

# CIE Chemistry A-Level

## Topic 18 - Carbonyl Compounds

### Flashcards

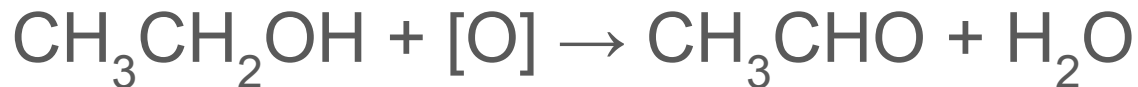


How are primary alcohols oxidised to aldehydes?



## How are primary alcohols oxidised to aldehydes?

If a primary alcohol is heated with acidified potassium dichromate(VI), the alcohol will be oxidised to form an aldehyde.



The acidified potassium dichromate(VI) will change colour from orange to green.



How are secondary alcohols oxidised to ketones?



## How are secondary alcohols oxidised to ketones?

If a secondary alcohol is heated under reflux with acidified potassium dichromate(VI), the alcohol will be oxidised to form a ketone:



The acidified potassium dichromate(VI) will change colour from orange to green.

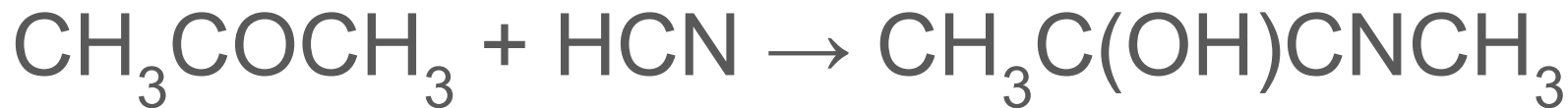
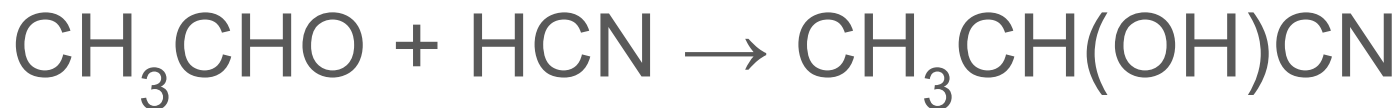


How are aldehydes and ketones reduced using cyanide ions?



How are aldehydes and ketones reduced using cyanide ions?

By using HCN in ethanol or NaCN solution:



How are aldehydes and ketones reduced using  $\text{NaBH}_4$  or  $\text{LiAlH}_4$  ions?



How are aldehydes and ketones reduced using  $\text{NaBH}_4$  or  $\text{LiAlH}_4$  ions?

$\text{NaBH}_4$  and  $\text{LiAlH}_4$  are reducing agents and can both be represented as  $[\text{H}]$  in chemical equations:

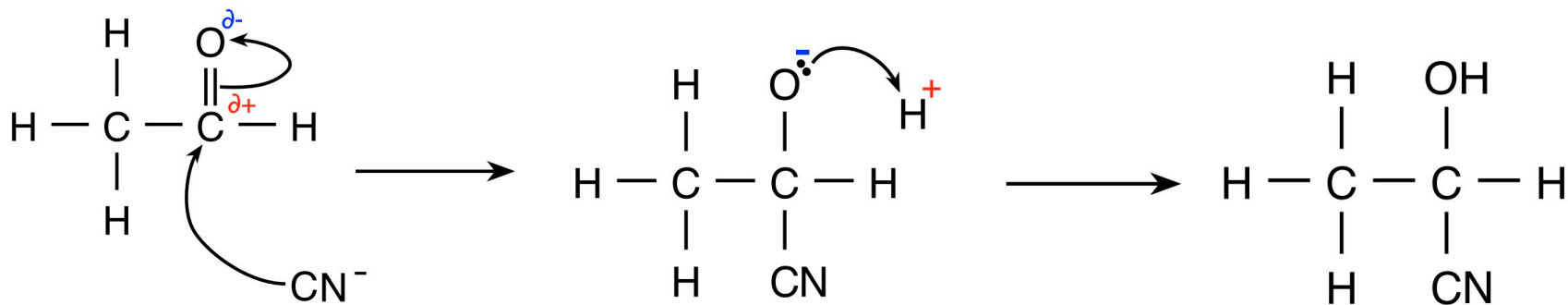


What is the mechanism for the reaction between HCN and aldehydes and ketones?



What is the mechanism for the reaction between HCN and aldehydes and ketones?

## Nucleophilic addition



What is the test for a carbonyl compound?



# What is the test for a carbonyl compound?

Brady's reagent / 2,4-dinitrophenylhydrazine  
(2,4-DNPH):

- Add a few drops of the unknown sample to 5 cm<sup>3</sup> of Brady's reagent.
- The presence of a carbonyl compound is indicated by a yellow/orange precipitate.



How can you test for an aldehyde using Fehling's solution?



How can you test for an aldehyde using Fehling's solution?

Warm the sample with Fehling's solution.

If an aldehyde is present, the blue solution will form a brick red precipitate.



How can you test for an aldehyde using  
Tollens' reagent?



How can you test for an aldehyde using Tollens' reagent?

Add Tollens' reagent to the sample and warm in a water bath.

The presence of a silver mirror on the test tube indicates that the sample contains an aldehyde functional group.



How do  $\text{CH}_3\text{CO}-$  compounds react with alkaline aqueous iodine?



How do  $\text{CH}_3\text{CO-}$  compounds react with alkaline aqueous iodine?

Iodine is added to the aldehyde or ketone solution. Just enough  $\text{NaOH}$  is added until the iodine is decolourised.

A pale yellow precipitate of tri-iodomethane,  $\text{CH}_3\text{I}$ , is formed.

