

Chemistry 1506: Allied Health Chemistry 2

Section 4: Aldehydes and Ketones

Functional Groups with Double Bonds to Oxygen

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Section 4.1 Introduction, Nomenclature, and Properties

◆ Carbonyl Groups

◆ C - O σ -bond and π -bond

◆ Relative Electronegativities of C and O

◆ Polarity of Bond

◆ δ^+ charge on C

◆ δ^- 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

Section 4.2 Synthesis and Reactions

◆ Preparation

◆ “Weak” Oxidation of 1° Alcohols gives Aldehydes

◆ CrO₃/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 π -bonds

- ◆ Reducing Agents

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

- ◆ Reduction of Aldehydes

- ◆ Gives 1° Alcohols

◆ Reduction of Ketones

◆ Gives 2° Alcohols

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