

## Chapter 13:Highlights

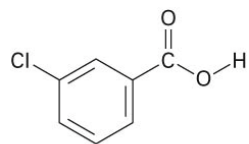
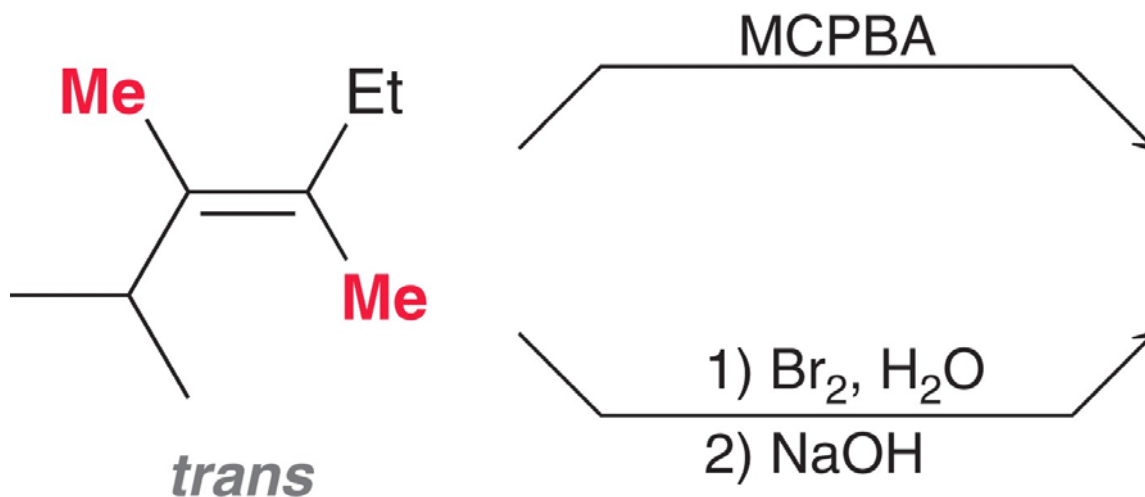
Today –Chapter 13 End! (Ch. 13.8-13.12)

A lot of this is 13.8-13.10....

We will not cover nomenclature of epoxides, thiols, or sulfides.

# Epoxidation

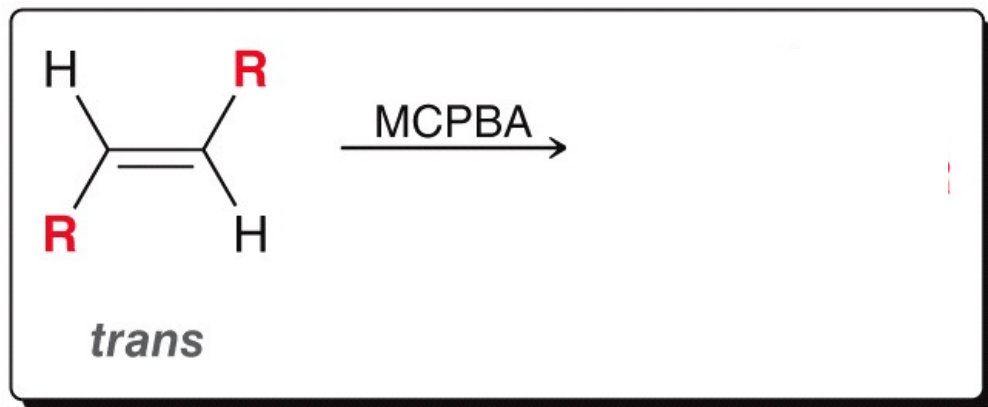
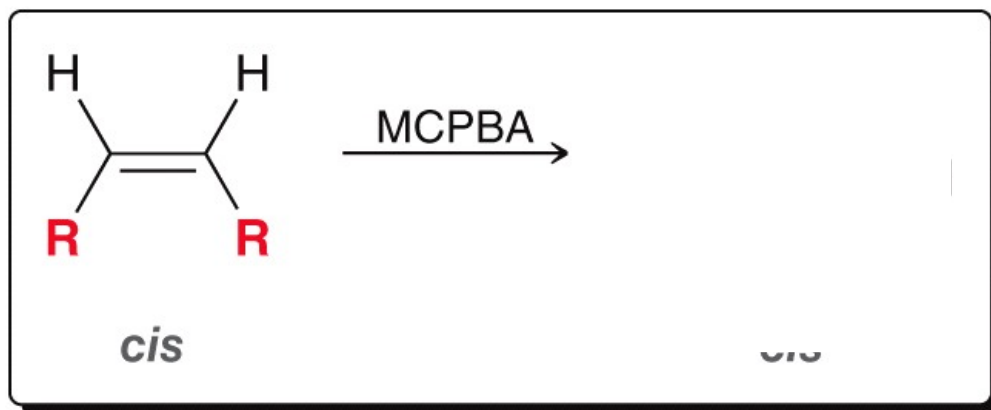
- The epoxidation methods we have discussed so far are NOT enantioselective
- Draw the products



