

Chapter 13:Highlights

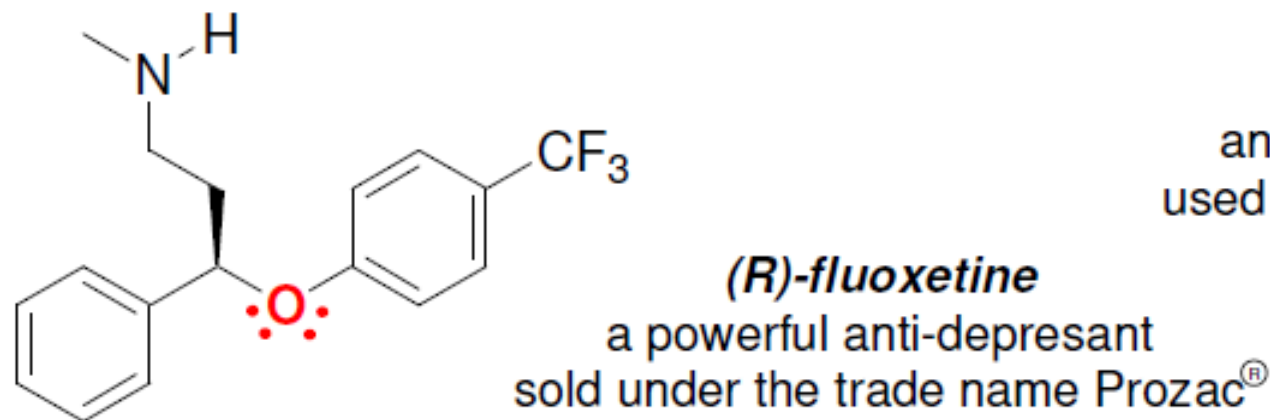
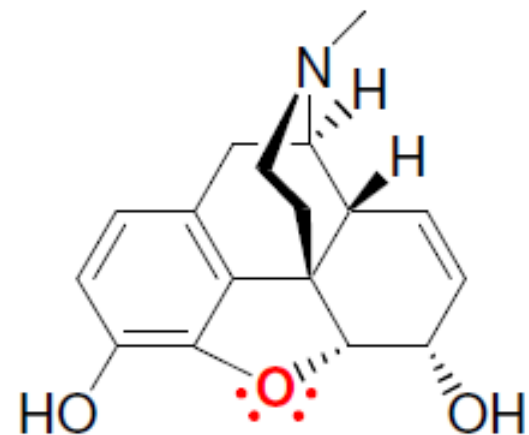
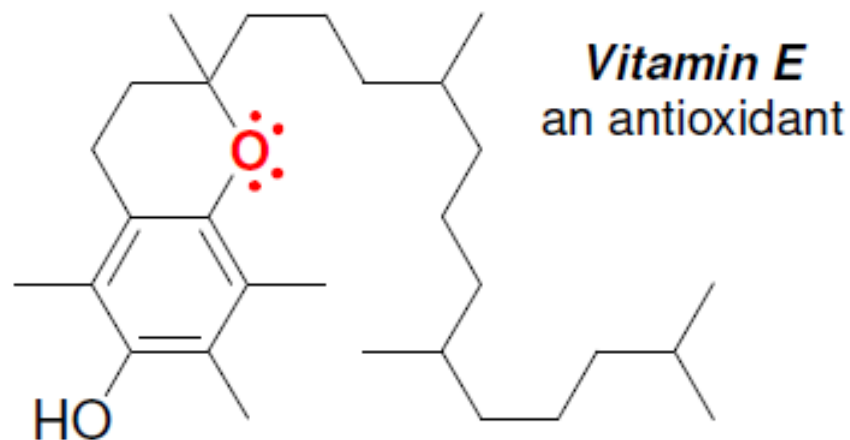
Today –(Ch. 13. 1- 13.6, 13.8)

Wednesday (Ch.13.9-13.12)

