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Course Code: CMM 102

Assignment

HCOOH - Methanoic acid
 $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ - Pentane-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
 $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$ - ~~Hexanoic acid~~ Hex-4-enoic acid

1) Physical appearance: - All simple aliphatic carboxylic acids up to C_{10} are liquids at room temperature. Most other carboxylic acids are solid at room temperature although anhydrous carboxylic acid (acetic acid also known as glacial ethanoic acid) freezes to an ice-like solid below the room temperature.

- Boiling points: -

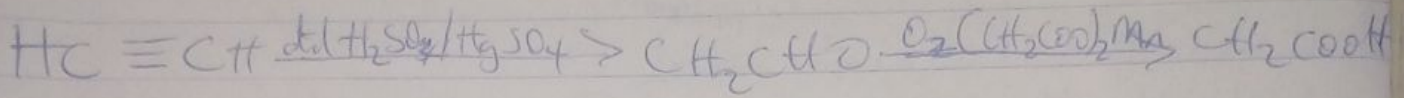
Boiling point increases with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparable relative molecular mass.

- Solubility: -

Lower molecular mass carboxylic acids with up to four carbon atoms in their molecules are soluble in water this largely due to their ability to form hydrogen bonds with water molecules.

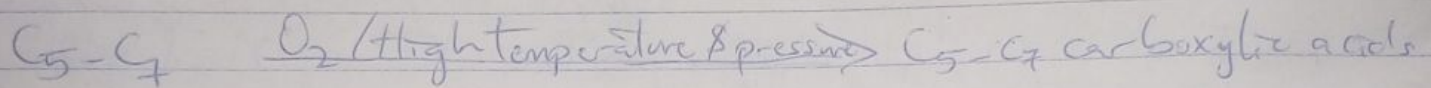
3.) From ethanol:-

Ethanoic acid is obtained commercially by the liquid phase air-oxidation of 5% solution of ethanol to ethanoic acid using manganite(II) ethanoate catalyst. Ethanol itself is obtained from ethylene.



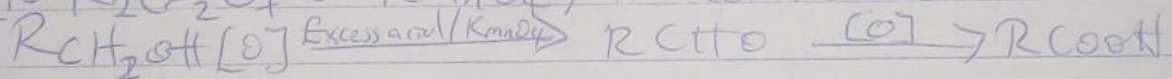
- From petroleum:-

Liquid phase air oxidation of C_5 - C_7 alkanes obtainable from petroleum at high temperature and pressure will give C_5 - C_7 carboxylic acids with methanoic, propanoic and butanedioic acids as by products.



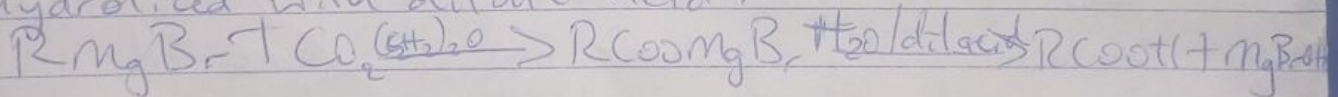
4.) Oxidation of Primary alcohols and aldehydes

Oxidation of primary alcohols and aldehydes can be used to prepare carboxylic acids using the usual oxidizing agents (ie $\text{K}_2\text{Cr}_2\text{O}_7$ or KMnO_4) in acidic solution -

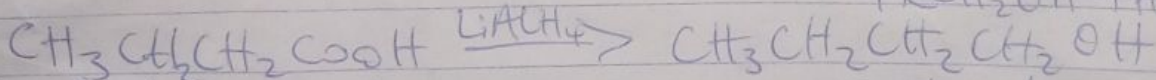
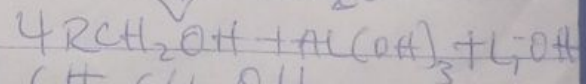
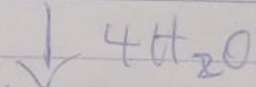
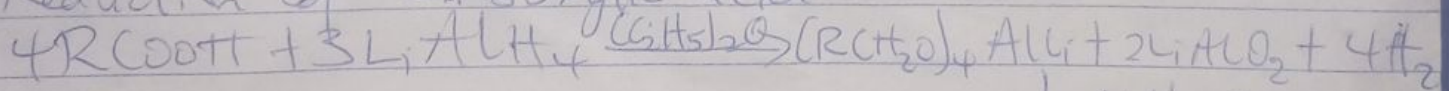


5.) Carbonation of Grignard reagent:-

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



6.) Reduction of Carboxylic acid.

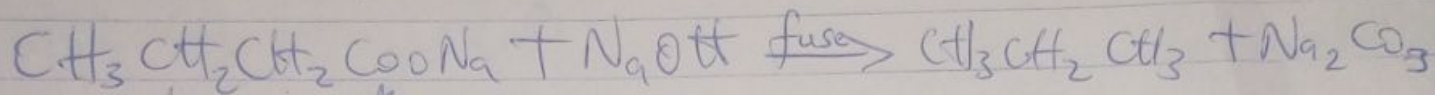


Butanoic acid

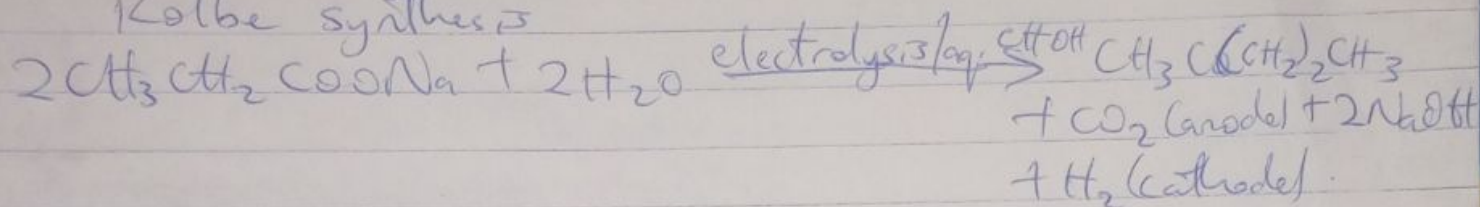
Butanol

(3)

5.) Decarboxylation of Carboxylic acid.



Kolbe synthesis



b.) Esterification.

