

## Chapter 6. Reactions of Alkenes

### Learning objectives:

1. Differentiate primary, secondary, and tertiary carbocations, and recognize the order of stability for these carbocations.
2. Identify the followings from a potential energy diagram when applicable: endothermic or exothermic reactions, activation energy, heat of reaction, locations of transition states, locations of intermediates, and rate-limiting step.
3. Write the electron-pushing (arrow-pushing) mechanisms for the following reactions of alkenes: hydrohalogenation, hydration, and halogenation.
4. Draw the potential energy diagrams and provide all the applicable information listed in "1" for hydrohalogenation, hydration, and halogenation of alkenes.
5. Explain the regio- and stereoselectivity issues involving in hydrohalogenation, hydration, and halogenation of alkenes.
6. Write the *syn* addition from a dihydroxylation of alkenes, and explain the observed stereochemistry of products.
7. Write the *syn* addition from a halogenation of alkenes, and explain the observed stereochemistry of products.
8. Arrange the order of stability of substituted alkenes, and correlate this order to the heat of hydrogenation of these alkenes.

### Sections to be covered (in the order of delivery):

- 6.1 An Overview
- 6.2 Reaction Mechanisms
- 6.3 Electrophilic Addition Reactions
- 6.4 Oxidation of Alkenes - Glycols
- 6.5 Reduction of Alkenes - Formation of Alkanes
- 6.6 Reactions That Produce Chiral Compounds

### Recommended additional problems

6.8 – 6.37