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D I A G R A M   S H E E T

OCR A2 Level Chemistry

Companion to: Organic Chemistry and Analysis - Carbonyl Compounds Explanation Sheet

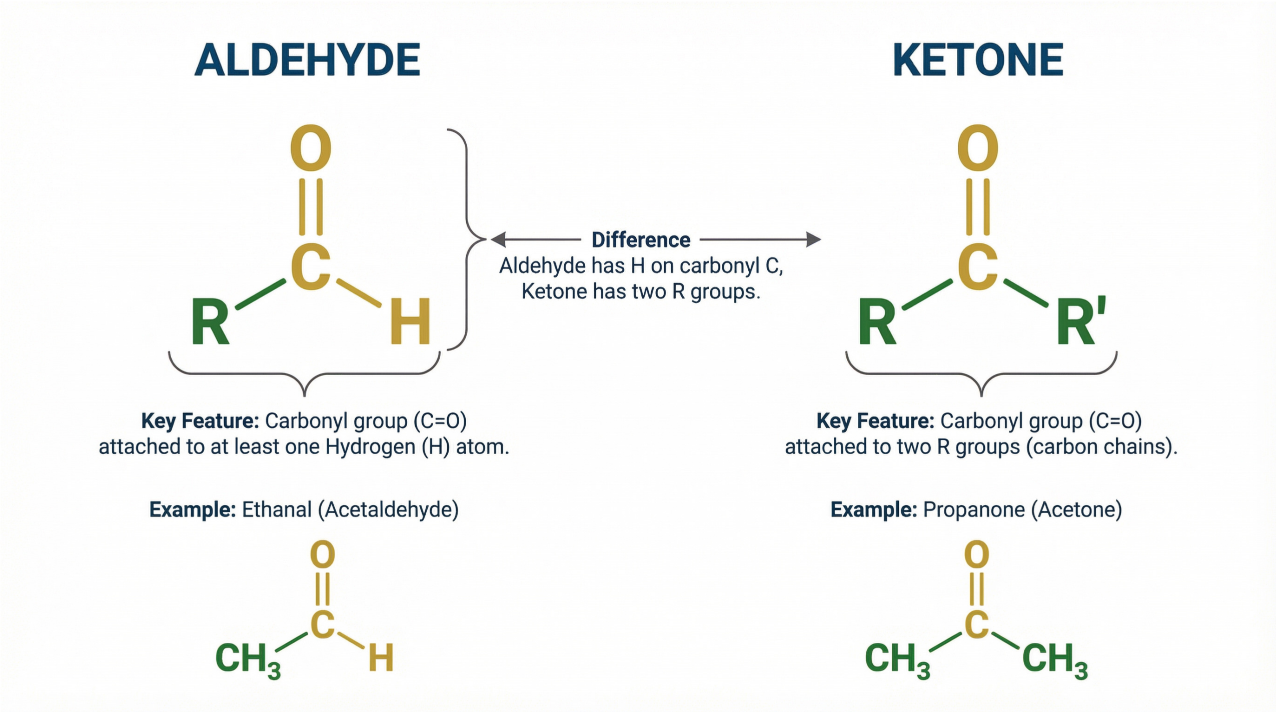
A2 LEVEL

Organic Chemistry and Analysis - Carbonyl Compounds

Figures in this Sheet

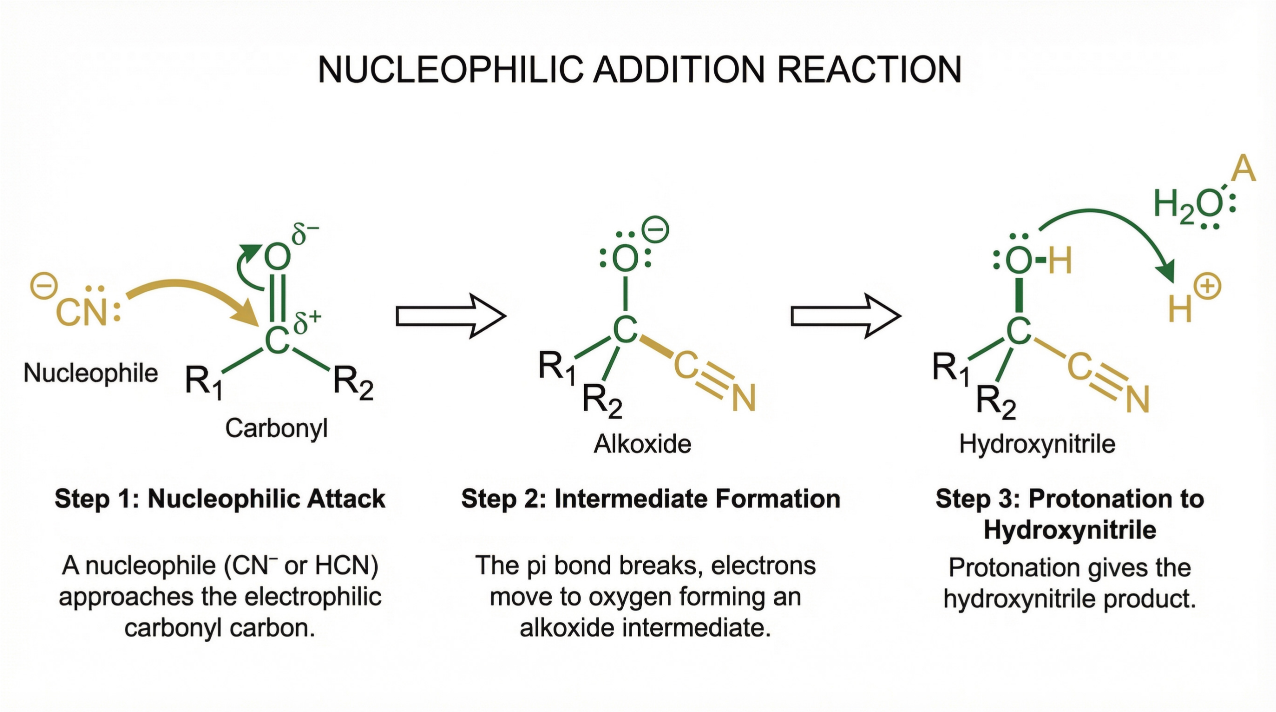
Organic Chemistry and Analysis - Carbonyl Compounds — Diagram Sheet

