

7.0: CHAPTER OBJECTIVES

Alkenes are a fundamental class of organic compounds characterized by the presence of a carbon-carbon double bond, which gives them unique structural and reactivity properties. In this introduction to Alkenes, we'll delve into their structure and reactivity, exploring the foundational concepts that define their behavior in chemical reactions.

Structure of Alkenes: At the heart of alkenes is the carbon-carbon double bond, consisting of one sigma (σ) bond and one pi (π) bond. This double bond imparts significant structural rigidity and planarity to alkenes. Due to the presence of this double bond, alkenes often adopt a trigonal planar geometry around the carbon atoms involved in the double bond.

Naming Alkenes: In the IUPAC nomenclature system, alkenes are named by identifying the longest continuous carbon chain containing the double bond. The suffix "-ene" is added to the end of the alkane name corresponding to the same number of carbon atoms, and the position of the double bond is indicated by the lowest numbered carbon atom involved in the double bond.

Reactivity of Alkenes: Alkenes exhibit rich reactivity owing to the presence of the π bond. The π bond is relatively weak compared to the σ bond, making it susceptible to various types of reactions, including addition reactions, polymerization, and elimination reactions.

Addition Reactions: One of the most common reactions involving alkenes is addition reactions, where atoms or groups are added to the carbon atoms of the double bond. Examples include hydrogenation, halogenation, hydration, and hydrohalogenation.

Polymerization: Alkenes readily undergo polymerization, a process where monomers containing double bonds join together to form long-chain polymers. This process is crucial in the production of various synthetic materials, such as plastics and synthetic rubbers.

Elimination Reactions: Elimination reactions involve the removal of atoms or groups from adjacent carbon atoms of a molecule, resulting in the formation of a double bond. The most common elimination reaction involving alkenes is the dehydrohalogenation of alkyl halides to form alkenes.

Understanding the structure and reactivity of alkenes is foundational in organic chemistry, as they serve as important intermediates and reactants in numerous synthetic pathways. In the subsequent discussions, we will explore these concepts in greater detail, elucidating the mechanisms and applications of various reactions involving alkenes.

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