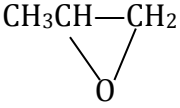
Nomenclature and Properties of Ethers & Epoxides

1. Write a structural formula for each of the following compounds:
    a. allyl *n*-propyl ether
    b. *p*-chlorophenyl methyl ether
    c. 2-methoxyhexane

2. Name each of the following compounds:

    a. $CH_3CH_2CH_2OCH(CH_3)_2$

    b. 

    c. $CH_3CH_2CH(OCH_2CH_3)CH_2CH_3$

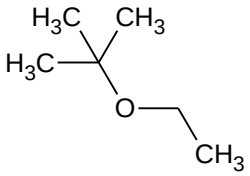
3. Ethers and alcohols can be isomeric. Write the structures and give the names of all possible isomers (14!) with the molecular formula $C_5H_{12}O$.

4. Consider two compounds that have nearly the same molar mass: 1,2-dimethoxyethane and *n*-hexane. Draw their structural formulas. Which would you expect to have the higher boiling point? Which would be more soluble in water? Explain your reasoning.

Preparation and Reaction of Grignard Reagents

5. Write an equation for the reaction of $CH_3CH_2OCH_2CH_2CH_2Br$ with Mg in ether followed by the addition of D_2O to the resulting solution.

Preparation of Ethers



6. Write an equation for the best method to prepare

Behavior of Ethers in Acids and Bases

7. Ethers are soluble in cold, concentrated sulfuric acid, but alkanes are not. This difference can be used as a simple chemical test to distinguish between these two classes of compounds. Write an equation to justify this fact.

8. Write an equation for each of the following reactions. If no reaction occurs, explain why that is so.
    a. diethyl ether with cold, concentrated H_2SO_4 →

    b. di-*n*-propyl ether with sodium metal →

Preparation and Reactions of Epoxides

9. Write an equation for the reaction of ethylene oxide with 1 mole of HCl.

10. Write an equation for the reaction of ammonia with ethylene oxide. The product is a water-soluble organic base used to absorb and concentrate CO_2 in the manufacture of dry ice.

Puzzles

11. What chemical test will distinguish between the compounds in each of the following pairs? Indicate what is visually observed with each test.

a. ethyl phenyl ether and allyl phenyl ether
b. 1-butanol and methyl *n*-propyl ether