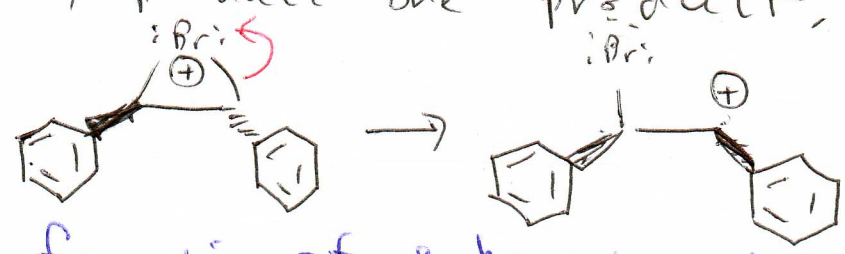
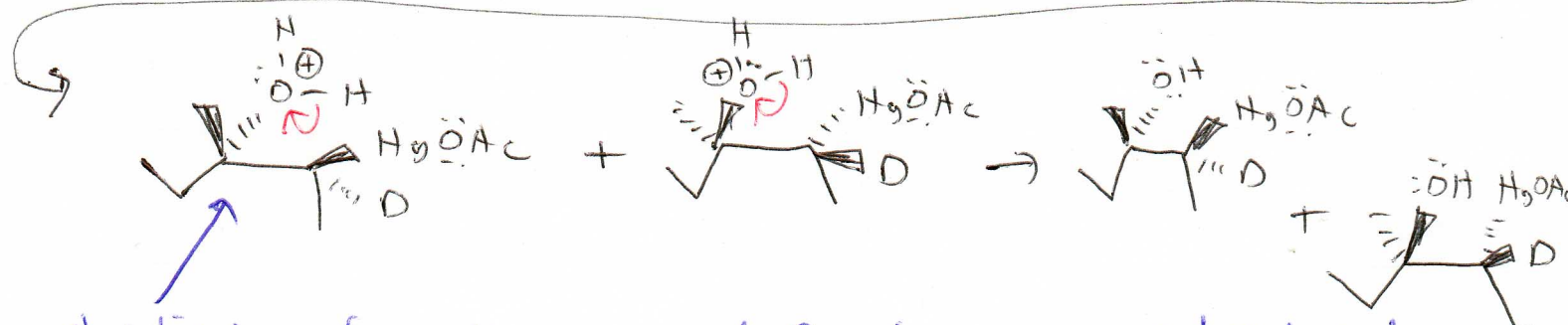


In this rxn, the ring remains intact until it is attacked by whatever nucleophile is present in sol'n. Because the ring remains intact, each intermediate will only produce one product.

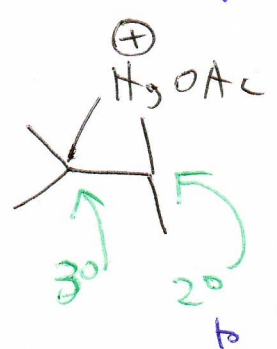


In this case, the ring can open independently only because

the formation of a benzyl carbocation is favorable. Only in this case, therefore, attack can occur from two different directions.



Addition of water occurred @ the most substituted position, so this is an example of Markovnikov addition. This might seem strange given that the mechanism of that step resembles an S_N2 rxn and involves a 3° substrate.



The 3-member ring is strained due to its small size and the ⁺ charge. When the ring opens, it is more favorable to produce a 3° vs 2° carbocation, so the bond to the 3° carbon is weaker and therefore breaks when water attacks.



The overall stereochemistry is anti addition, due to the cyclic intermediate.

1. utility - alkene \rightarrow alcohol (H_2O) or ether ($-OR$)

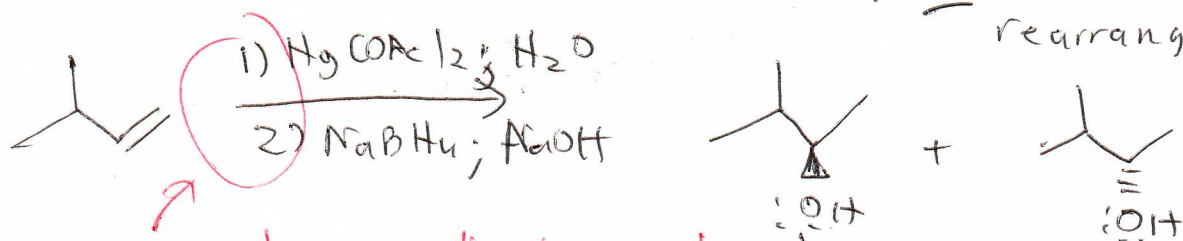
2. reagents: 1) $Hg(OAc)_2$ and H_2O or ROH
2) $NaBH_4, -OH$

