

SECTION 17 - ETHERS, EPOXIDES, AND SULFIDES

17-1 -- Nomenclature of Ethers (R-O-R')

- Common Names of Some Ethers
- Epoxides = Cyclic, 3-Membered Ring Ethers
- "Oxiranes"
- IUPAC Names of Ethers

17-2 -- Preparation of Ethers

- Williamson Ether Synthesis (S_N2)
- Possible E2 Side Reactions

17-3 -- Preparation of Epoxides

- 2 Ways to Form a Ring Ether (Epoxide)
- Alkene + Peroxyacid (RCO_3H) \rightarrow Epoxide + Carboxylic Acid
- Meso Compound Products and Enantiomeric Epoxide Products
- Cyclization of Bromohydrins to Form Epoxides

17-5 -- Ring-Opening Reactions of Epoxides

- The Acid-Catalyzed Epoxide Ring Opening
- The Base-Catalyzed Epoxide Ring Opening
- Stereochemistry Concerns

17-6 -- The Addition of Grignard Reagent to Epoxides

17-6 -- Sulfides (R-S-R')

- Sulfides = Sulfur Analogs of Ethers
- Preparation of Sulfides
- The Thiolate Ion, RS^-

17-7 -- 2 Major Differences Between Sulfides and Ethers

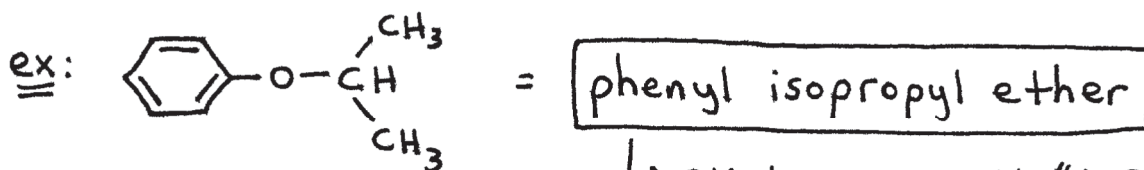
- Sulfides are Good Nucleophiles
- Sulfides are Easily Oxidized (via 1. H_2O_2 ; followed by 2. CH_3CO_3H)

* Nomenclature of Ethers

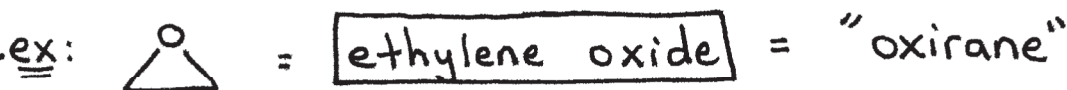
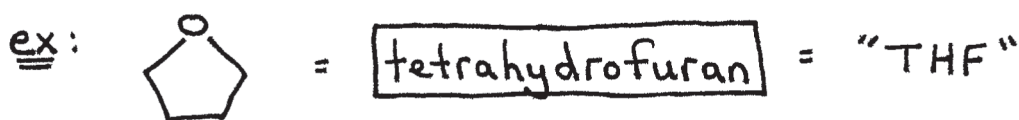
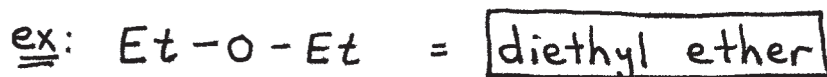
↳ $R-\ddot{O}-R'$ = oxygen single-bonded to 2 carbons.

↳ some common ethers:

general: $R-O-R'$ = alkyl alkyl' ether



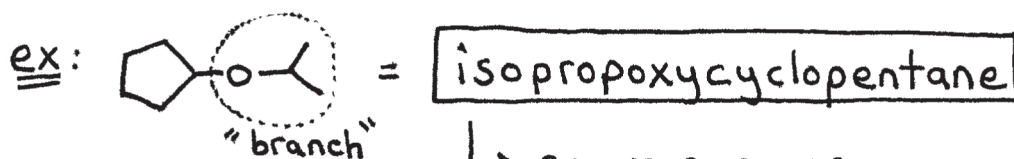
↳ OK to name it "left to right", as written.



