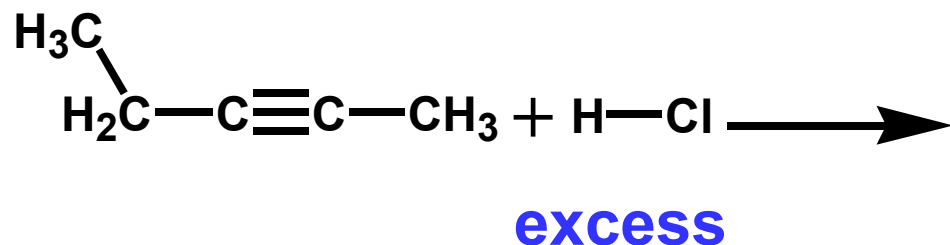
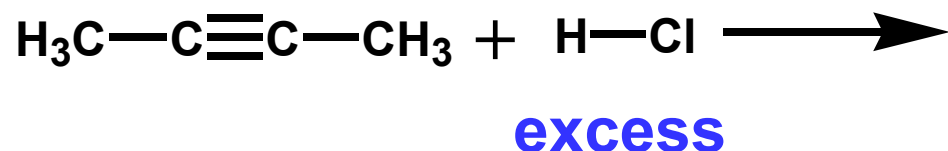


Chapter 9:

Alkynes and Reactions with Alkynes

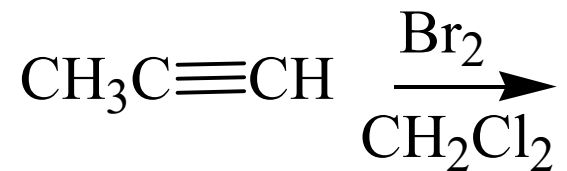
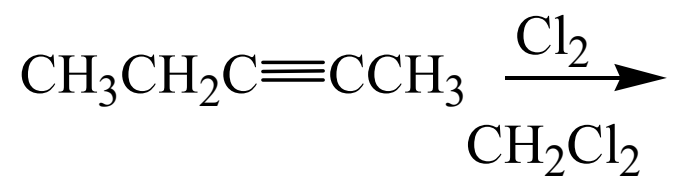
- Today (9.5-9.10) Reactions with Alkynes
- Friday (End Chapter 9)
 - ✓ Preparation of Alkynes
 - ✓ Acetylide Formation
 - ✓ Hydrohalogenation
 - ✓ Anti Markovnikov Hydrohalogenation
 - Addition of Halogens
 - Reduction of Alkynes
 - Acid Catalyzed Addition of Water
 - Hydroboration/Oxidation
 - Oxidative Cleavage

Hydrohalogenation of Alkynes



Anti- Markovnikov Addition

Halogenation of Alkynes



Halogenation of Alkynes



Slide 4

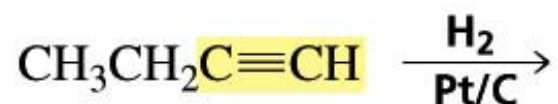
AEVG1

Anne E. V. Gorden, 10/28/2017

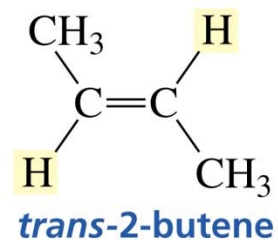
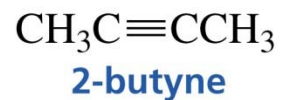
Addition of Hydrogen

Formation of Cis Alkene

Like alkenes, alkynes can readily undergo hydrogenation.