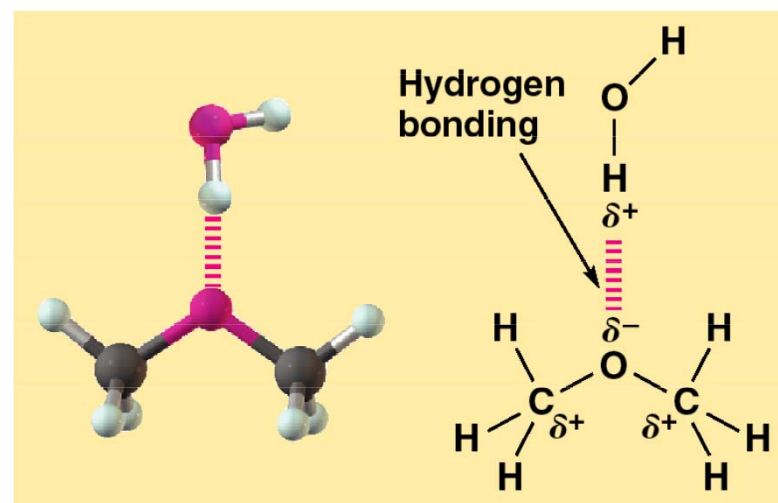
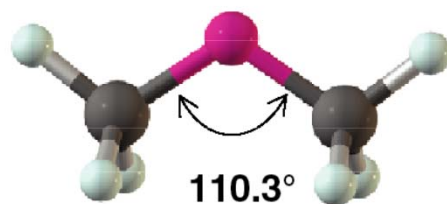
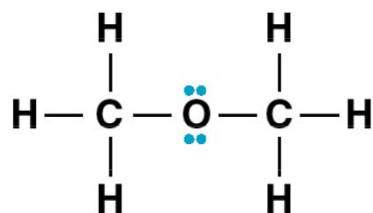
We will not cover nomenclature of epoxides.

CHAPTER 13: Introduction to Ethers

- Compounds containing ether groups are quite common.



Ethers: Structure and Nomenclature



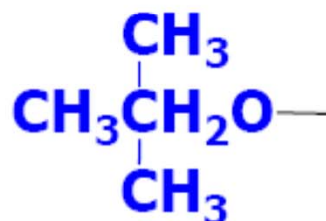
Naming Ethers

For symmetrical ethers, name the alkane on each side and then add "ether."

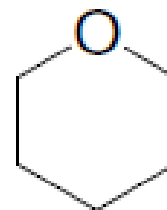
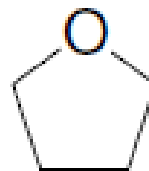
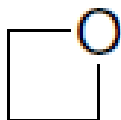
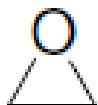
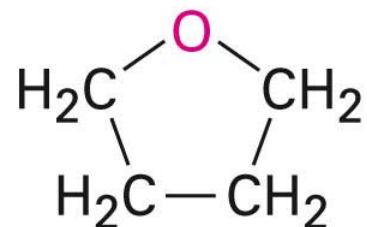
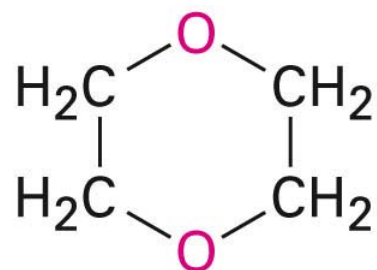
For unsymmetrical (or asymmetrical) ethers, name the alkane on each side, and then add "ether."



As substituents, add "oxy" to the alkyl name:



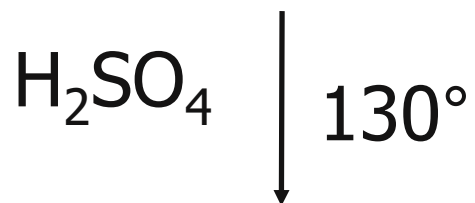
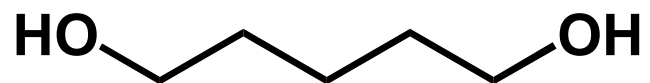
Cyclic Ethers



