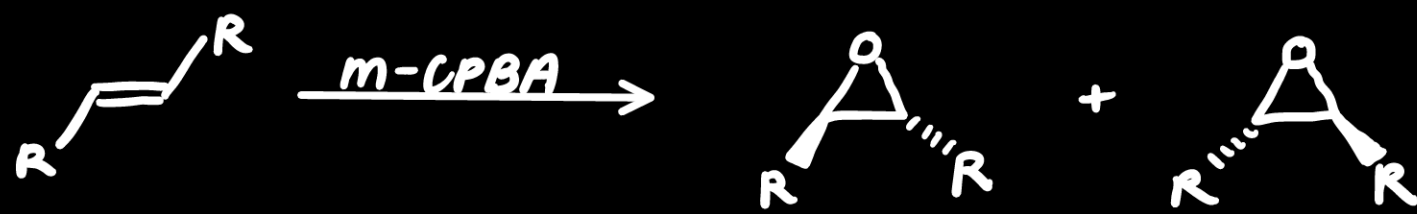


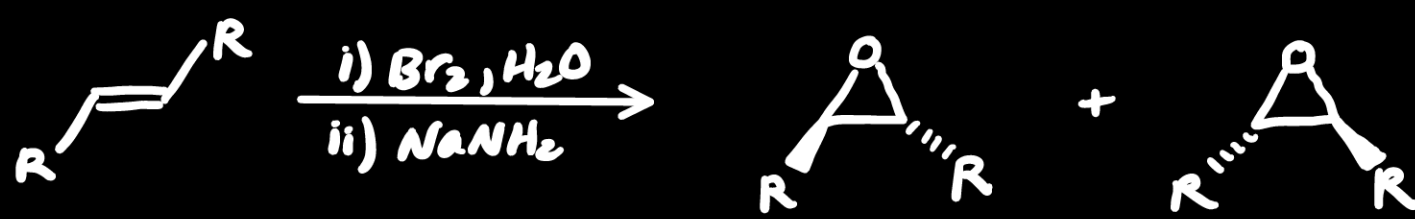
Chapter 11 - Summary of Reactions

Thursday, August 6, 2020

4:00 PM



- concerted rxn mech
- alkene geometry preserved (cis \rightarrow cis, trans \rightarrow trans)
- racemic mixt. if chiral center formed



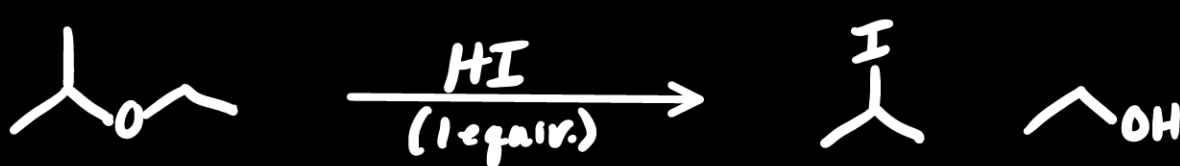
- despite going through a diff rxn mech, the stereochemistry gives the same result as m-CPBA



- Williamson ether synthesis
- RX must be 1° (otherwise E2)
- ROH must be 1° or 2° (otherwise E2)



- acid cat. ether synthesis
- alkene must be able to form a carbocation

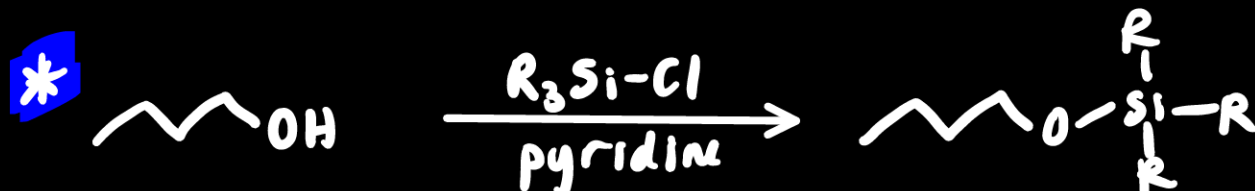


- 1° ether carbons react by SN2 w/ halogen, 2°, 3° ether carbons by SN1

- 1st equiv., halogen goes to ether carbon that forms the most stable cation

- stereochem. considerations applicable to SN1, SN2 apply depending on mech.

- HBr also works

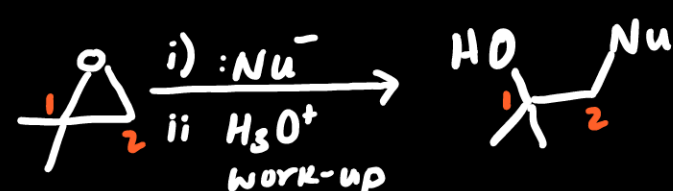


- protecting group for alcohols
- R = CH₃, others



- removal of protecting group

Epoxide-opening (BASIC/NU)



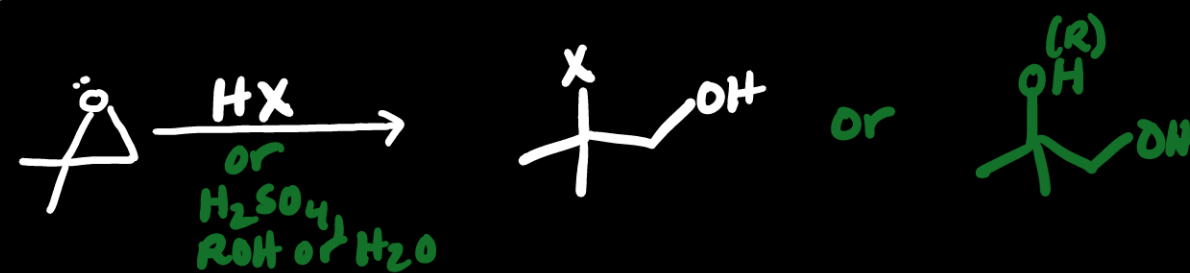
- mechanism is SN2
- nucleophile attacks less substituted side of epox.
- side of epoxide (due to sterics)
- two part rxn i) strong Nu ii) H₃O⁺ work-up

:Nu⁻ = any strong nucleophile (anything that can do SN2 and organometallics)
OH⁻, OR⁻, NH₂⁻, NHR⁻, NR₂⁻, CN⁻, SH⁻, SR⁻, N₃⁻, I⁻, Br⁻
amines \rightarrow moderate Nu, but still works
"H⁻" as LiAlH₄

STEREOCHEMISTRY

SN2 \rightarrow inversion of configuration at the carbon Nu attacks

Epoxide-opening (acidic conditions)



- mechanism is SN2
- nucleophile attacks more substituted side of epox.
- side of epoxide (due to location of δ^+ charge)
- one part rxn (strong acid + weak Nu)

Acid	Nu
HCl	Cl ⁻ (from HCl)
HBr	Br ⁻ (from HBr)
HI	I ⁻ (from HI)
H ₂ SO ₄	any weak nucleophile \rightarrow H ₂ O, ROH

STEREOCHEMISTRY

SN2 \rightarrow inversion of configuration at the carbon Nu attacks



- oxidation to sulfoxide



- oxidation to sulfone



- two SN2, 2nd is intramolecular
- typical SN2 considerations apply

* indicates rxns for which you do not need to know arrow-pushing mechanisms