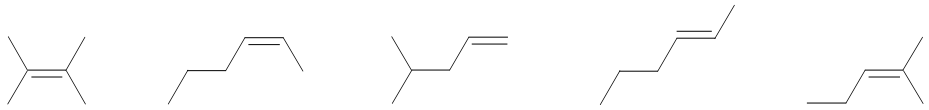
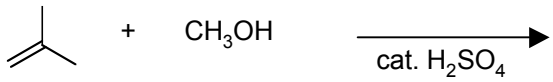
Chemistry 30A Discussion – Week 9: Alkenes – DCF

1. Rank the stability of the following isomers from 1-5 (1 being the most stable).

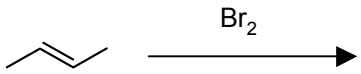


2. Provide the product of each reaction given below. In the space under each reaction, provide a curved arrow mechanism of the transformation.

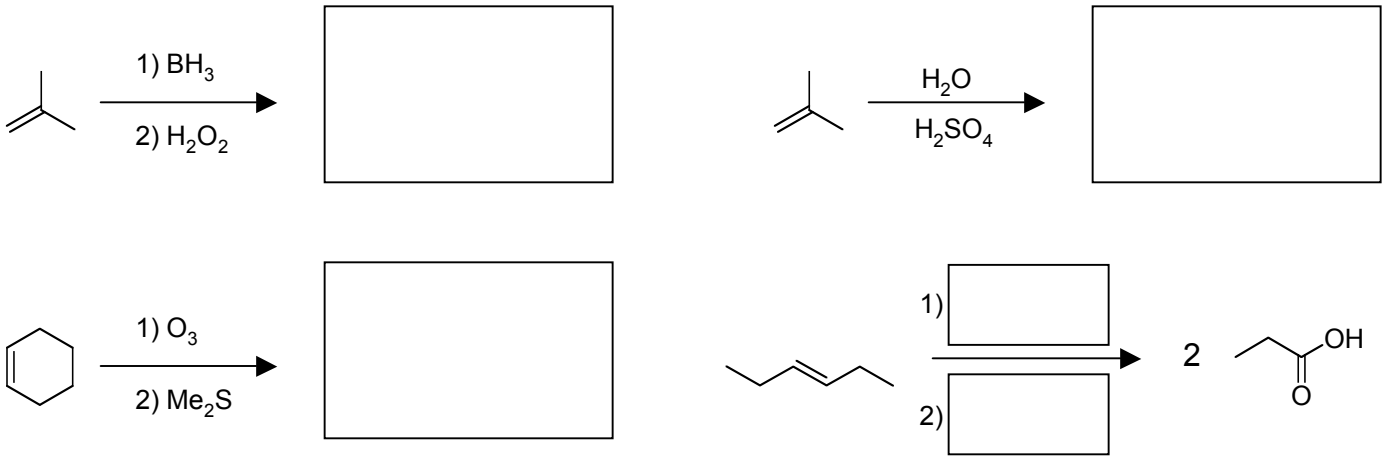
A



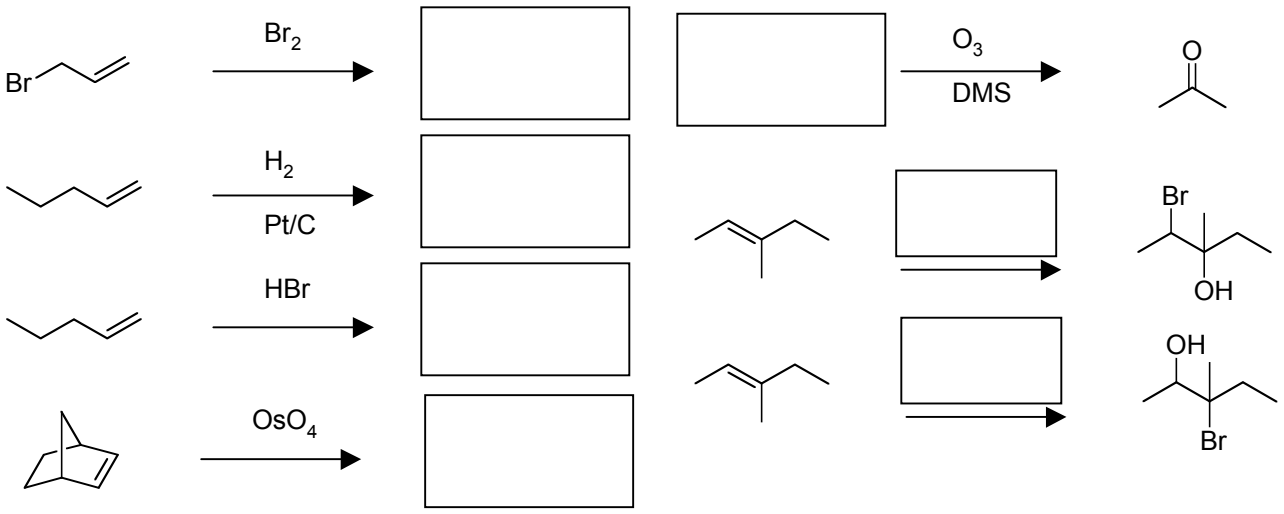
B



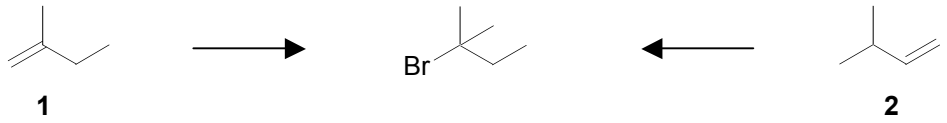
3. Fill in the boxes with the missing product or reagents of each reaction.



4. Fill in the boxes with the missing product or reagents of each reaction.



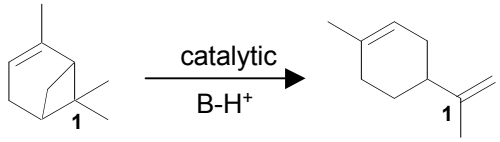