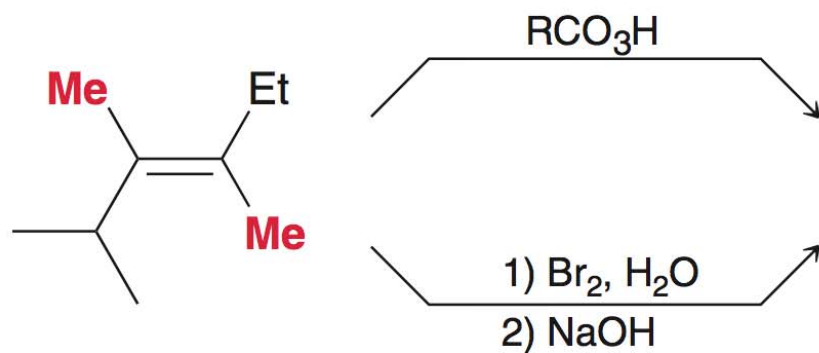
*meta*-Chloro-  
benzoic acid

# Epoxidation

- Epoxidations of alkenes ARE **stereospecific**

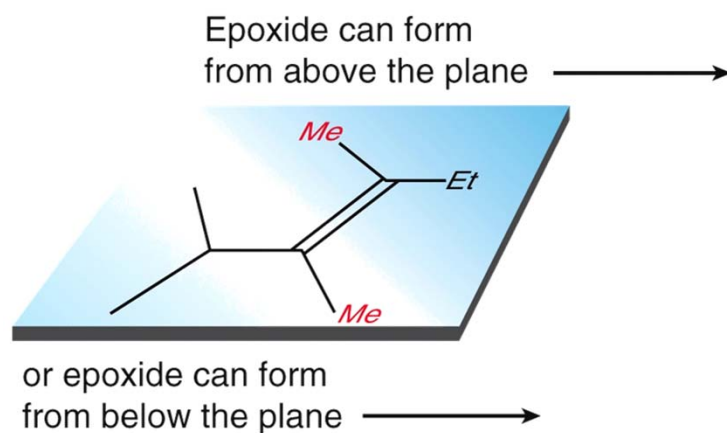


# Enantioselective Epoxidation



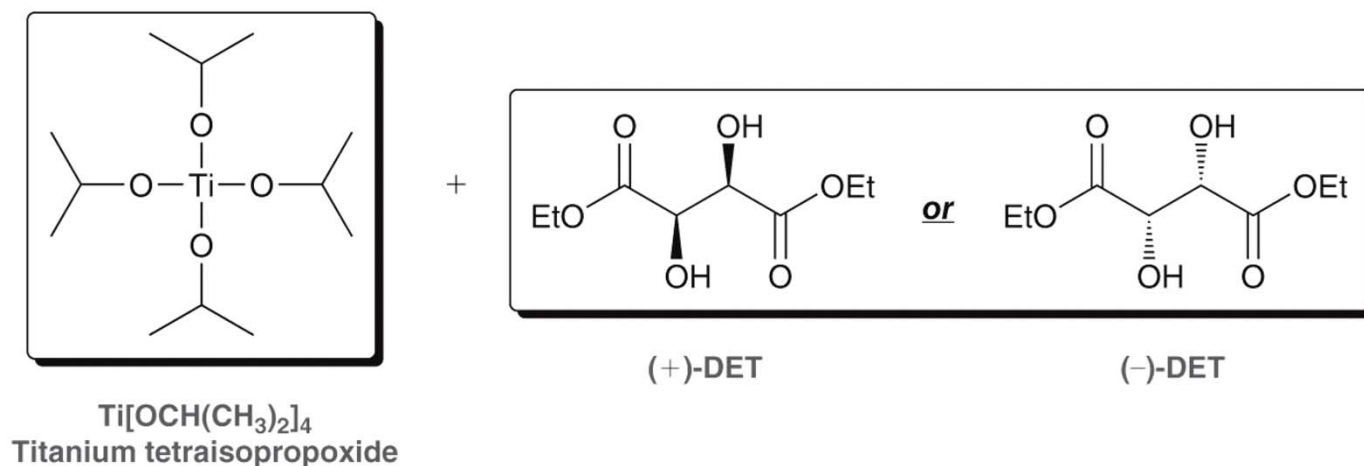
# Enantioselective Epoxidation

- The epoxidation forms a racemic mixture because the alkene can react on either face