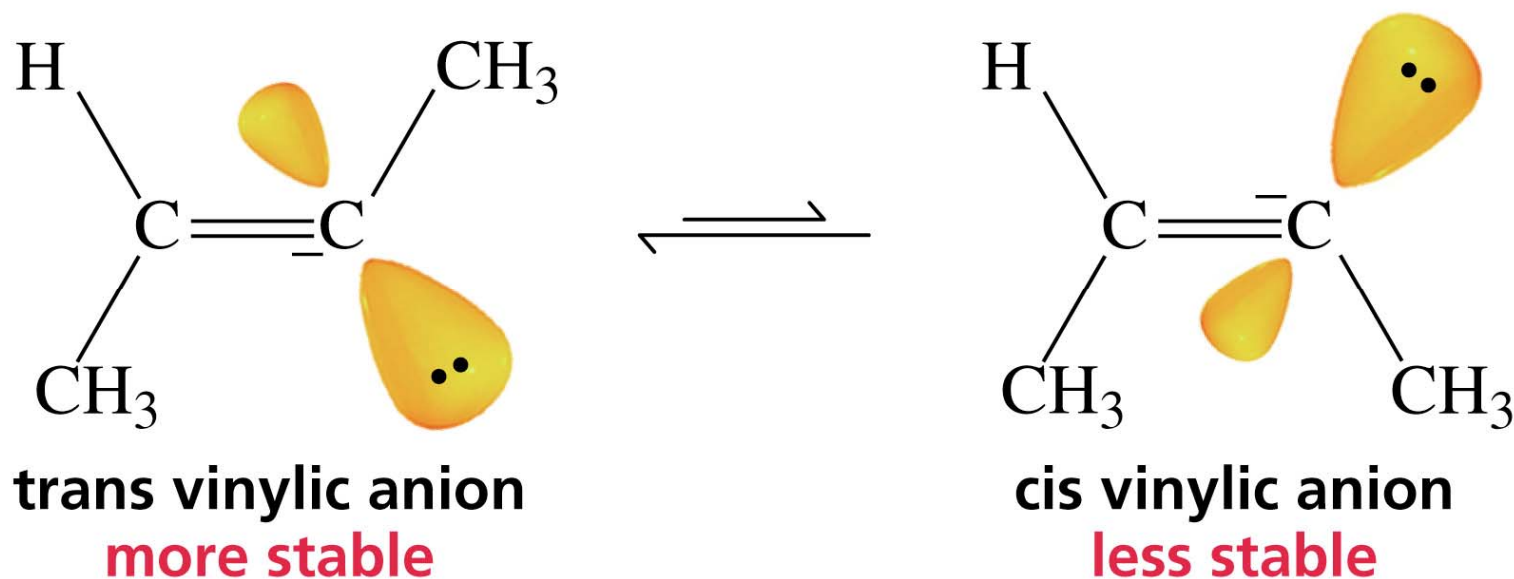


Chemical Reduction of Internal Alkynes to form Trans Alkenes



Reason for trans addition:

The radical anion adopts a trans configuration to reduce repulsion.

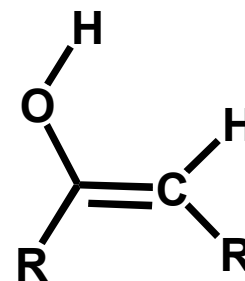
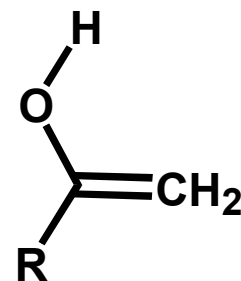
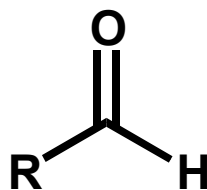
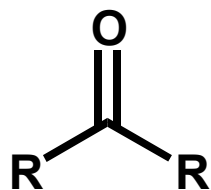


Reduction of Alkynes – Summary

- Two equivalents of H_2 are consumed for each alkyne \rightarrow alkane conversion.



New Functional Groups

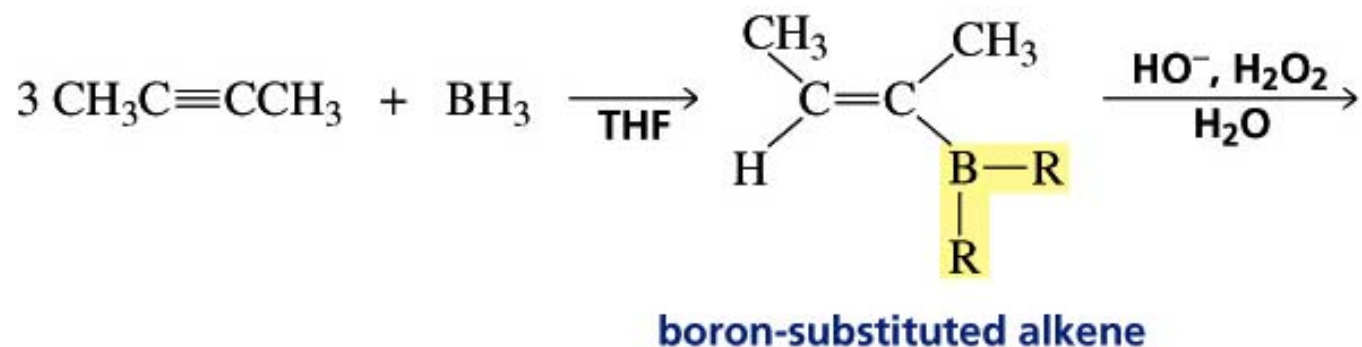


Acid-Catalyzed Addition of Water to Alkynes

Like alkenes, alkynes can also undergo acid catalyzed Markovnikov hydration.