5a. Provide a detailed, stepwise arrow-pushing mechanism for the addition of HBr to alkene **1** below. Addition of HBr to the isomeric alkene **2** yields the same product. Provide a detailed mechanism for this reaction.



1 **2**

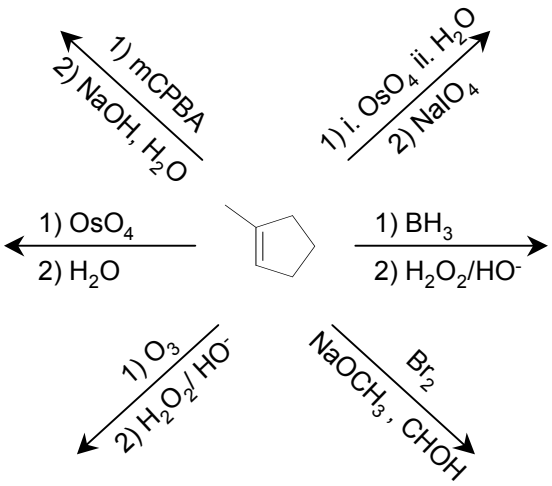
5b. For each mechanism in problem 2a provide a detailed reaction coordinate diagram. Indicate transition states and intermediates appropriately. Indicate the rate determining step of each reaction.

6. α-pinene undergoes an acid-catalyzed rearrangement to afford limonene. Provide a three-step, detailed, arrow-pushing mechanism for this process. (Hint: note that carbon 1 is labeled in the starting material and the product.)

