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19/MHS01/061

CHEM 1

ASSIGNMENT

1 Alkanols can be classified based on;

① Based on the kind of carbon that bears the -OH group.

=> Primary Alkanols: These are alkanols that have the -OH group attached to the primary carbon, the primary carbon is a saturated carbon atom which has either 3 hydrogen atoms attached to it or only 1 alkyl group and 2 hydrogen atoms attached to it Ecample ~~ene~~

* Methanol (CCH_3OH)

=> Secondary Alkanols: These are alkanols that have the -OH group attached to a saturated carbon atom which has 2 other alkyl groups (R) attached to it E.g. Propan-2-ol (C_3H_7OH)

=> Tertiary Alkanols: These are alkanols that have the -OH group attached to a saturated carbon atom which has 3 other alkyl groups attached to it E.g. 2-methyl propan-2-ol [$(CH_3)_3COH$] = (C_4H_9OH)

② Based on the number of -OH group.

=> Monohydric alkanols -> These are alkanols that contains one hydroxyl (C-OH) group, E.g * ~~Ethanol~~ Ethanol (C_2H_5OH)

=> Dihydric alkanols -> These are alkanols that contains 2 hydroxyl groups (C-OH) They are also known as glycols E.g * 1,2-Ethandiol ($C_2H_6O_2$)

=> Trihydric alkanols -> These are alkanols that contain 3 hydroxyl groups (C-OH)

* 1,2,3-Propantriol (Glycerol) $C_3H_{10}O_4$

=> Polyhydric alkanols -> These are alkanols with 4 or more hydroxyl groups, They are also known as sugar alcohols E.g * Sorbitol ($C_6H_{14}O_6$)

2 $CH_3CH_2CH_2CH_2C=OCH_3CH_2CH_3$ Condensed to $CH_3(CH_2)_3C=O(CH_2)_2CH_3$, reacts with a named Grignard reagent.

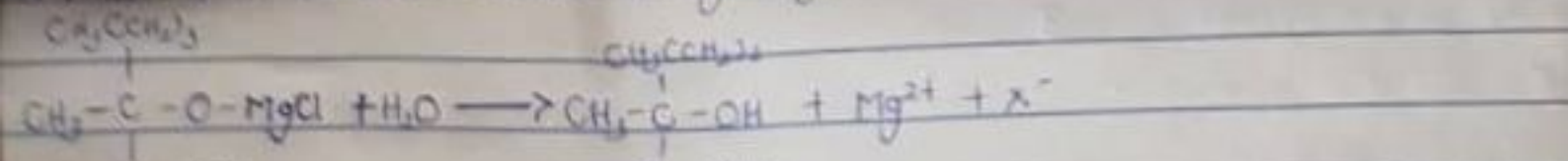
Grignard reagent = Methyl magnesium chloride (CH_3MgCl)

$$\underset{\text{methyl magnesium chloride}}{CH_3MgCl} + \underset{\text{4-Octanone}}{CH_3(CH_2)_3C=O(CH_2)_2CH_3} \longrightarrow CH_3-\overset{\overset{CH_3(CH_2)_3}{|}}{\underset{\underset{(CH_2)_2CH_3}{|}}{C}}-O-MgCl$$

=> Dilute acid is then added to this to hydrolise it.

$$CH_3-\overset{\overset{CH_3(CH_2)_3}{|}}{\underset{\underset{(CH_2)_2CH_3}{|}}{C}}-O-MgCl + H_2O \longrightarrow CH_3-\overset{\overset{CH_3(CH_2)_3}{|}}{\underset{\underset{(CH_2)_2CH_3}{|}}{C}}-O-MgCl$$

Dilute acid is then added to hydrolyze it



4-methyl-4-octanol

3

Ethene (Ethylene) hydration

Ethanol is manufactured by reacting ethene with steam. The reacti is reversible, and the formation of ethanol is exothermic.

$C_2H_4(g) + H_2O(g) \rightleftharpoons CH_3CH_2OH(g)$

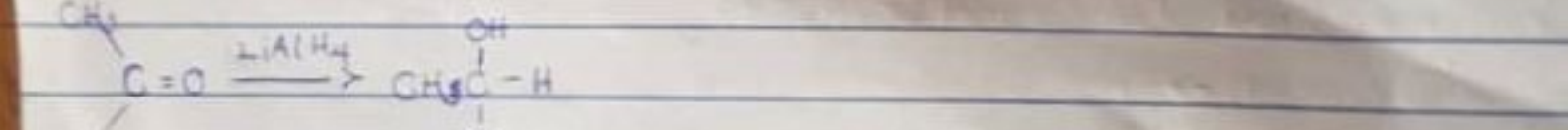
The reaction needs 1 vol. of Ethene and 0.6 vol. of steam a temperature of 300°C, a pressure of 60-70 atm and Phosphoric (V) acid as a catalyst.

Only 5% of the ethene gas is converted into ethanol (by cooling and recycling the ethene, it is possible to achieve 95% Conversion

ii Reduction of Alkanones

Used Example: 2-Propanone

Reducing agent: Lithium tetrahydridoaluminate (III) ($LiAlH_4$)



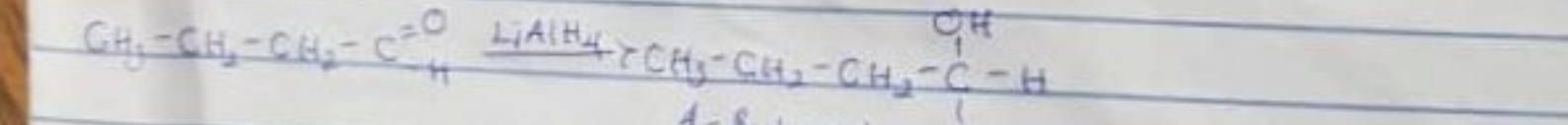
2-Propanol

The reduction of Alkanones results in the production of secondary alkan

ii Reduction of Alkanals

Used Examples: Butanal

Reducing agent: Lithium tetrahydridoaluminate (III) ($LiAlH_4$)



The reduction of alkanals produces primary alkanol.