** → an epoxide = a 3-membered ring ether.

↳ also called "oxiranes".

- IUPAC naming = alkoxy group (-OR) treated as a substituent.

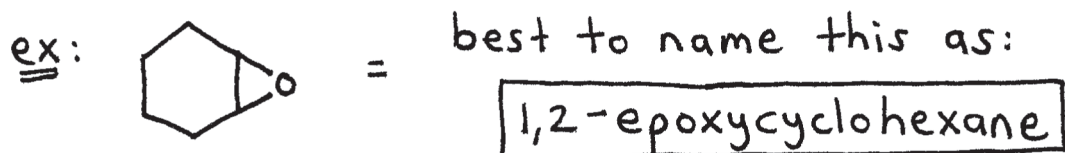
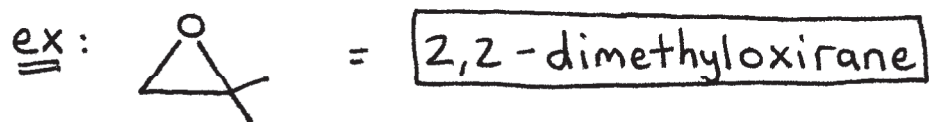


↳ common name:

cyclopentyl isopropyl ether

↳ better

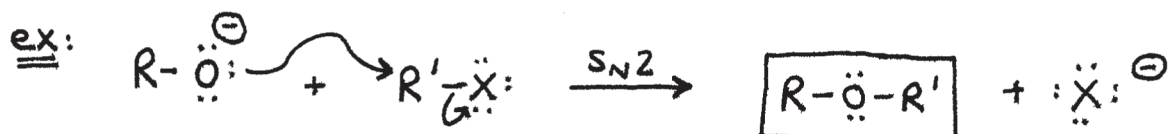
- Epoxides are named as substituted oxiranes, or via the epoxy prefix.



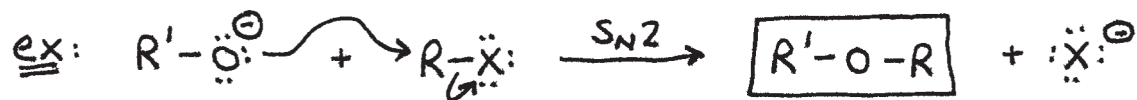
* Preparation of Ethers.

↳ we will focus on the "Williamson Ether Synthesis."

↳ wants to get most S_N2 chemistry possible, and least amount of E2.



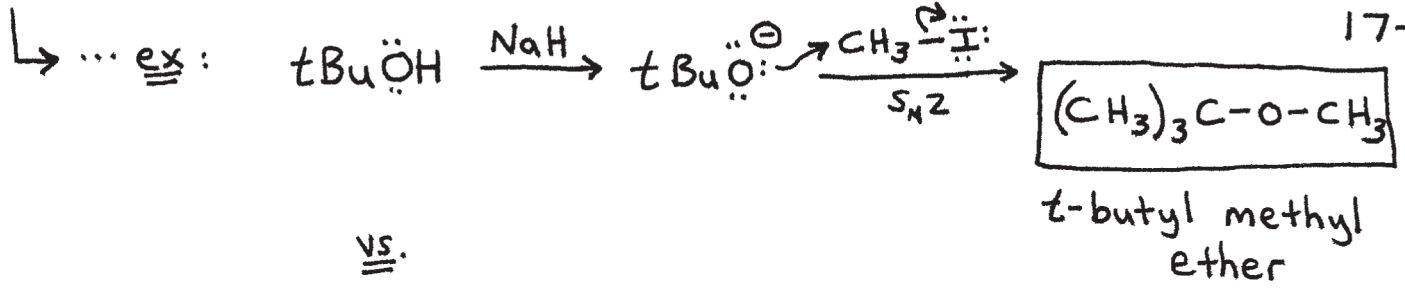
* R more sterically hindered than R'