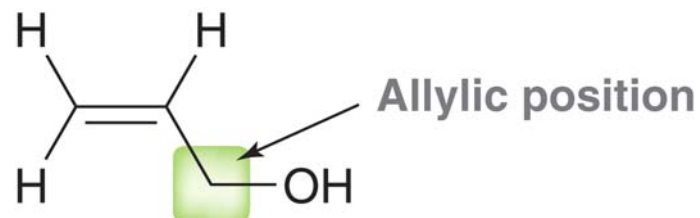


# Enantioselective Epoxidation

- The Sharpless catalyst is a chiral complex of titanium tetrakisopropoxide and diethyl tartrate.



- This catalyst will cause an enantioselective epoxidation of an allylic alcohol

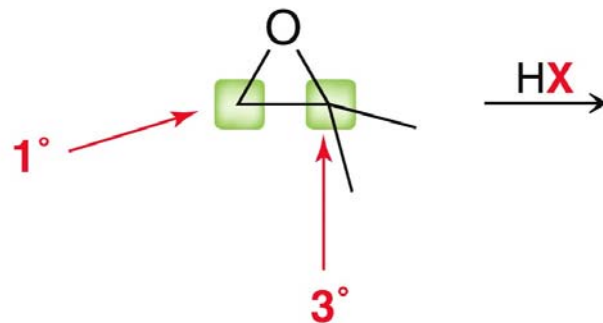
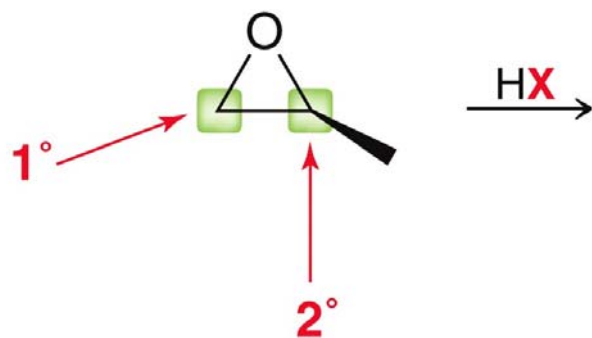


# Acid catalyzed Ring Opening of Epoxides

- :

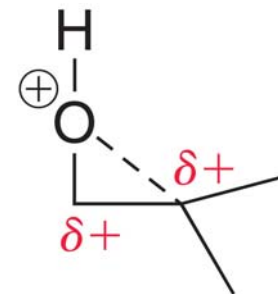
# Acid catalyzed Ring Opening of Epoxides

