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CHEM 102 ASSIGNMENT

1 CLASSIFICATION OF ALCOHOLS

There are two major ways of classifying alcohols

\*this type of classification is based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. This classification divides alcohols into three:

i) Primary alcohols: alcohols in which there are two or three hydrogen atoms attached to the carbon carrying the hydroxyl group e.g CH3OH (methanol)

ii) Secondary alcohols:alcohols in which there is only one hydrogen atom attached to the carbon carrying the hydroxyl group e.g CH3CH(OH)CH3.

iii) Tertiary alcohols : alcohols in which there are no hydrogen atoms attached to the carbon bearing the hydroxyl group e.g (CH3)3 C-OH.

\*The second type of classification is based on the hydroxyl group present the alcohol possesses. This classification divides alcohols into four.

i) Monohydric alcohols: alcohols which have an hydroxyl group present in their alcohol structure e.g CH3 CH2 CH2 OH.

ii)Dihydric alcohols :alcohols which have two hydroxyl group present in their alcohol structure e.g HOCH2 CH2 CH2 OH

iii)Trihydric alcohols: alcohols which have three hydroxyl group present in their alcohol structure e.g OH CH2 CH2 (OH) CH2 OH

iv) Polyhydric alcohols: Alcohols which have more than three hydroxyl groups in their alcohol structures. They are also reffered to as polyols e.g CH3 CH (OH) CH (OH) CH (OH) CH (OH) CH (OH) CH (OH) CH3.

2 SOLUBILITY OF ALCOHOLS

Lower alcohols with up to three carbon atom in their molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules. The water solubility decreases with increasing relative molecular mass .All monohydric alcohols are soluble in organic solvent . The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules

3 INDUSTRIAL MANUFACTURE OF ETHANOL

Generally, starchy foods such as rice maize or parley are used as a source of starch ; potato among the lot is the most common.

a)Extraction of the starch: The potato is crushed and then steamed at 1400C to 1500C under pressure to prepare starch solution known as mash. Before hydrolysis, starch undergoes germination at 100C to 130C for a few days .This germinated starch is called malt.

b) Hydrolysis of starch : starch is hydrolysed to maltose, by an enzyme known as diatase . 2(C6H10 O5)n + nH2O Diatase n(C12 H22 O11)

50 – 60 matose

C) yeast is then added at room temperature. Yeast contains 2 enzymes which converts the maltose to glucose.

C12 H22 O11(aq) +H2O(I) maltose 2 C6 H12 O6 (aq)

15C glucose.

The glucose at constant temperature is then converted into alcohol by the enzyme zymase contained also in yeast.

C6 H12 O6 zymase 2 CH3 CH2 OH + 2CO2

15C ethanol

4) Reaction between 2-methyl propane and butyl magnesium chloride.

CH3CH(CH3)-C-H +CH3 CH2 CH2 CH2 MgCl

o

CH3 CH(CH3)-C-H + MgCl.

CH3CH2CH2CH2

+H2O CH3 CH(CH3) –C-H + Mg(OH)CL

CH3CH2CH2CH2

7)CH3 CH(CH3) –C- H LiAlH4 CH3CH(CH3)CH2OH

H2O

2-methylpropane-1-ol

8)propane-1-ol to propane-2-ol

CH3 CH2 CH2 OH +H2SO4.

CH3 CH2 CH2 OH2 OSO3H.

-H2O CH3 CH2 CH2 CH2 OSO3H

Propyl hydrogensulphate.

-H2SO4 CH3 CH = CH2.

+ H2O CH3 CH (OH) CH3

Propan-2-ol.