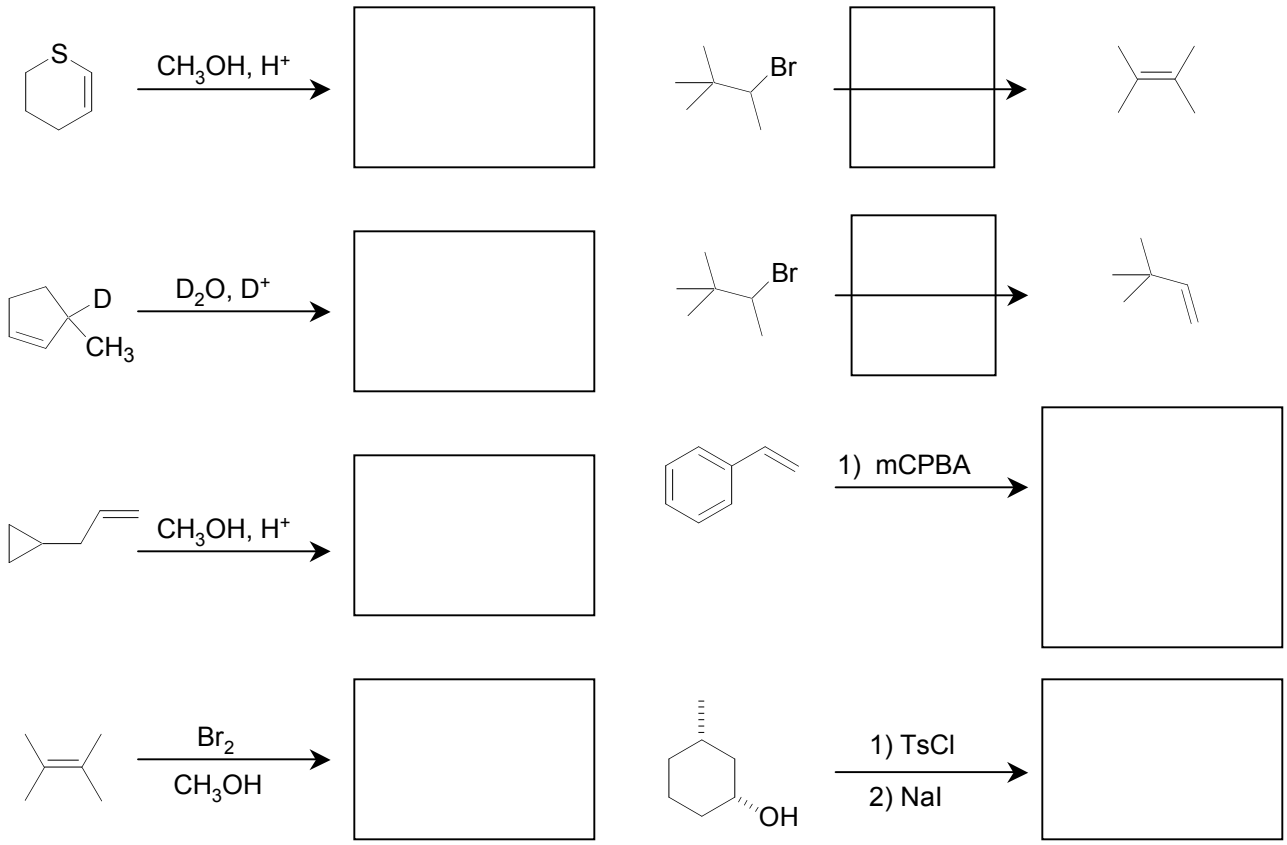


α-pinene limonene

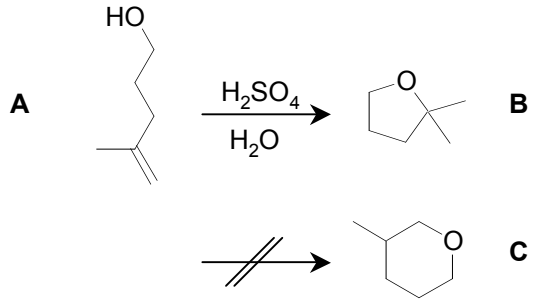
7. Draw the product of each reaction indicated on the substrate below. Be sure to indicate the relative stereochemistry at any chiral carbons.



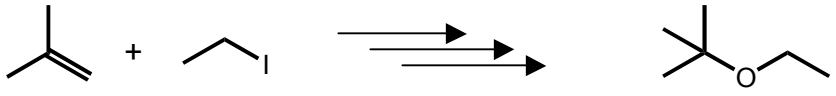
8. Fill in the appropriate starting material(s), reagent(s), or major product for the following reactions (show stereochemistry where appropriate:



9. Provide a detailed mechanism for the following transformation from **A** to **B** **and** explain why compound **C** is not formed.

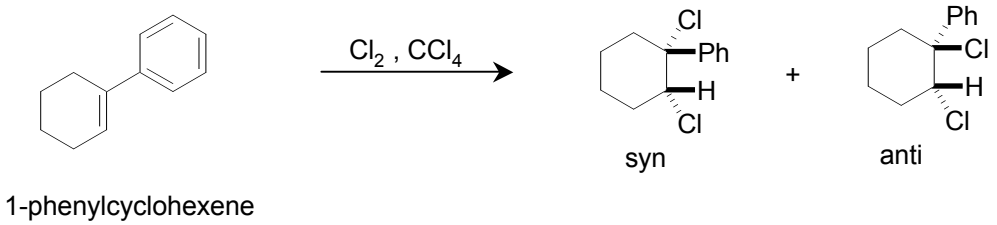


10. Design a synthesis of ethyl tert-butyl ether starting from isobutylene and ethyl iodide. Use any other reagents as needed. (Hint: more than one step is required).



11. Alkenes generally undergo dihalgonation with anti-stereochemistry via a halonium ion intermediate. Interestingly, when 1-phenylcyclohexene reacts with Cl_2 in CCl_4, a mixture of the syn and anti isomer products are isolated. Propose a mechanism to explain this result.

Radical Mechanism – Will be covered during week 10.



1-phenylcyclohexene