

Name: Osadebe Antoinete Adaobi

Dept: MBBS

College: MHS

Course Code: CHM 102

Matric No: 19/MHS01/360

ASSIGNMENT ON CARBOXYLIC ACID

1. Give the IUPAC names of the following compounds.

(a) HCOOH ----Methanoic acid

(b) $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ --- pentanol,5-dioic acid

(c) $\text{HO}_2\text{C}-\text{CO}_2\text{H}$ -----Ethanedioic acid

(d) $\text{CH}_3(\text{CH}_2)_4\text{COOH}$ -----Hexanoic acid

(e) $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$ ----Hex-4-eneoic acid

2. Discuss briefly the physical properties of carboxylic acids under the following headings.

(i) physical appearance: all simple aliphatic carboxylic acids up to C_{10} are liquid at room temperature. Most other carboxylic acids are solid at room temperature

Although anhydrous carboxylic acids eg. Acetic acids freezes to an ice-like solid below the room temperature.

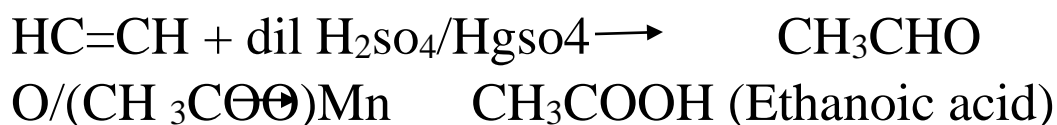
(ii) Boiling point: boiling point increases with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids and have higher melting point than their aliphatic counterparts of comparable relative molecular mass

iii) Solubility: Lower molecular mass carboxylic acids with up to the four carbon atoms in their molecules are soluble in water; this is largely due to their ability to form hydrogen bonds with water molecules. The water solubility of the acids decreases as the relative molecular mass increases because the structure becomes relatively more hydrocarbon in nature and hence covalent. All carboxylic acids are soluble in organic solvents.

3. Write two industrial preparations of carboxylic acids.
 a. From carbon(ii) oxide



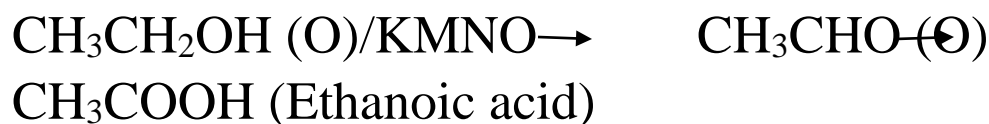
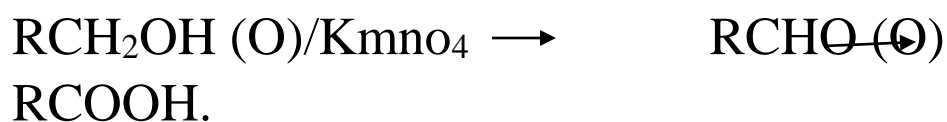
(b) from ethanol.



4. With Equation and brief explanation, discuss the synthetic preparation of carboxylic acid.

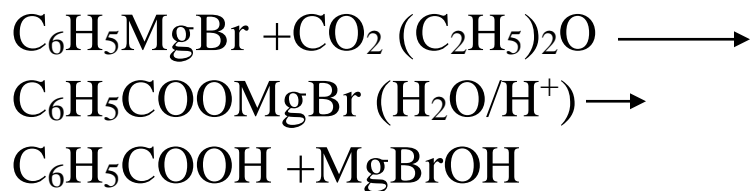
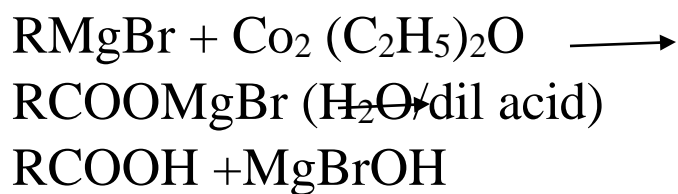
(a) Oxidation of primary alcohols and aldehydes.

Oxidation of primary alcohols and aldehydes can be used to prepare carboxylic acid using $K_2Cr_2O_7$ or $KMnO_4$ as oxidizing agent.

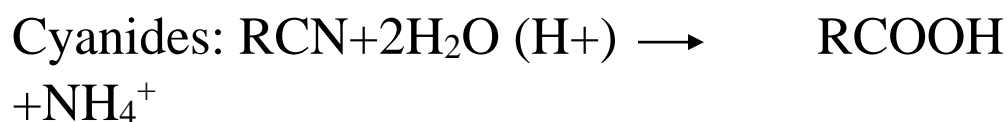


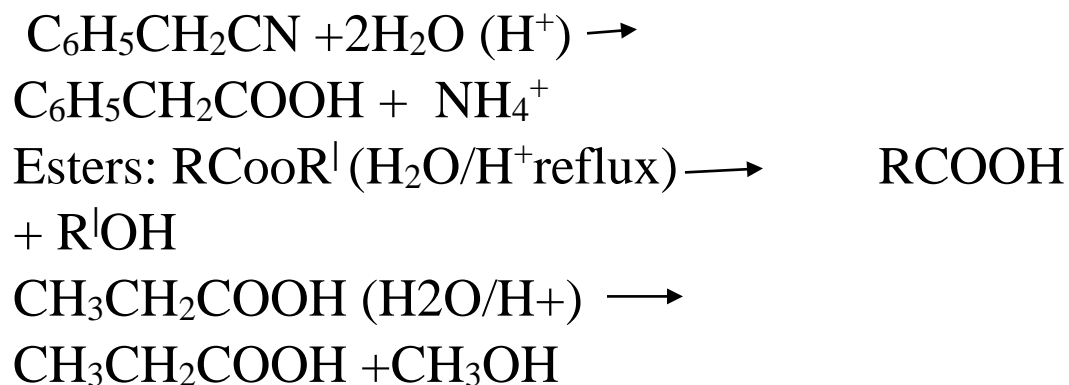
(b) Carbonation of Grignard reaction.

Aliphatic carboxylic acids are obtained by bubbling carbon (iv) oxide into the Grignard reagent and then hydrolysed with dilute acids.



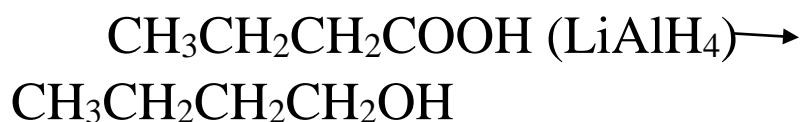
(c) Hydrolysis of cyanides or esters.





5) With chemical equation only, outline the reduction, decarboxylation and esterification of carboxylic acid.

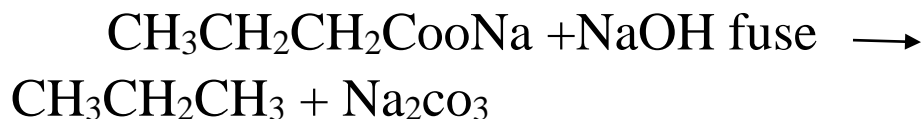
a) reduction.



Butanoic acid

butanol

b) Decarboxylation.



c) esterification.

