

Chapter 18: Carbonyl Compounds II

Learning Objectives:

1. Recognize and assign names to aldehydes and ketones.
2. Write the mechanism for nucleophilic addition and nucleophilic addition-elimination reactions of aldehydes and ketones, and be able to predict the products of such reactions.
3. Be able to explain the relative reactivity of carbonyl compounds toward nucleophilic addition.
4. Be able to describe the concept of employing protecting groups.
5. Predict the products of the reactions of carbonyl compounds with Grignard reagents, hydride ion donors, sulfur nucleophiles, and with phosphonium ylides (the Wittig reaction).
6. Be able to recognize *Re* and *Si* faces of carbonyl compounds, and the stereochemistry outcomes from a nucleophilic addition.
7. Predict the products of addition reactions to α,β -unsaturated carbonyl compounds.

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

- 18.2 Relative Reactivities of Carbonyl Compounds*
- 18.3 How Aldehydes and Ketones React*
- 18.4 Reaction of Carbonyl Compounds with Carbon Nucleophiles*
- 18.5 Reaction of Carbonyl Compounds with Hydride Ion*
- 18.6 Reaction of Aldehydes and Ketones with Nitrogen Nucleophiles*
- 18.7 Reaction of Aldehydes and Ketones with Oxygen Nucleophiles*
- 18.8 Protecting Groups*
- 18.9 Addition of Sulfur Nucleophiles
- 18.10 The Wittig Reaction*
- 18.11 Stereochemistry of Nucleophilic Addition Reactions: *Re* and *Si* Faces
- 18.12 Designing a Synthesis V: Disconnections, Synthones, and Synthetic Equivalents
- 18.13 Nucleophilic Addition to α,β -Unsaturated Aldehydes and Ketones*
- 18.14 Nucleophilic Addition to α,β -Unsaturated Carboxylic Acid Derivatives

* Sections that will be focused

Recommended additional problems

8.40 – 8.55, 8.58 – 8.61, 8.63 – 8.67, 8.69 – 8.72, 8.74