{BF}_3 \cdot \text{Et}_2\text{O}$! Describe the reaction in detail! Why is the allylsilane in this transformation more reactive than propene?

2. React diphenylacetylene with $\text{Co}_2(\text{CO})_8$ and subsequently with *cis*-but-2-ene. Describe the mechanistic scheme for this Pauson-Khand-reaction in full detail!

3. a) Draw the structures of a Grubbs-type metathesis catalyst and of a Schrock-type catalyst. What are the main differences between these two catalyst classes?

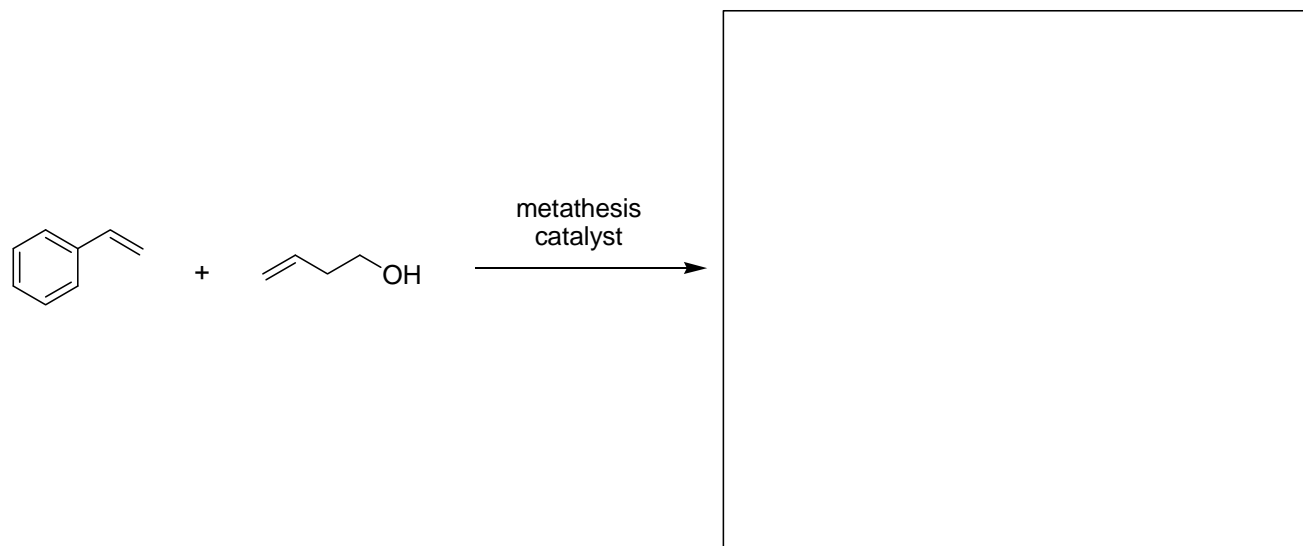
b) Also draw the structure of a N-heterocyclic carbene with at least two mesomeric formulas!

4. a) Supplement the following reaction scheme.



b) What is the driving force in this olefin metathesis reaction?

c) Give the products of the following reaction. What is the general problem of this type of alkene metathesis? Which type of catalyst would you use and why?



d) Design “your” example (different from the example of the lecture) on enantioselective ring opening metathesis by a enantiopure Ru-catalyst cat* (structure of catalyst has not to be given)!