Synthesis of Ethers

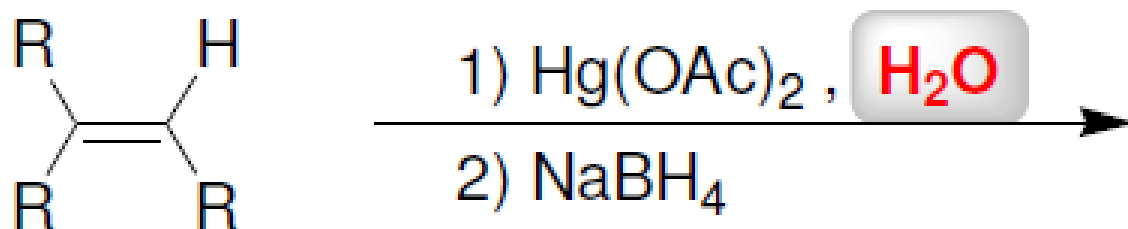
Ethers are prepared industrially by acid–catalyzed dehydration of primary alcohols

Intramolecular Analog

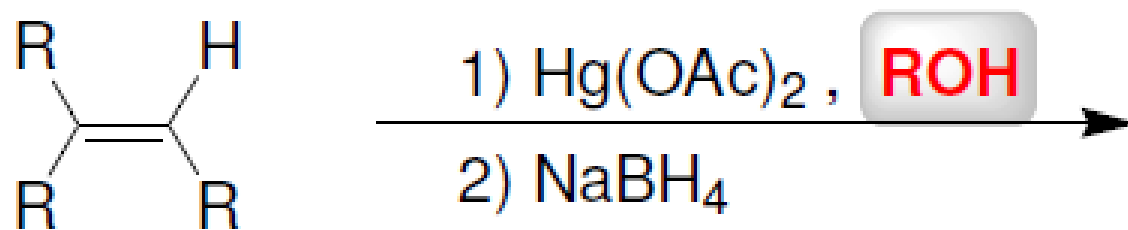


Preparation of Ethers

- Recall from Section 8.5 that oxymercuration-demercuration can be used to synthesize alcohols.



- Similarly, alkoxymercuration-demercuration can be used to synthesize ethers.

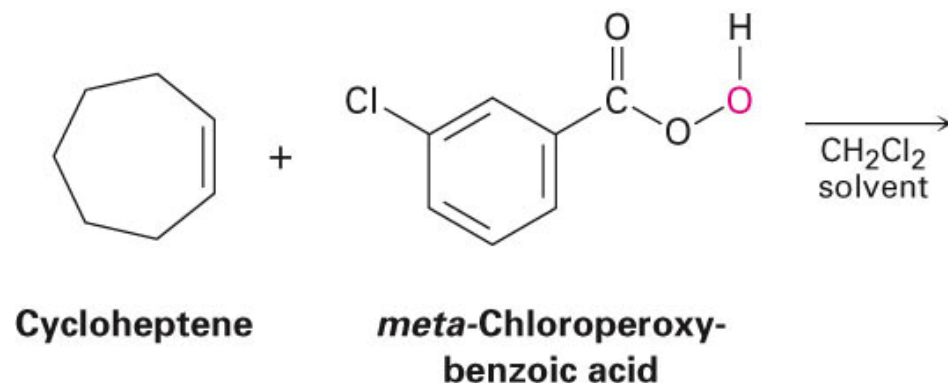


The Williamson Ether Synthesis

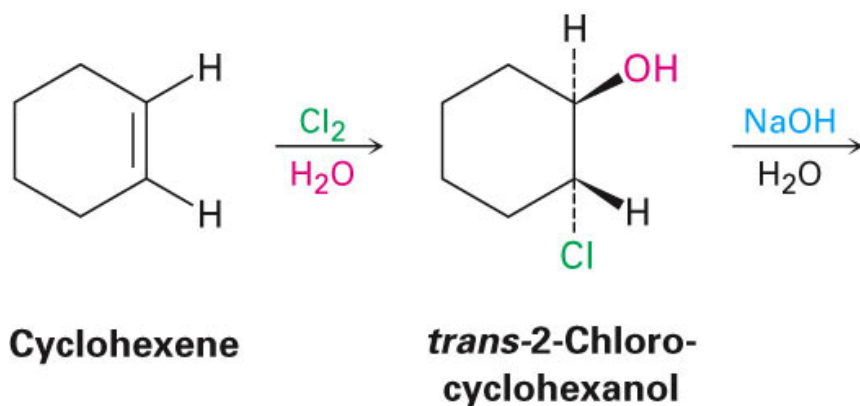
- Reaction of metal alkoxides and primary alkyl halides and tosylates
- Best method for the preparation of ethers

Preparation of Epoxides:

