Chapter 9:

Alkynes and Reactions with Alkynes

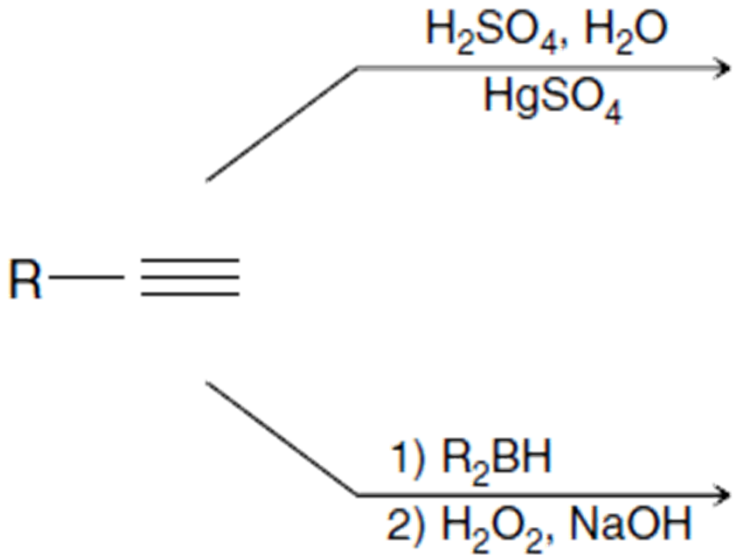
- Today (End Chapter 9)

  - ✓ Acetylide Formation
  - ✓ Hydrohalogenation
  - ✓ Anti Markovnikov Hydrohalogenation
  - ✓ Preparation of Alkynes
  - ✓ Addition of Halogens (Dibromination)
  - ✓ Reduction of Alkynes (Hydrogenation)

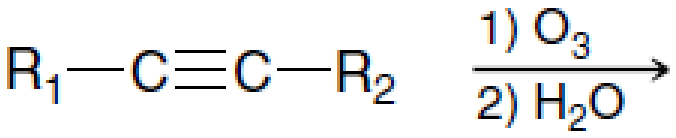
  - Acid Catalyzed Addition of Water
  - Hydroboration/Oxidation

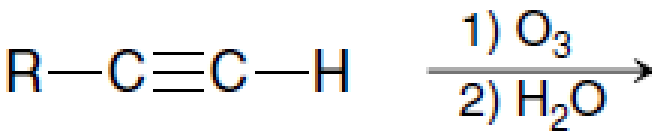
Hydration Regioselectivity

- Markovnikov hydration leads to a ketone.
- Anti-Markovnikov hydration leads to an aldehyde.



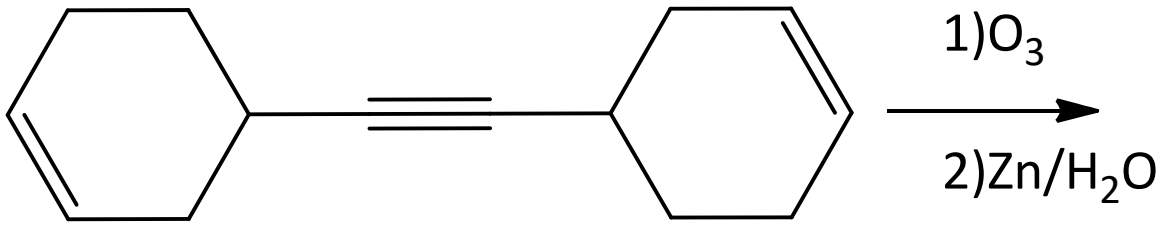
Alkyne Ozonolysis





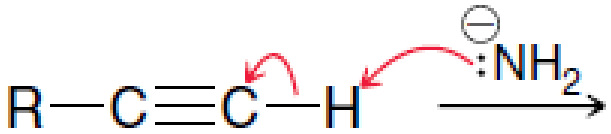
Alkyne Ozonolysis

- Predict the product(s) for the following reaction.

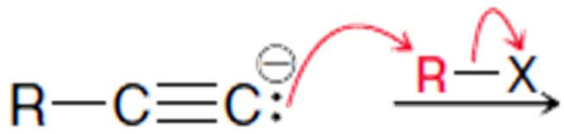


Alkylation of Terminal Alkynes

- As acids, terminal alkynes are quite weak.
- With a VERY strong base, a terminal alkyne can be deprotonated and converted into a good nucleophile.

