

CHAPTER OVERVIEW

14: CONJUGATED COMPOUNDS AND ULTRAVIOLET SPECTROSCOPY

LEARNING OBJECTIVES

After you have completed Chapter 14, you should be able to

1. fulfill all of the detailed objectives listed under each individual section.
2. use the reactions discussed, along with those from previous chapters, when designing multi-step syntheses.
3. use the reactions and concepts discussed to solve road-map problems.
4. use ultraviolet-spectral data, in conjunction with other spectral data, to elucidate the structure of an unknown compound.
5. define, and use in context, the key terms introduced.

You have already studied the chemistry of compounds that contain one carbon-carbon double bond. In this chapter, you will focus your attention on compounds that contain two or more such bonds. In particular you will study the properties of those compounds that contain two carbon-carbon double bonds which are separated by one carbon-carbon single bond. These compounds are called “conjugated dienes.”

To understand the properties exhibited by conjugated dienes, you must first examine their bonding in terms of the molecular orbital theory introduced in [Section 1.11](#). Then, you must learn how the products of a reaction are dependent on both thermodynamic and kinetic considerations. Which of these two factors is the most important can sometimes determine which of two possible products will predominate when a reaction is carried out under specific conditions. Although we shall not make extensive use of ultraviolet spectroscopy, this technique can often provide important information when conjugated compounds are being investigated. In general, ultraviolet spectroscopy is less useful than the other spectroscopic techniques introduced earlier.

[14.0: Introduction](#)

[14.1: Stability of Conjugated Dienes- Molecular Orbital Theory](#)

[14.2: Electrophilic Additions to Conjugated Dienes- Allylic Carbocations](#)

[14.3: Kinetic vs. Thermodynamic Control of Reactions](#)

[14.4: The Diels-Alder Cycloaddition Reaction](#)

[14.5: Characteristics of the Diels-Alder Reaction](#)

[14.6: Diene Polymers- Natural and Synthetic Rubbers](#)

[14.7: Structure Determination in Conjugated Systems - Ultraviolet Spectroscopy](#)

[14.8: Interpreting Ultraviolet Spectra- The Effect of Conjugation](#)

[14.9: Conjugation, Color, and the Chemistry of Vision](#)

[14.S: Conjugated Compounds and Ultraviolet Spectroscopy \(Summary\)](#)

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