3. conditions: _____

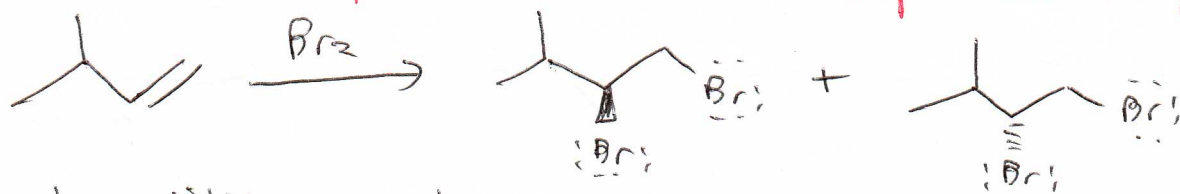
4. mechanism: cationic / stepwise

5. stereochemistry: form 5 enantiomers; overall anti addition

6. regiochemistry: Markovnikov; no carbocation rearrangement



These numbers indicate the reagents must be used in a specific order as separate steps.



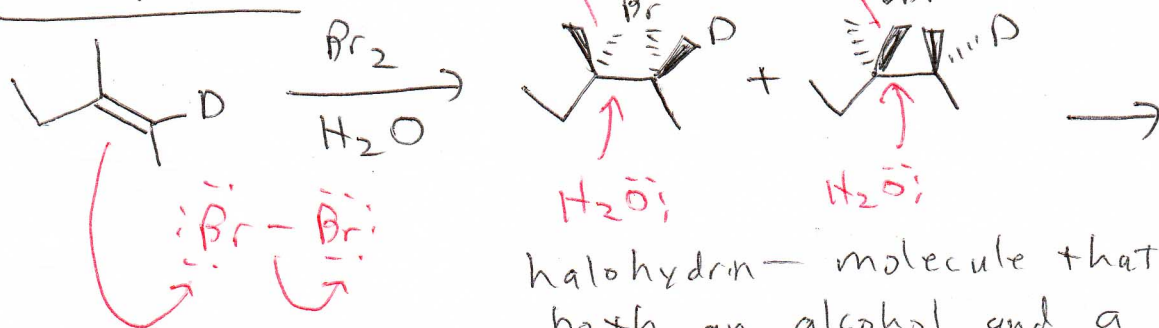
1. utility: alkene \rightarrow vicinal dihalide

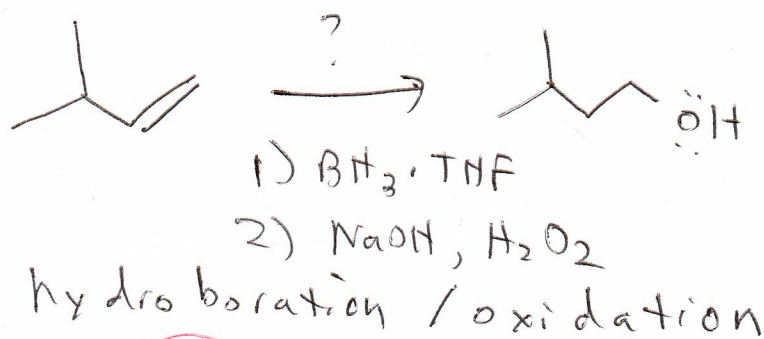
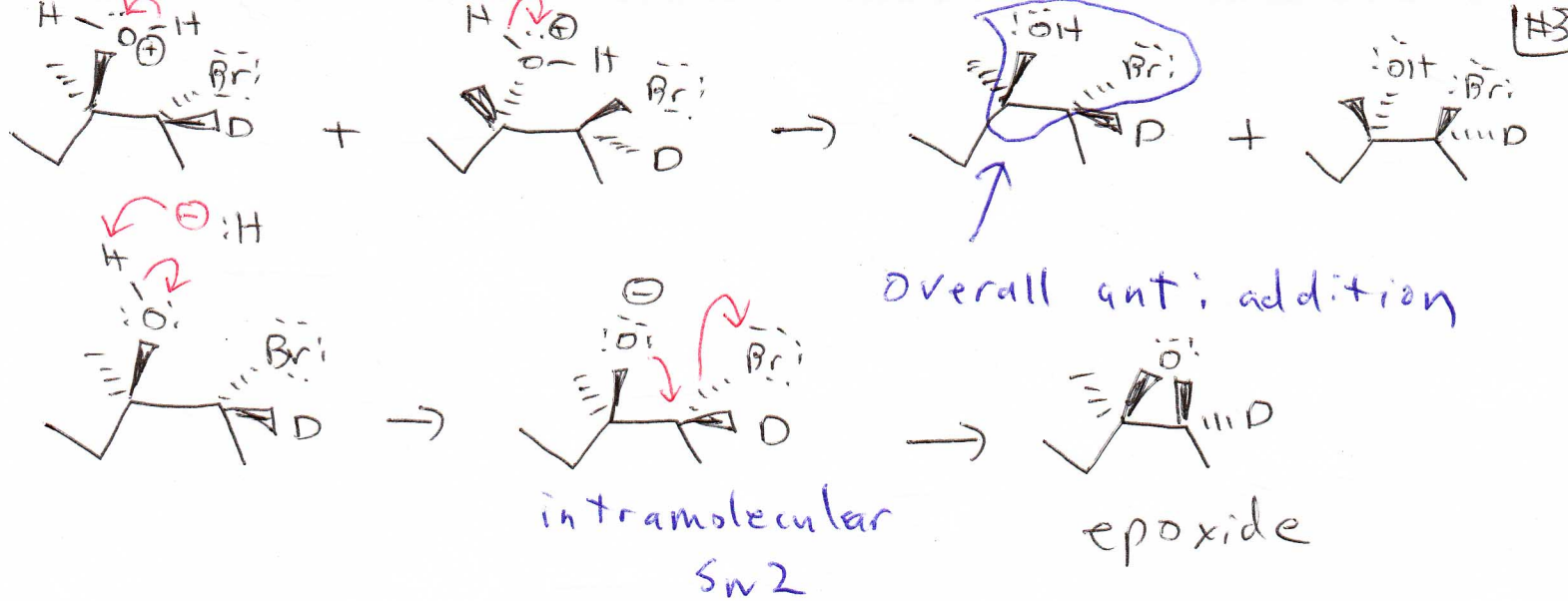
2. reagents: Br_2 or Cl_2

