CHAPTER OVERVIEW

15: ETHERS, EPOXIDES AND THIOETHERS

LEARNING OBJECTIVES

After reading this chapter and completing ALL the exercises, a student can be able to

- predict relative boiling points and solubilities of ethers (refer to section 15.1)
- explain how ether solvents stabilize electrophilic reagents (refer to section 15.1)
- determine the structures of ethers from their spectra, and explain their characteristic absorptions and fragmentations (refer to section 15.2)
- devise efficient laboratory synthesis of ethers and epoxides, including:

a) Williamson ether synthesis (refer to section 15.3)

b) alkoximercuration-demercuration (refer to section 15.4)

c) peroxyacid epoxidation (refer to Chapter 9 section 12)

d) base-promoted cyclization of halohydrins (refer to section 15.7)

- predict the products or reactions of ethers and epoxides, including:

a) acidic cleavage of ethers (refer to section 15.5)

b) opening of epoxides (refer to section 15.8)

c) reactions of epoxides with organometallic reagents (refer to section 15.10)

- explain how Crown ethers solvate metal cations (refer to section 15.10)
- explain the reaction of epoxy monomers to form the adhesive resin (refer to section 15.11)
- describe the structure and reactive of sulfides (refer to section 15.12)
- use your knowledge of chemical reactivity to propose mechanisms and products for similar reactions you have never seen before (chapters to date)
- propose multiple-step syntheses using all of the reactions studied through this chapter (chapters to date)

Please note: IUPAC nomenclature and important common names of alcohols were explained in Chapter 3.

15.1: Physical Properties of Ethers
15.2: Spectroscopy of Ethers
15.3: The Williamson Ether Synthesis
15.4: Alkoxymercuration-Demercuration Synthesis of Ethers
15.5: Acidic Cleavage of Ethers
15.6: Autoxidation of Ethers
15.7: Synthesis of Epoxides
15.8: Opening of Epoxides
15.9: Reactions of Epoxides with Grignard and Organolithium Reagents
15.10: Crown Ethers
15.11: Epoxy Resins - The Advent of Modern Glues
15.12: Thioethers (Sulfides) and Silyl Ethers
15.13: Additional Exercises
15.14: Solutions to Additional Exercises

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