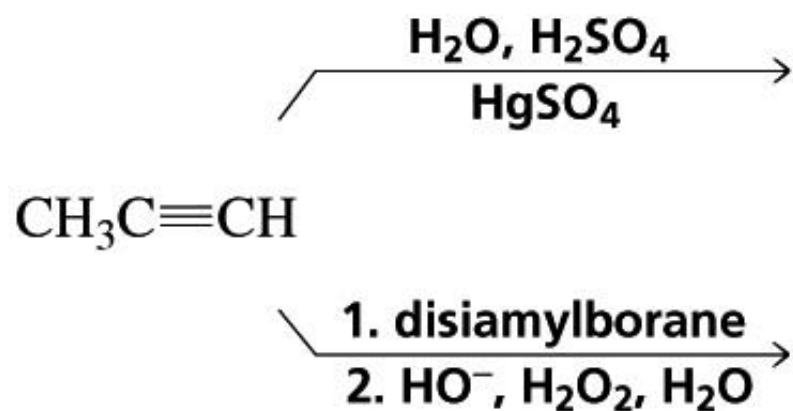


Hydroboration – Internal Alkynes

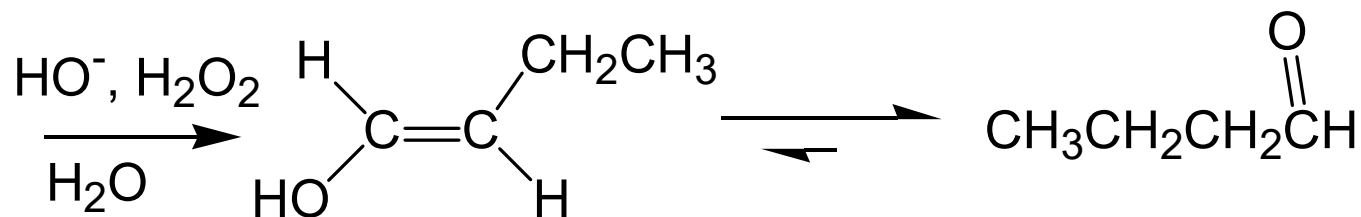
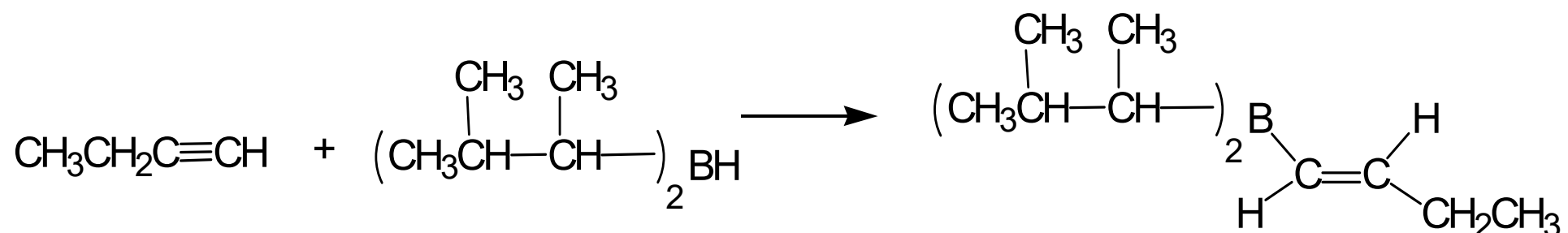


Internal alkynes react easily with BH_3 to form a trialkenylborane. The addition is comparable to treatment of an alkene with BH_3 . The reaction involves syn addition of hydrogen and boron.

Formation of Ketone versus Aldehyde

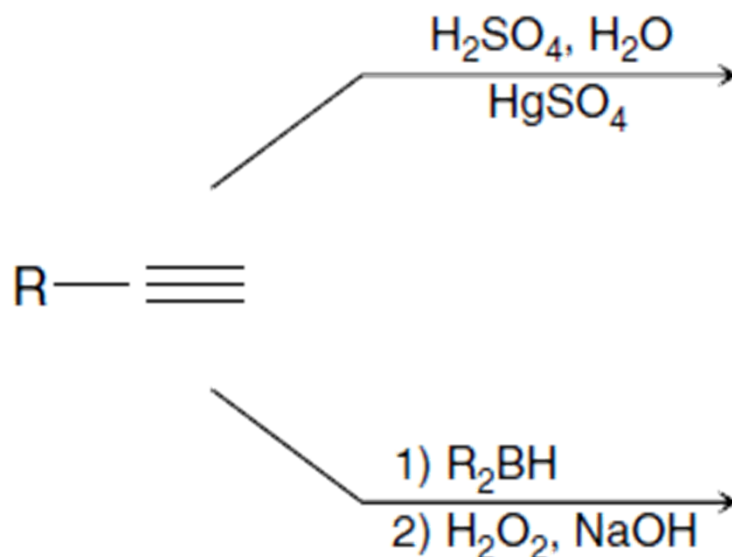


Hydroboration–Oxidation of Terminal Alkynes



Hydration Regioselectivity

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



Suggested Homework Problems Chapter 9

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