3. conditions: no light

5 + 6 \rightarrow same as oxymercuration - demercuration

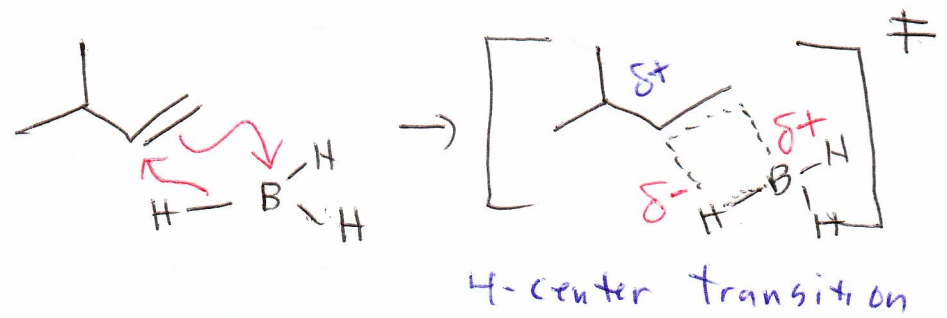
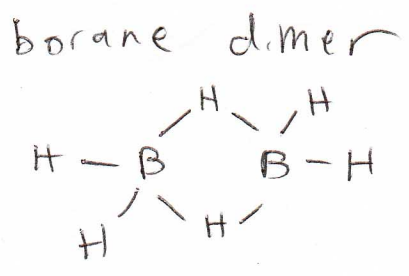
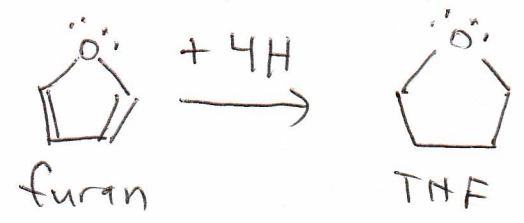
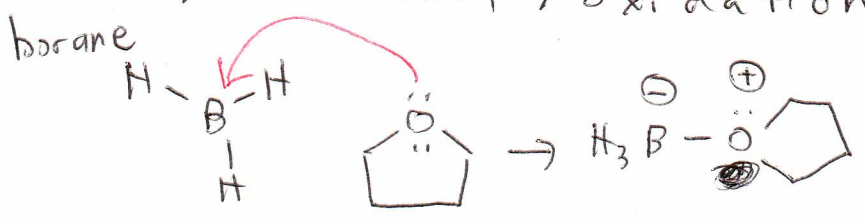
Halohydrin





anti-Markovnikov add'n
(substituent ends up on less substituted carbon)

tetrahydrofuran (THF)



This rxn step appears to be anti-Markovnikov addition since the hydrogen (which normally is the electrophile) ends up at the more substituted position. However, hydrogen is more ~~and~~ electronegative than boron, so boron is the electrophile, consequently, the boron adds to the less substituted position, ~~so that~~ ~~and~~ Because of the cyclic transition state, no carbocation forms, so no rearrangement occurs.

