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CHM 102 Assignment

1. Classification of Alcohols

A. Classification based on the number of hydrogen atoms attached to the carbon atom containing the OH group

- i. If 2 or 3 hydrogen atoms are attached to the carbon atom bearing the OH group, it is called a primary alcohol (1°).
- ii. If one hydrogen atom is attached, it is called a secondary alcohol (2°).
- iii. If no hydrogen atom is attached to the carbon atom, it is a tertiary alcohol (3°).

Examples.

Methanol CH_3OH (1°)

Propan2ol $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ (2°)

B. Classification based on the number of hydroxyl groups they possess.

Monohydric alcohol have one OH group present in the alcohol structure. Dihydric alcohols are called glycols, they have 2 hydroxyl group present in the structure while trihydric alcohols or triols have 3 OH groups present in the structure of the alcohol. Polyhydric alcohols or polyols have more than 3 OH groups.

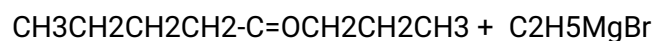
Examples

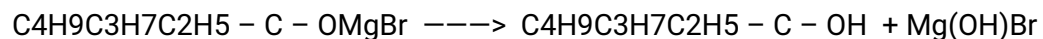
Monohydric alcohol – Propanol $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

Dihydric alcohol – Ethane1,2diol $\text{HOCH}_2\text{-CH}_2\text{OH}$

2. Grignard synthesis of Alkanols

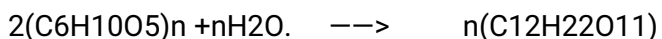
Grignard reagent – $\text{C}_2\text{H}_5\text{MgBr}$





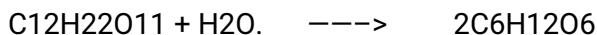
3. Industrial manufacturer of Ethanol

Carbohydrate such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalysts, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. On warming starch with malt to 60° for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.



Carbohydrate 60°C / diastase. Maltose

The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°.



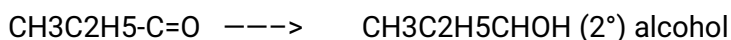
Maltose. 15°C / maltase. Glucose

The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme Zymase contained also in yeast



Glucose. 15°C / Zymase Ethanol

4. Alkanone. Reduction of alkanone gives secondary alkanols



Alkanals. Reduction of alkanals gives primary alkanols.