- Treatment of an alkene with a peroxyacid



- Treatment of a halohydrin with base gives an epoxide

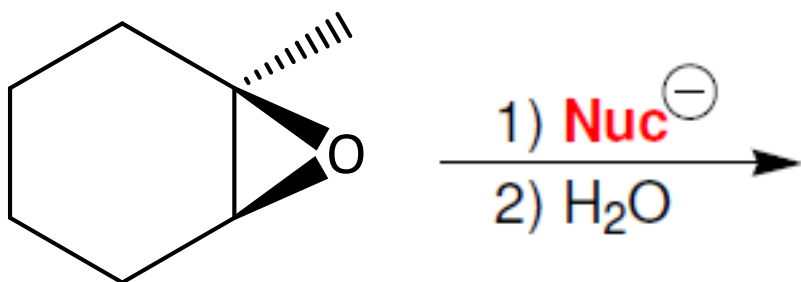
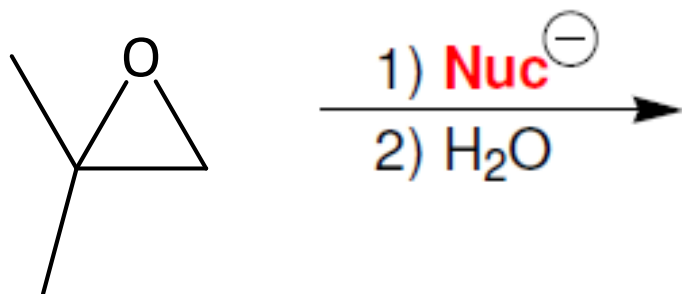


Acid catalyzed Ring Opening of Epoxides

Nucleophile attacks more substituted carbon of protonated epoxide

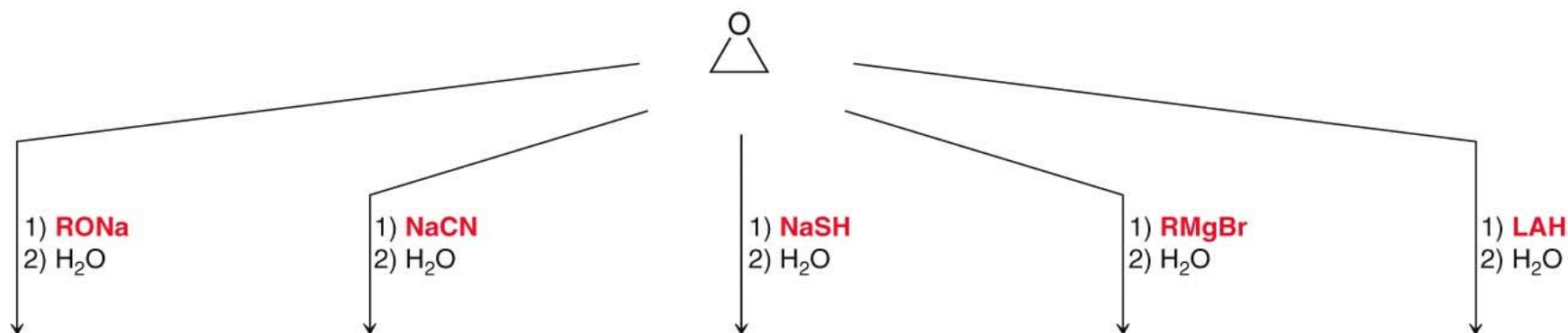
Ring-opening of Epoxides - basic

- Most ethers do not react with neutral or basic nucleophiles \rightarrow RO- is a poor leaving group.
- Epoxides are an exception. The relief of ring strain provides a driving force to open the ether.
- Pay attention to regio- and stereoselectivity.