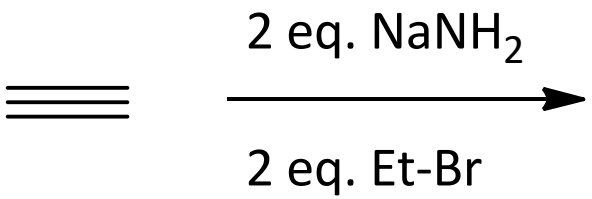


- The alkynide ion can attack a methyl or 1° alkyl halide electrophile.

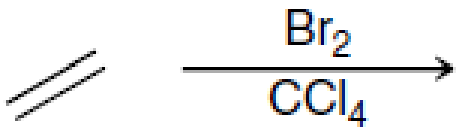


Alkylation of Terminal Alkynes

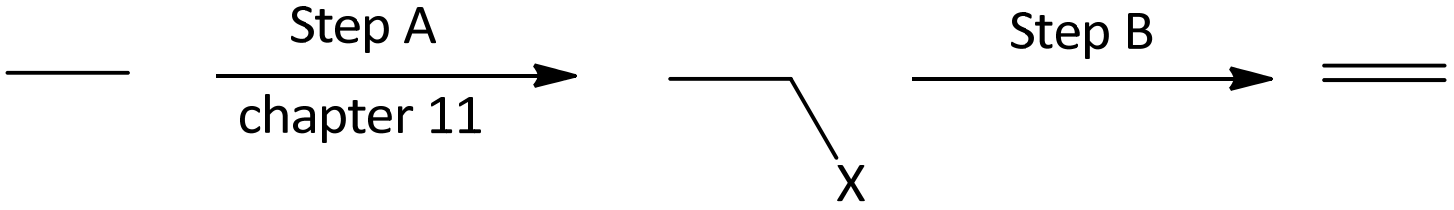
- Acetylene can be used to perform a double alkylation.



Synthetic Strategies



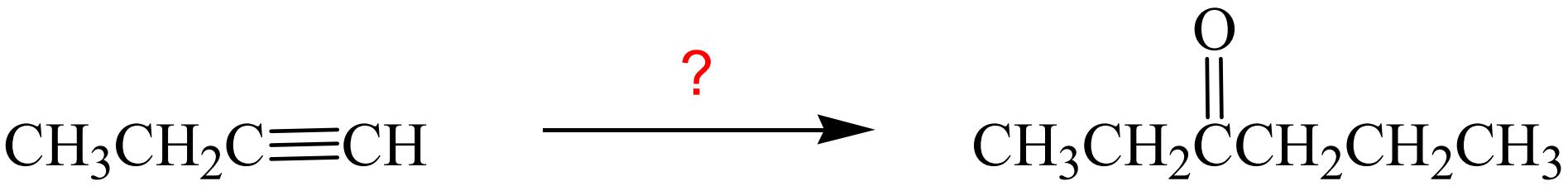
- We will have to wait until Chapter 11 to see how to convert an alkane into an alkene, but here is a preview.



  - What conditions would you use in step B?

Designing a Synthesis

Example 1



Strategy for a Successful Synthesis

Retrosynthesis

Designing a Synthesis

Example 2

Starting with Acetylene, what would be the appropriate set of reagents to produce 2-methyl-4-nonyne?

a. 1. $NaNH_2$
   2. n-bromobutane
   3. $NaNH_2$
   4. t-butylbromide

b. 1. $NaNH_2$
   2. n-bromobutane
   3. $NaNH_2$
   4. isobutylbromide

c. 1. $NaNH_2$
   2. n-bromobutane
   3. 1-chloro-2-methyl-propane

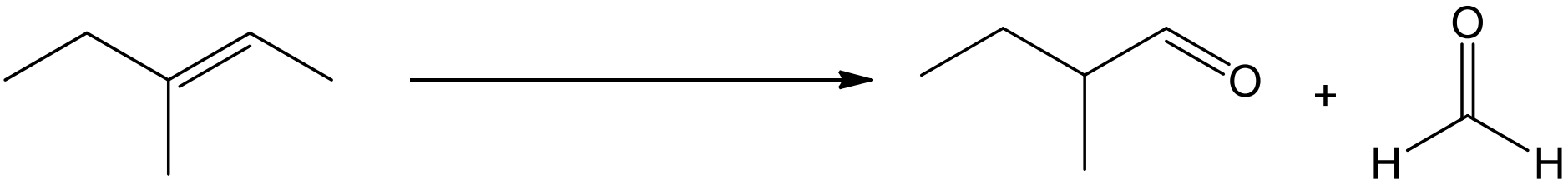
d. 1. $NaNH_2$
   2. n-bromobutane
   3. isobutylbromide

