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Course CHM102

Assignment in Carboxylic acid

- 1.
- HCOOH - methanoic acid
 - $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ - pentan-1,5-dioic acid
 - $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ - Butanoic acid
 - $\text{HO}_2\text{C}-\text{CO}_2\text{H}$ - Ethanedioic acid
 - $\text{CH}_3(\text{CH}_2)_4\text{COOH}$ - Hexanoic acid

2. Physical properties of Carboxylic acids

i. Physical appearance:

~~Most~~ aliphatic alkanoyl carboxylic acid up to C_6 are liquid at room temperature. Most other carboxylic acids are solid, although acetic acid (anhydrous carboxylic acid) freezes to an ice-like solid below the room temperature.

ii. Boiling points

Boiling points increases with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids having higher melting points than their aliphatic counterpart of comparable relative molecular mass.

iii. Solubility:

Carboxylic acid up to four carbon atoms are soluble in water due to their ability to form hydrogen bond with water. Solubility decreases with increasing molecular mass because they become covalent in nature.

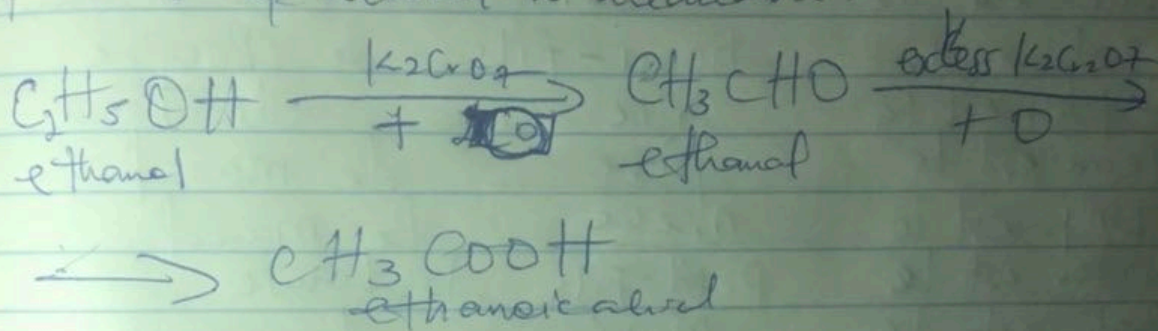
3. Industrial preparation

- Addition of carbon(II) oxide to hot sodium hydroxide
- Liquid phase air oxidation of ethanal

4. Synthetic preparation

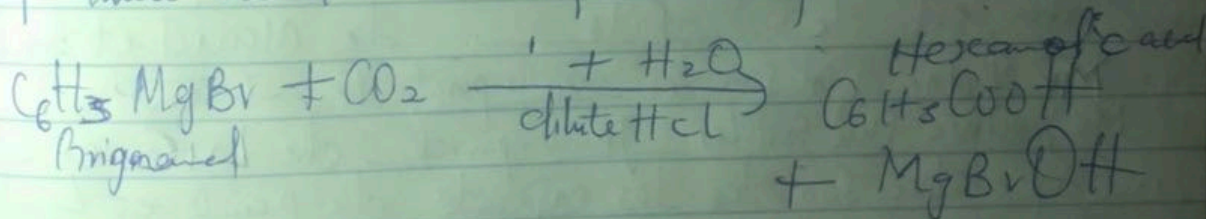
i. Oxidation of primary alcohol and aldehyde

When primary alcohol and aldehyde are treated with oxidizing agent ($K_2Cr_2O_7/K_2Cr_2O_4$) Carboxylic acid is produced. Alcohol is first converted to ~~an~~ aldehyde then to carboxylic acid if only alcohol is available.



ii) Carbonation of Grignard reagent

When grignard reagent is carbonized and then hydrolyzed by dilute acid, Carboxylic acid is formed



iii) Hydrolysis of nitriles (Cyanides) or ester

When nitriles are hydrolyzed with the help of dilute HCl, Carboxylic acid is yielded

