

**Chemistry 506: Allied Health Chemistry 2****Chapter 13: Aldehydes and Ketones****Functional Groups with Double Bonds to Oxygen**

Introduction to General, Organic & Biochemistry, 5<sup>th</sup> Edition by  
Bettelheim and March: Chapter 13, Pages 425-450

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**Outline**

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13A Section(s) 13.1/2/3 Introduction, Nomenclature, and Properties

## ◆ Carbonyl Groups

◆ C - O  $\sigma$ -bond and  $\pi$ -bond

## ◆ Relative Electronegativities of C and O

## ◆ Polarity of Bond

◆  $\delta^+$  charge on C◆  $\delta^-$  charge on O

## ◆ Dipole - Dipole forces cause Mp and Bp increases

## ◆ Lone Pairs on Oxygen

## ◆ Aldehydes

◆ At least one H on Carbonyl Carbon

◆ Formaldehyde (Methanal)

◆ IUPAC Nomenclature

◆ anal ending

◆ Examples

## ◆ Ketones

◆ Two Carbons attached to Carbonyl Carbon

◆ Acetone (Propanone)

◆ IUPAC Nomenclature

◆ one ending

◆ Examples

13B Section(s) 13.4/5 Synthesis and Reactions

- ◆ Preparation
  - ◆ “Weak” Oxidation of 1° Alcohols gives Aldehydes
  - ◆ CrO<sub>3</sub>/pyridine
  
- ◆ Oxidation of 2° Alcohols gives Ketones

- ◆ Oxidation Reactions of Aldehydes and Ketones

- ◆ Requires a Hydrogen on same carbon

- ◆ Oxidation of Aldehydes

- ◆ By Oxidizing Agents, [O]

- ◆ Gives Carboxylic Acids

- ◆ Attempted Oxidation of Ketones

- ◆ By Oxidizing Agents, normal [O] gives no reaction

- ◆ Reductions of Aldehydes and Ketones

- ◆ Via addition to  $\pi$ -bonds

- ◆ Reducing Agents

- ◆  $[H] = H_2/\text{catalysts}, NaBH_4$

- ◆ Reduction of Aldehydes

- ◆ Gives  $1^\circ$  Alcohols

◆ Reduction of Ketones

◆ Gives 2° Alcohols

Skip p 434 on Acetals and Hemiacetals

Questions: 13.1 to 13.27



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