- Under acidic conditions, Nu attack still occurs

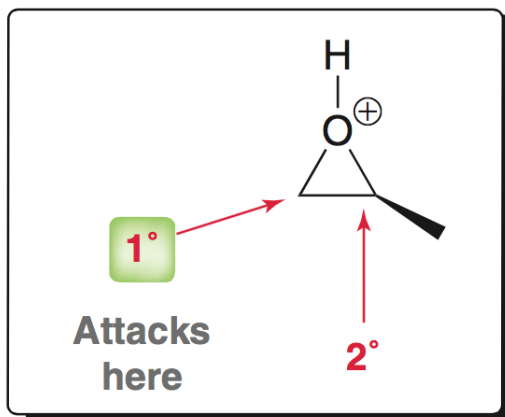




# Acid catalyzed Ring Opening of Epoxides

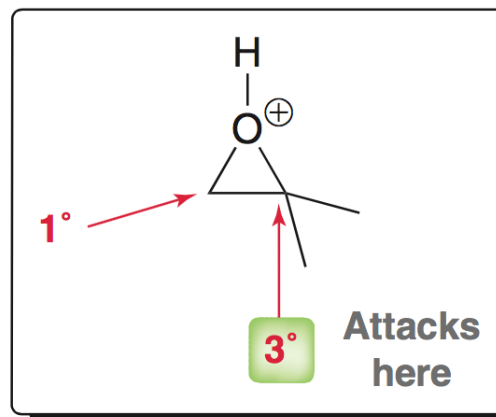


Primary vs. secondary



Dominant factor = steric effect

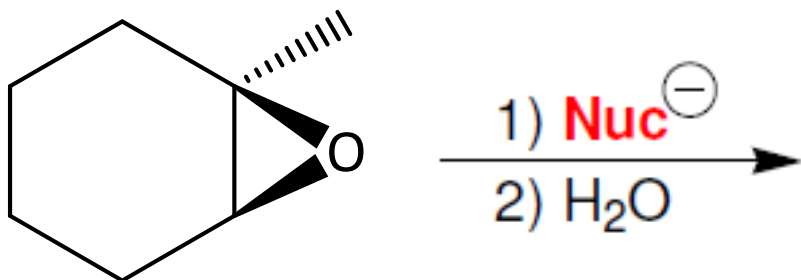
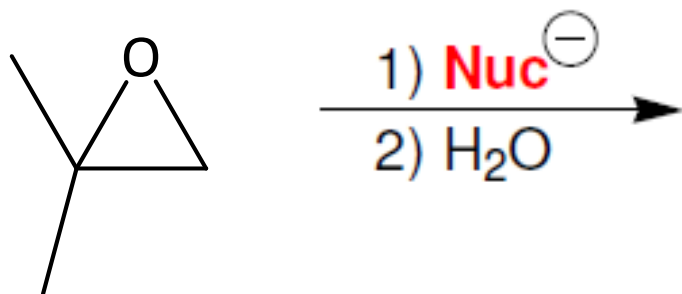
Primary vs. tertiary