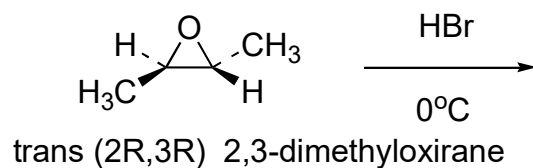
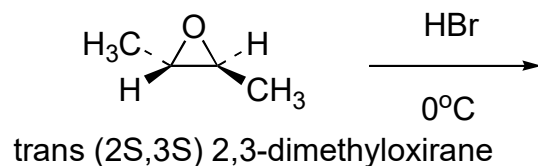
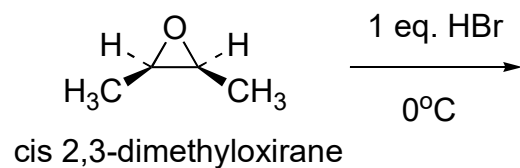
Ring-opening of Epoxides

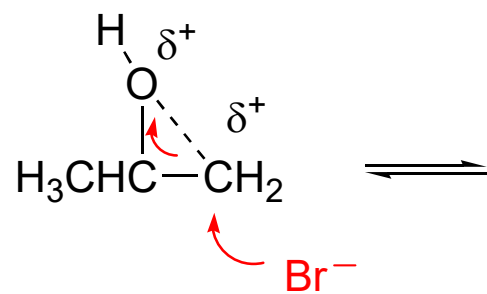
- Epoxides can be opened by many other strong nucleophiles as well



Reaction of Epoxide with hydrogen halides.

Epoxides are also cleaved by dilute solutions of HX. Here trans halohydrins are produced.



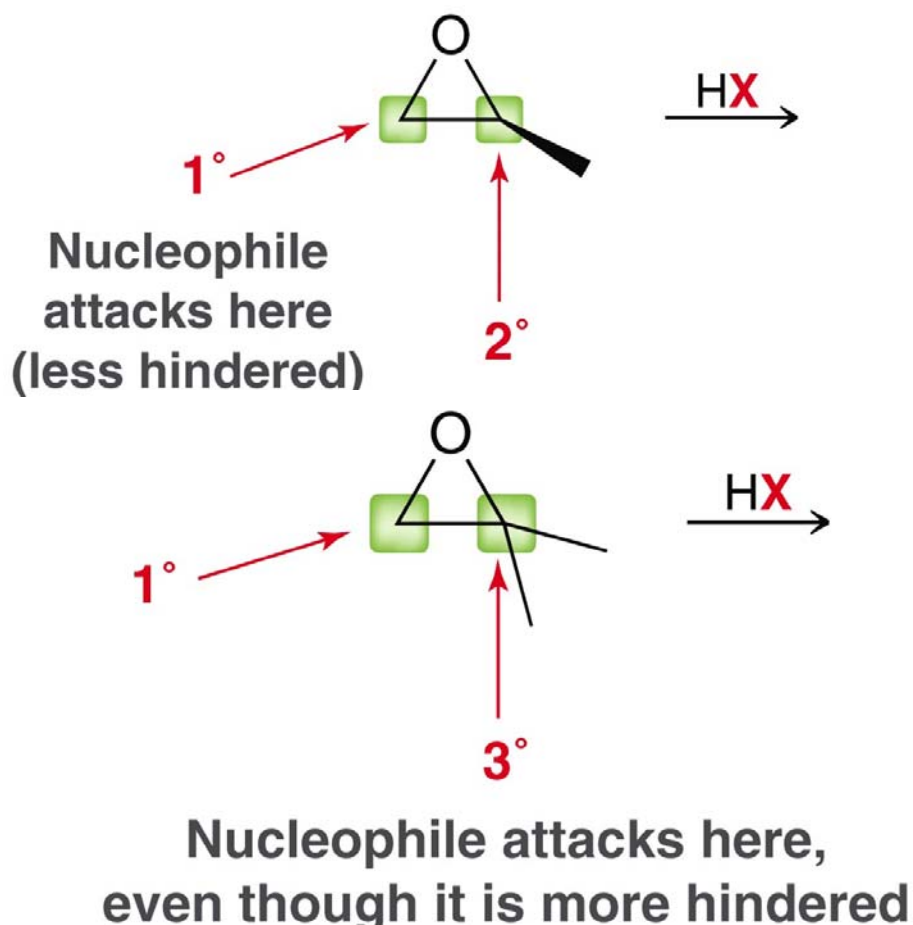


resembles 1°
 carbocation
 less stable

less product

Ring-opening of Epoxides - Regiochemistry

- Under Nucleophilic Conditions.... We have to Consider both steric and electronic effects (induction).



For Next Time....

Suggested Homework Problems

Chapter 13 #1, 5, 10, *18, 26, 29, 37, 38, 44, ***51**