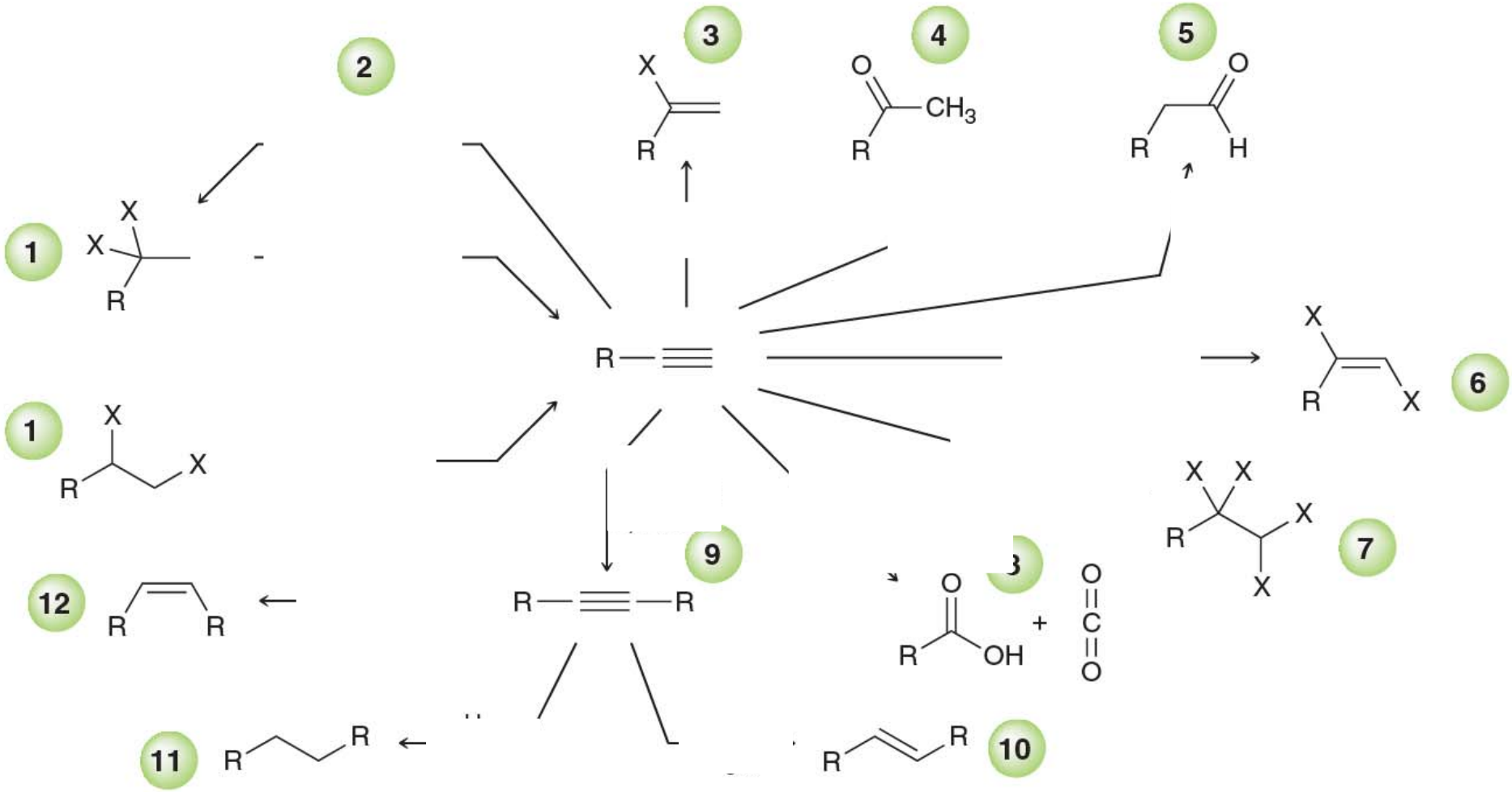
e. 1. $NaNH_2$
   2. n-bromobutane
   3. NaOEt
   4. 1-chloro-2-methyl-propane

Designing a Synthesis

Example 3

Example 4




1
X
X
R
1
X
R
X
2
3
X
R
4
O
CH3
R
5
O
R
H
6
X
R
X
7
X
X
R
X
X
8
O
R
OH
+
O=C=O
9
R
R
10
R
R
11
R
R
12
R
R

For Next Time….

Suggested Homework Problems Chapter 9

1,7,9,13,18,20,32-37, 41,44,52,57

MONDAY Chapter 10 (10.1-10.4)