Dominant factor = electronic effect

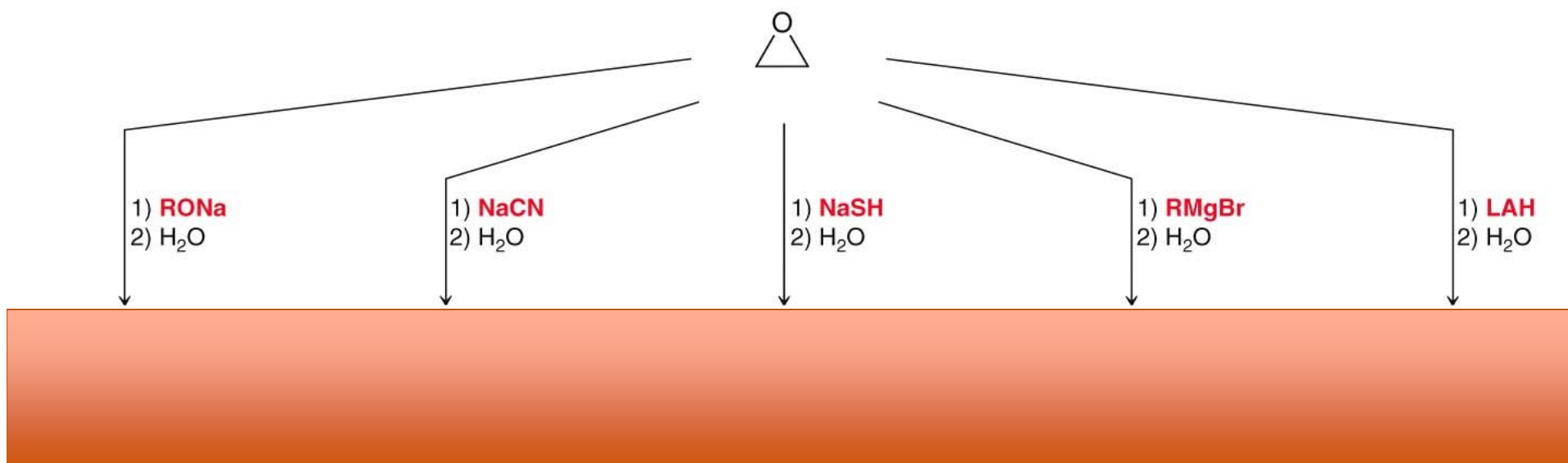
# Basic Ring-opening of Epoxides

- Most ethers do not react with neutral or basic nucleophiles



# Basic Ring-opening of Epoxides

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

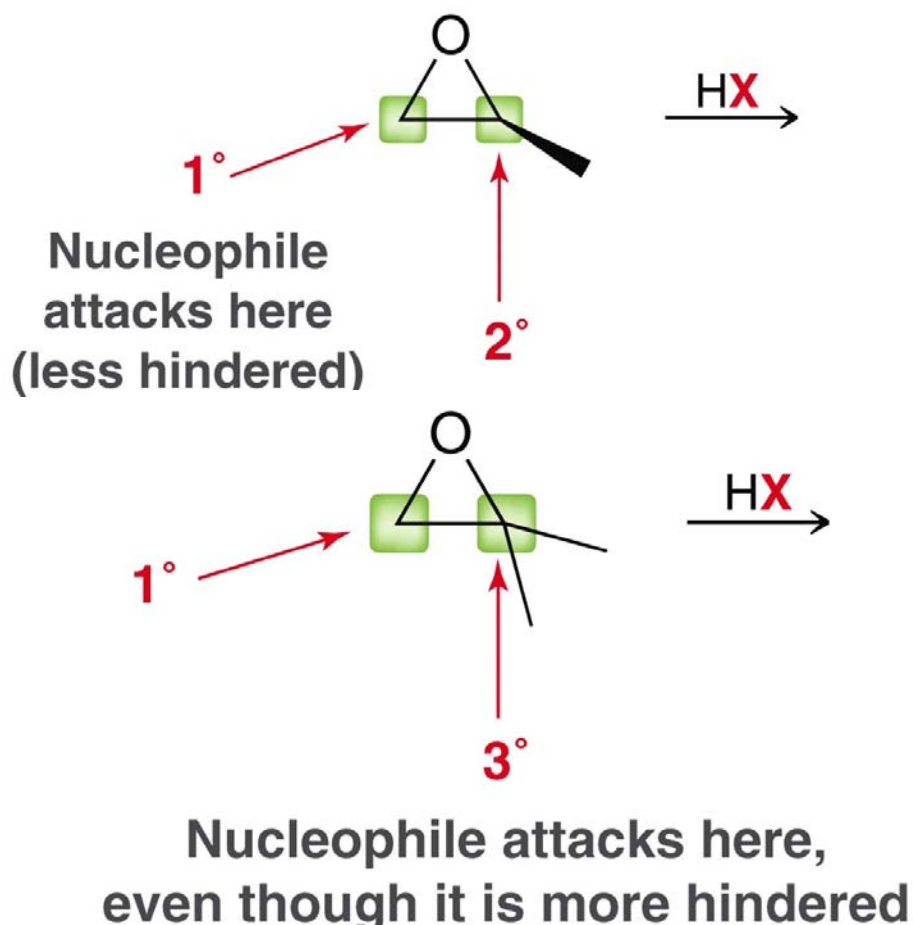


# Basic Ring-opening of Epoxides

- Strong nucleophiles react readily with epoxides

# Ring-opening of Epoxides - Regiochemistry

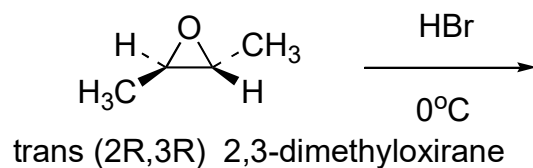
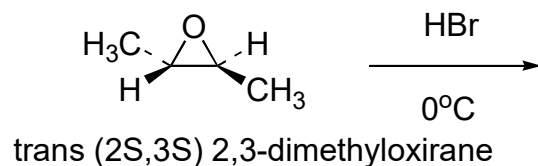
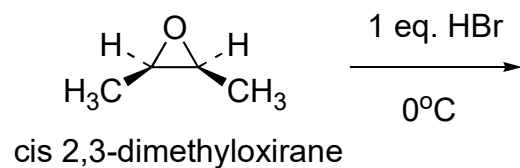
- Under Nucleophilic Conditions.... We have to Consider both steric and electronic effects (induction).



# Summary: Epoxides

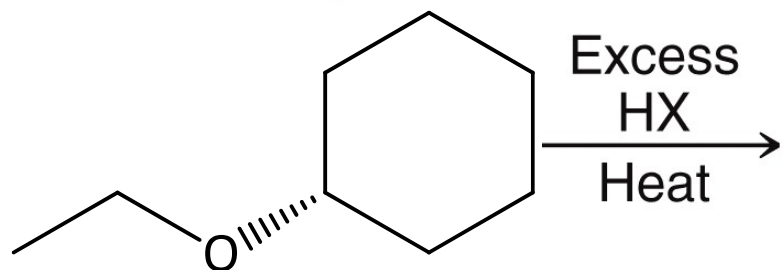
## Reaction of Epoxide with hydrogen halides.

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



# Reactions of Ethers

- Predict the products for the following acid-promoted cleavage





# For Next Time....

Suggested Homework Problems

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

Chapter 11 #7, 9, 11, 12, 18, 21, 30