

## 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) alkoxymercuration-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 reactivity 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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