

CHAPTER OVERVIEW

7: ALKENES - STRUCTURE AND REACTIVITY

LEARNING OBJECTIVES

After you have completed Chapter 7, you should be able to

1. fulfill all of the detailed objectives listed under each individual section.
2. describe the importance of alkenes to the chemical industry.
3. use the concept of “degree of unsaturation” in determining chemical structures.
4. describe the electronic structure and geometry of alkenes.
5. describe the factors that influence alkene stability, and determine the relative stability of a number of given alkenes.
6. write the IUPAC name of a given alkene, and draw the structure of any alkene, given its IUPAC name.
7. determine whether a given alkene has an *E* configuration or a *Z* configuration.
8. explain why alkenes are more reactive than alkanes.
9. describe the reaction between an alkene and a hydrogen halide, and explain why one product is formed rather than another. Base your explanation on the concepts of carbocation stability and the Hammond postulate.
10. define, and use in context, the key terms introduced in this chapter.

This, the first of two chapters devoted to the chemistry of alkenes, describes how certain alkenes occur naturally, then shows the industrial importance of ethylene and propylene (the simplest members of the alkene family). The electronic structure of alkenes is reviewed, and their nomenclature discussed in detail. After dealing with the question of cis-trans isomerism in alkenes, Chapter 7 introduces the reactivity of the carbon-carbon double bond. The chapter then focuses on one specific reaction—the addition of hydrogen halides to alkenes—to raise a number of important concepts, including carbocation stability and the Hammond postulate.

[7.0: Chapter Objectives](#)

[7.1: Introduction to Alkenes](#)

[7.2: Industrial Preparation and Use of Alkenes](#)

[7.3: Calculating Degree of Unsaturation](#)

[7.4: Naming Alkenes](#)

[7.5: Cis-Trans Isomerism in Alkenes](#)

[7.6: Sequence Rules - The E,Z Designation](#)

[7.7: Stability of Alkenes](#)

[7.8: Electrophilic Addition Reactions of Alkenes](#)

[7.9: Orientation of Electrophilic Additions - Markovnikov's Rule](#)

[7.10: Carbocation Structure and Stability](#)

[7.11: The Hammond Postulate](#)

[7.12: Evidence for the Mechanism of Electrophilic Additions - Carbocation Rearrangements](#)

[7.S: Alkenes- Structure and Reactivity \(Summary\)](#)

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