Figure 1: Molecular Structures and Functional Groups of Aldehydes and Ketones



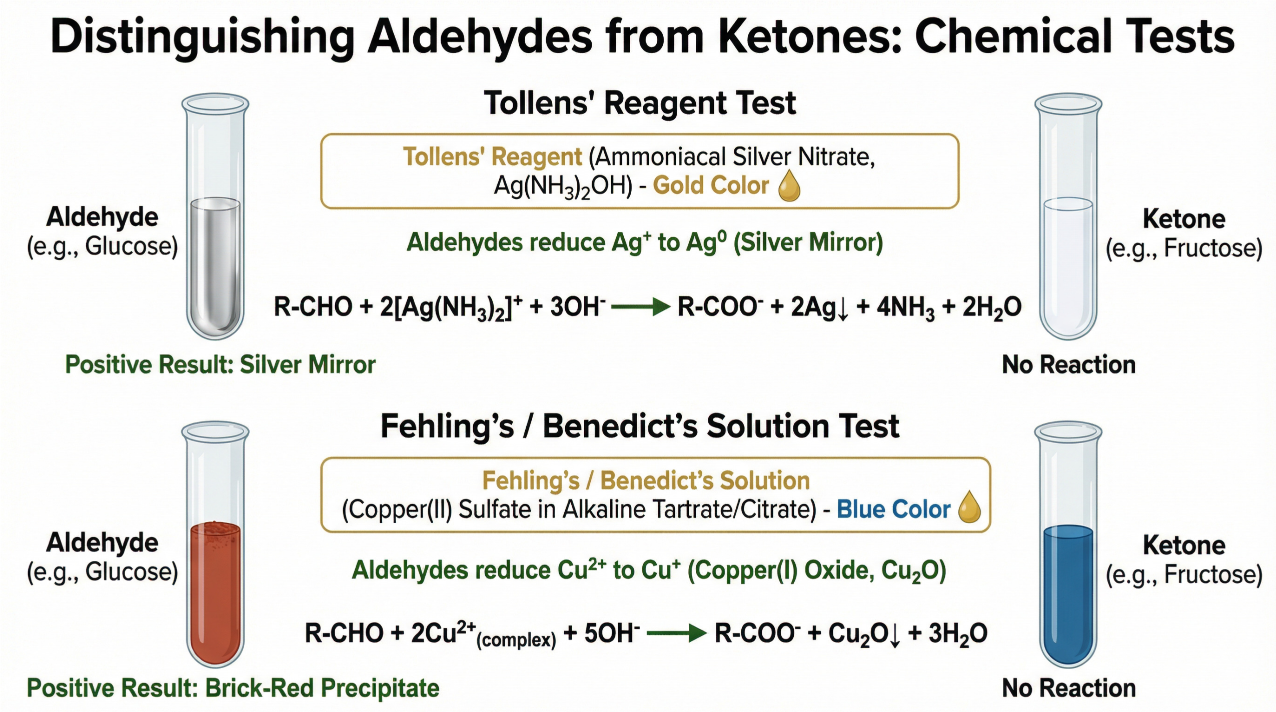
This diagram illustrates the general molecular structures of **aldehydes** and **ketones**, highlighting the **carbonyl functional group (C=O)**. Aldehydes have the carbonyl group bonded to at least one hydrogen atom, typically at the end of the carbon chain, while ketones have the carbonyl group bonded to two carbon atoms, located within the carbon chain. Understanding these structural differences is crucial because they influence the chemical reactivity and physical properties of these compounds.

Figure 2: Nucleophilic Addition Mechanism to a Carbonyl Group



This diagram explains the **nucleophilic addition reaction mechanism** common to aldehydes and ketones, which is fundamental to their chemical behavior. The nucleophile attacks the electrophilic carbon of the carbonyl group, breaking the π bond and forming a tetrahedral intermediate. The mechanism shows curved arrows illustrating electron movement, emphasizing the polarity of the carbonyl bond and why the carbon is susceptible to nucleophilic attack. This understanding is essential for predicting products of many important reactions, including reduction and addition reactions.

Figure 3: Oxidation of Aldehydes to Carboxylic Acids



This diagram shows the **oxidation reaction** of an aldehyde to a carboxylic acid, a key reaction distinguishing aldehydes from ketones. The aldehyde functional group is oxidized by an oxidizing agent (such as acidified potassium dichromate), converting the carbonyl carbon's oxidation state and adding an -OH group. The diagram highlights why ketones do not undergo oxidation under similar conditions. This reaction is important for understanding the chemical tests used to identify aldehydes and ketones and their reactivity patterns.

Study Notes

Use this space to annotate the diagrams above, add your own labels, or note down exam-style questions that relate to each figure. Try covering the labels and testing yourself from memory.