

CHAPTER OVERVIEW

9: REACTIONS OF ALKENES

LEARNING OBJECTIVES

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

- draw the general Electrophilic Addition Reaction (EAR) mechanism for an alkene - refer to section 9.1
- predict the products/specify the reagents for EAR of hydrohalic acids (HX) with symmetrical alkenes - refer to section 9.2
- predict the products/specify the reagents for EAR of hydrohalic acids (HX) with asymmetrical alkenes using Markovnikov's Rule for Regioselectivity - refer to section 9.3
- apply the principles of regioselectivity and stereoselectivity to the addition reactions of alkenes - refer to sections 9.3 - 9.14
- predict the products, specify the reagents, and discern most efficient reaction for hydration of alkenes (acid catalyzed hydration; or oxymercuration/demercuration; or hydroboration/oxidation) - refer to sections 9.4, 9.5, and 9.6 respectively
- discern the stereochemical differences between the EAR of chiral and achiral alkenes - refer to sections 9.7 and 9.8
- predict the products/specify the reagents for halogenation and hydrohalogenation of alkenes - refer to sections 9.9 and 9.10 respectively
- recognize organic oxidation and reduction reactions - refer to sections 9.11 and 9.12
- predict the products/specify the reagents for hydrogenation (reduction) of alkenes - refer to section 9.11
- predict the products/specify the reagents for epoxidation of alkenes - refer to section 9.12
- predict the products/specify the reagents for dihydroxylation of alkenes - refer to sections 9.13 and 9.14
- predict the products/specify the reagents for oxidative cleavage of alkenes - refer to section 9.15
- predict the products of carbene additions to alkenes - refer to section 9.16
- predict the polymer/specify the monomer for radical, chain -growth polymers of alkenes - refer to section 9.17
- discuss an example biological addition reactions - refer to section 9.18

[9.1: Electrophilic Addition Reactions \(EARs\)](#)

[9.2: Addition of Hydrogen Halides to Symmetrical Alkenes](#)

[9.3: Alkene Asymmetry and Markovnikov's Rule](#)

[9.4: Hydration- Acid Catalyzed Addition of Water](#)

[9.5: Hydration- Oxymercuration-Demercuration](#)

[9.6: Hydration - Hydroboration-Oxidation](#)

[9.7: Stereochemistry of Reactions - Hydration of Achiral Alkenes](#)

[9.8: Stereochemistry of Reactions - Hydration of Chiral Alkenes](#)

[9.9: Addition of Halogens](#)

[9.10: Formation of Halohydrins](#)

[9.11: Reduction of Alkenes - Catalytic Hydrogenation](#)

[9.12: Oxidation of Alkenes - Epoxidation](#)

[9.13: Dihydroxylation of Alkenes](#)

[9.14: Opening of Epoxides - Acidic versus Basic Conditions](#)

[9.15: Oxidative Cleavage of Alkenes](#)

[9.16: Addition of Carbenes to Alkenes - Cyclopropane Synthesis](#)

[9.17: Radical Chain-Growth Polymerization](#)

[9.18: Biological Additions of Radicals to Alkenes](#)

[9.19: Additional Exercises](#)

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