CHM 102 Assignment

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1. Classification of Alcohols

They are classified by the number of hydrogen atoms attached to the carbon carrying the hydroxyl /functional group. 2-3 number of hydrogen atoms are referred to as primary alcohols, 1 hydrogen atom are secondary alcohols and those with 0 hydrogen atoms are tertiary alcohols. They are also classified according to the number of hydroxyl atoms attached to the alkyl. (OH)-monohydric alcohol, (OH)2-dihydric/glycol alcohol, (OH)3-trihydic or triol alcohol and (OH)4-polyhric/polyl alcohol.

 CH3CH2 CH3CH2

 | | H+ OH-

1. CH3CH2MgBr + CH3CH2CH2CH2-C=O>CH3CH2CH2 -C-OMgBr > CH3CH2CH2CH2-C-OH + Mg(OH)Br

 | | |

 CH2CH2CH3 CH2CH2CH3 CH2CH2CH3

1. Production of ethanol: It is derived from the processes by the name fermentation. It is a process that involves carbohydrate compounds breaking down in the presence of a catalyst to form simple compounds and release carbon(iv)oxide. 95% of ethanol is formed from fermentation.

Step1: 2(C6H10O5)n + nH20 (enzyme: Diastase from malt at 60oC)> nC12H22O11

 carbohydrate maltose

Step2: C12O22O11 + H20 (enzyme: Maltase from yeast at 15oC)> 2C6H12O6

Step3: C6H12O6 (enzyme: Zymase from yeast at 15oC)> 2CH3CH2OH + 2CO2

1. Reduction of Aldehydes and Ketones:

 Sodium tetrahydridoborate (previously known as sodium borohydride) has the formula NaBH4, and contains the BH4- ion. That ion acts as the reducing agent.

There are several quite different ways of carrying out this reaction. Two possible variants (there are several others!) are:

The reaction is carried out in solution in water to which some sodium hydroxide has been added to make it alkaline. The reaction produces an intermediate which is converted into the final product by addition of a dilute acid like sulphuric acid.

The reaction is carried out in solution in an alcohol like methanol, ethanol or propan-2-ol. This produces an intermediate which can be converted into the final product by boiling it with water.

In each case, reduction essentially involves the addition of a hydrogen atom to each end of the carbon-oxygen double bond to form an alcohol. Reduction of aldehydes and ketones lead to two different sorts of alcohol.

Reduction of Aldehydes

Reduction of Ketones