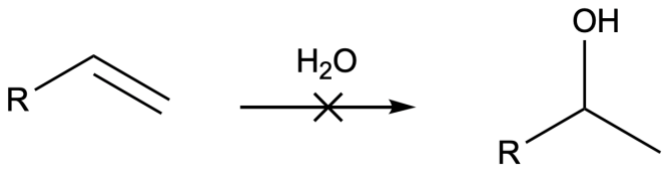
**Problem Set 7**

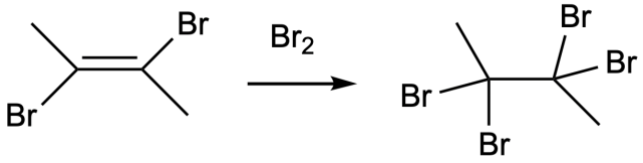
Organic Chemistry 1 (Greenberg)

Fall 2025

1. Alice just learned about hydrohalogenation reactions in her organic chemistry class! She wants to add as many different groups to her alkene as possible. However, she found that putting the alkene in water does not yield any products. Explain why this reaction does not work with a sentence or energy diagram with a qualitative description of the HOMO and LUMO.

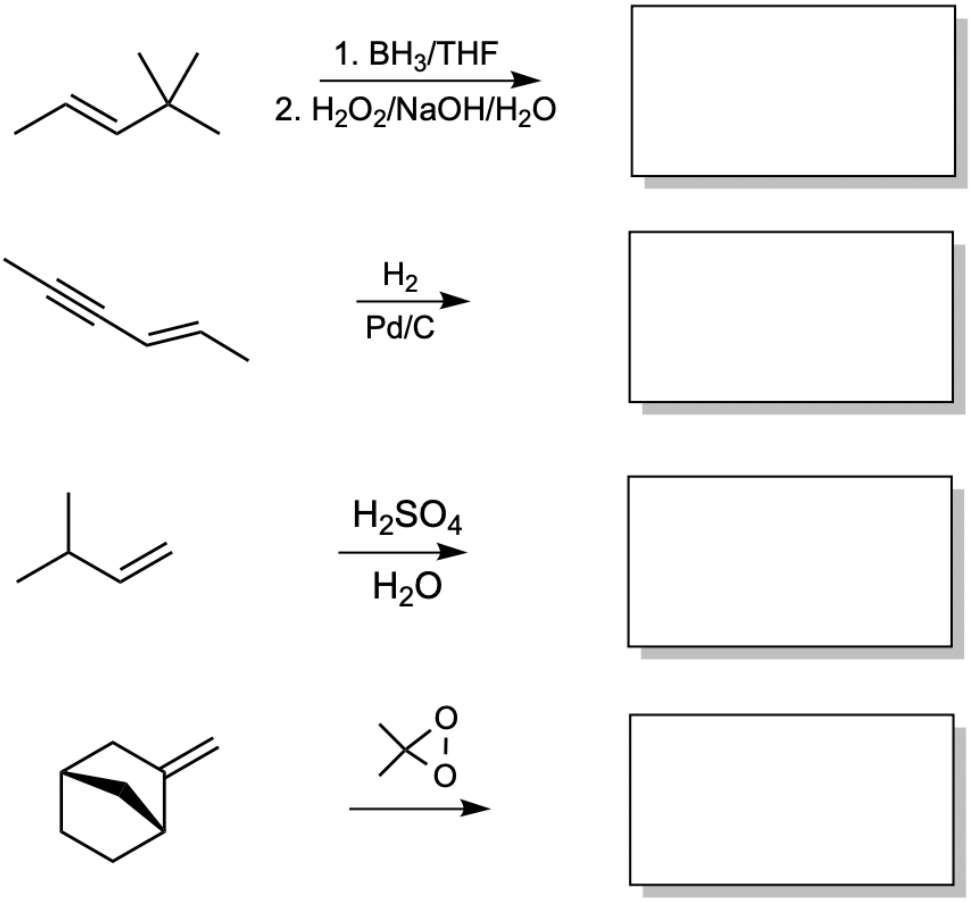



2. Alkynes undergo similar reactions with alkenes due to their nucleophilic nature. How can we rationalize whether a reaction with an alkyne will proceed to an alkene and alkane?
    a. Draw the mechanism and transition state for the following reactions:

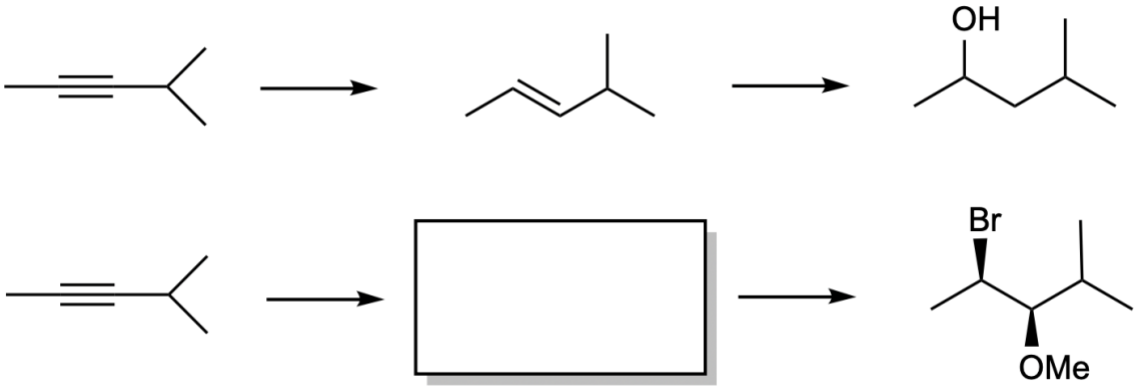



b. Using the transition states you drew above, explain why it is very difficult to isolate the bromoalkene intermediate when $Br_2$ is added to an alkyne.

3. Draw the products for the following reactions, indicating stereochemistry where appropriate and major/minor products.

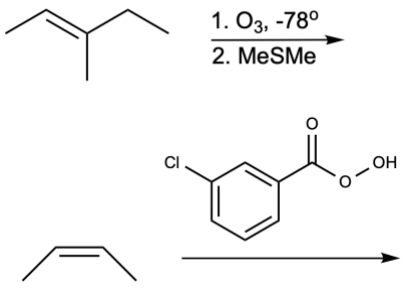


4. Our first multistep reaction!
    a. Provide the reagents and intermediates for the following reactions.

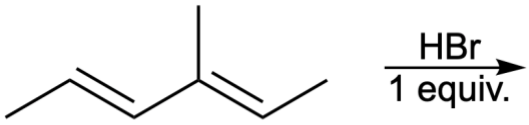



    b. Uh oh! Tommy accidentally swapped the reagents for the first step (alkyne -> alkene) between the two reactions! Assuming the reagents for the second step (alkene -> alkane) remained as written, how does this affect the products?

5. John and Justin are falling asleep in lecture. Suddenly Dr. Greenberg surprised them with a pop quiz! If they don't figure out the products and draw the following mechanisms, they will be banished to the steam tunnels ☹. Help them out!



6. What does it mean for a reaction to be thermodynamically or kinetically controlled? Draw all major regioisomeric products which form in the reaction below and show the mechanism for each regioisomer's formation.




   a. Draw an energy diagram for each regioisomer's formation showing relative energies of reactants, intermediates, and products.

   b. Predict which regioisomer will form more at cold temperatures versus hot temperatures. Explain your answer using the energy diagrams drawn above.

**Clubs and Orgs Bulletin:**

Promote your club! https://forms.gle/V19BipzLyuAaWMyz8

Violet Patient Volunteering Program
Violet is a fantastic opportunity for clinical volunteering, peer education, and community engagement. We spread sexual and reproductive health education across 3 clinics in Baltimore,

and our applications for our Spring 2026 volunteering program are open! The written application is due Sunday, October 26th at 11:59 pm. Check our instagram @violet4teens for the link :)

Society of Women Engineers
SWE is hosting a Professor Panel dinner on 10/22 from 6–7:30pm! Meet female WSE professors, learn about their research and paths into academia, and get advice on post-college opportunities. Registration on HopkinsGroups is required and food is provided. Follow us on Instagram @jhuswe to learn more!

**Tip of the Week:**

If you ever experience a behavioral health crisis or are concerned about someone else, call and connect with JHU's Behavioral Health Crisis Support Team 24/7 at (410) 516-9355. Find out more information at https://wellbeing.jhu.edu/bhcst.