

Hydroxyl group (-OH)
General formulae: $C_nH_{(2n+1)}OH$

Apparatus:

alcohols to aldehyde: heating under distillation

alcohols to carboxylic acids: heating under reflux

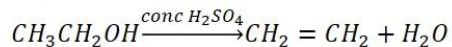
Apparatus

Combustion of alcohols:
Alcohol + oxygen $\rightarrow$ carbon dioxide + water

Elimination of H_2O

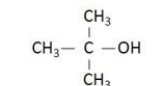
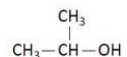
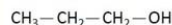
Alkenes are formed.

Conditions: heated with an excess of conc. H_2SO_4 or conc. H_3PO_4 at a temperature of 443 K



Elimination reaction of secondary and tertiary alcohols results in more than one product.

Primary alcohol	Secondary alcohol	Tertiary alcohol
Propan-1-ol	Propan-2-ol	2-methylpropan-2-ol
$CH_3-CH_2-CH_2-OH$	$CH_3-\overset{\overset{CH_3}{ }}{CH}-OH$	$CH_3-\overset{\overset{CH_3}{ }}{C}-OH$ $ $ CH_3



Types

Alcohols

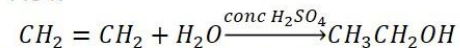
Oxidation of alcohols

Reagent: $K_2Cr_2O_7$ with dil. H_2SO_4

- Primary alcohols oxidise to form aldehyde. Aldehydes can be further oxidised to form carboxylic acids.
- Secondary alcohols oxidise to form ketones. Tertiary alcohols do not undergo this reaction.

Hydration of alkenes:

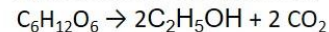
Conditions: heated with an excess of conc. H_2SO_4 or conc. H_3PO_4 at a temperature of 443 K



Steps: breaking of double bond and formation of carbocation, attack by water molecule & regeneration of catalyst.

Alcohol production

By fermentation of glucose:



Absence of air. Yeast is added to initiate fermentation. Temperature of 35°C and takes several days to complete.

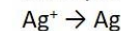
Testing with **2,4 DHNP**: Orange ppt in the presence of aldehyde or ketones

Characteristics test of carbonyl compounds

Testing with Tollens' reagent:

Ammoniacal silver nitrate solution

Aldehyde $\rightarrow$ carboxylic acid



Aldehydes: Formation of Silver mirror

Ketones: no reaction

Testing with Fehling's reagent:

$Cu^{2+} \rightarrow Cu_2O$ (Aldehydes alone: Blue $\rightarrow$ Orange-red ppt)