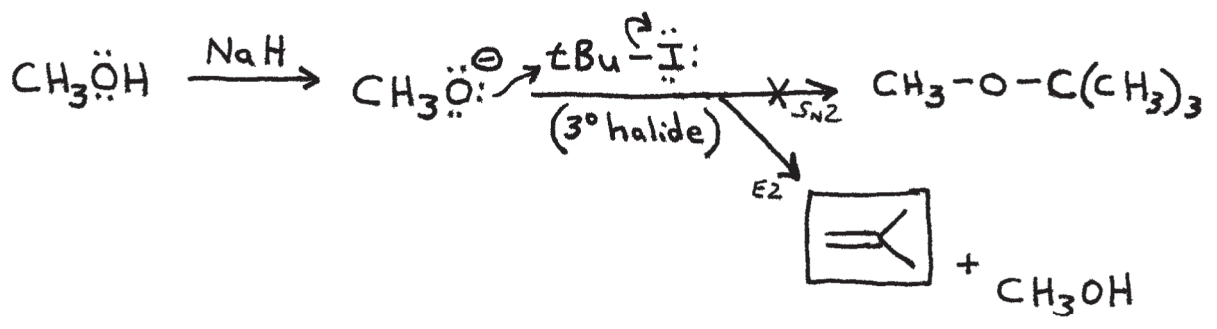
* R' more sterically hindered than R

- note: Because these are S_N2 mechanisms, the alkyl halide must be methyl or primary (1°), or "maybe" 2°, due to steric concerns.

↳ beware = E2 may be a side-reaction...



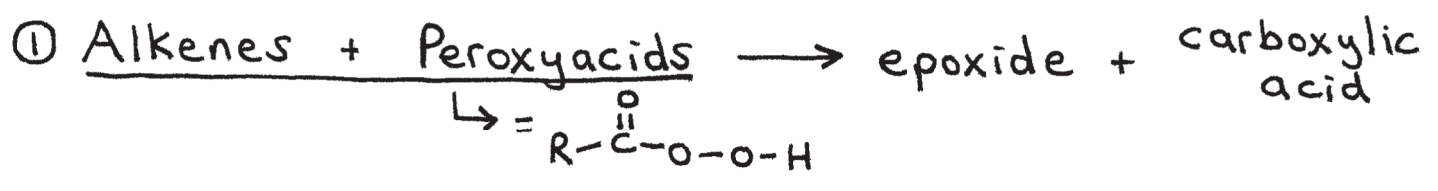
t-butyl methyl ether



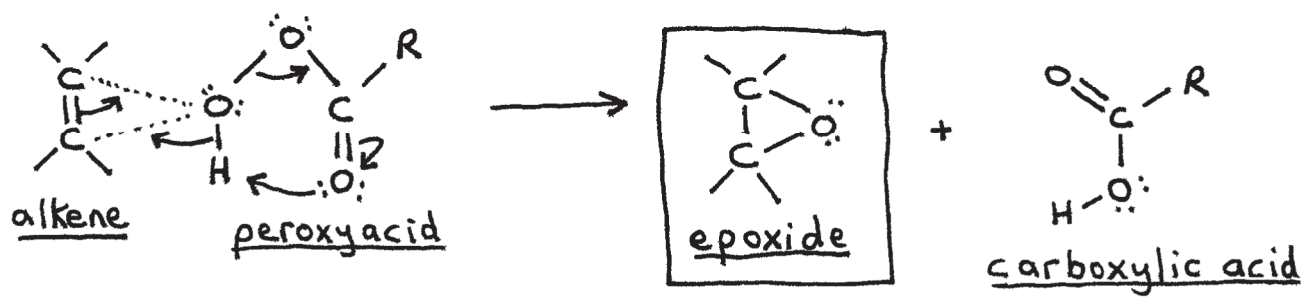
* NaH - could have been replaced with Na, K, NaNH₂, R-Li, or R-MgX; all very strong bases.

* Preparation of Epoxides.

↳ 2 ways we'll examine.



mechanism:



* two actual examples next page...

SECTION 17 - ETHERS, EPOXIDES, AND SULFIDES

Were the FREE Section 17 Notes Useful?
Want the FULL VERSION of the Section 17 Notes?

Download Them Instantly for Only \$6.99 at:

OChemNotes.com