Oyeleye Ibrahim-Niass Oluwaseyi
19/ENG04/052 Eled/Eled Engineering CHM 102

1 i) Based on the number of hydrogen atoms attached to the carbon atom containing the -OH group: If two or three Hydrogen atoms are connected to the -OH containing carbon, [e.g CH_3OH and CH_3CH_2OH] it is a primary alcohol (°1). If it has One Hydrogen atoms, it is a secondary alcohol (°2) [eg $CH_3CH(OH)CH_3$]. while if it has no Hydrogen atom connected to it, it is a tertiary atom (°3) [eg. $(CH_3)_3C-OH$]

ii) Based on the number of OH groups they posses.
Monohydrics [eg $CH_3(CH_2OH)$] have one OH group.
Dihydric or Glycols [eg $CH_3CH(OH)(CH_2OH)$] have two OH groups
Trihydric or Triols [eg $CH_2OHCH(OH)_2$] have three OH groups
Polyols [eg $CH(OH)_2CH(OH)CH(OH)_2$] have more than three OH groups

2 Solubility of Alcohols: lower alcohols with up to three carbon atoms in ther molecules are soluble in water because these lower alcohols can from hydrogen bond with water. higer ones cant form H2 bond so they dont dissolve, but they generally dissolve in organic solvent

3 ~~Starch con~~ Production of ethanol
Starch containing materials ~~includes~~ and on warming will malt at 60°C for a peroid are converted to maltose by actun of the diatase enzyme

$$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow[\text{diatase}]{60^\circ C} n(C_{12}H_{22}O_{11})$$
carbohydrate — water — maltase

On addition of yeast which contains maltase. at a temperature of 15°C. Maltose is broken down to form glucose.

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow[\text{maltase}]{15^\circ C} 2\,C_6H_{12}O_6$$

Glucose at a constant temperature of 15°C is converted into alcohol by addition of 2 g mase in yeast

$$C_6H_{12}O_6 \longrightarrow 2\,CH_3CH_2OH + 2CO_2$$

Ethanol — carbon dioxide

4

$$CH(CH_3)_2-C(=O)-H + C_4H_9MgCl \xrightarrow{(C_2H_5)_2O} CH(CH_3)_2-C(C_4H_9)(H)-OMgCl$$

$$\xrightarrow[\text{dil acid}]{H_2O} CH(CH_3)_2-C(C_4H_9)(H)-OH + MgClOH$$

5

$$CH_2(CH_3)-C(=O)-CH_3 + C_4H_9MgCl \xrightarrow{(C_2H_5)_2O} CH_2(CH_3)-C(C_4H_9)(CH_3)-OMgCl$$

$$\xrightarrow[\text{dil acid}]{H_2O} CH_2(CH_3)-C(C_4H_9)(CH_3)-OH + MgClOH$$

~~6~~ ~~$CH_2(CH_3)C(CH_3)O \xrightarrow{LiAlH_4/(C_2H_5)_2O} CH_2(CH_3)$~~

6 $CH_2(CH_3)C(CH_3)O \xrightarrow{LiAlH_4/(C_2H_5)_2O} CH_2(CH_3)CH(CH_3)OH$

7 $CH(CH_3)_2CHO \xrightarrow[LiAlH_4/(C_2H_5)_2O]{} CH(CH_3)_2OH$

8 Conversion of Propan-1-ol to propan-2-ol

$CH_3CH_2CH_2OH + H_2SO_4$

Propanol

$\longrightarrow CH_3CH_2CH_2OH_2HSO_4 \xrightarrow{-H_2O} CH_3CH_2CH_2$

$\xrightarrow{-H_2O} CH_3CH=CH_2 + H_2SO_4$

$\xrightarrow[\text{dil acid}]{H^+OH^-} CH_3-CH(OH)-CH_3$

Propan-2-OL

$CH_3CH(OH)CH_3$