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Computer Engineering
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Chm 102

- 1) $\text{HCOOH} \rightarrow$ Methanoic acid
 $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH} \rightarrow$ Pentan-1,5-dioic acid
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH} \rightarrow$ Butanoic acid
 $\text{HO}_2\text{C}-\text{CO}_2\text{H} \rightarrow$ Ethanedioic acid
 $\text{CH}_3(\text{CH}_2)_4\text{COOH} \rightarrow$ Hexanoic acid
 $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH} \rightarrow$ Hex-4-enoic acid

2) Physical Appearance

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

- Boiling Point

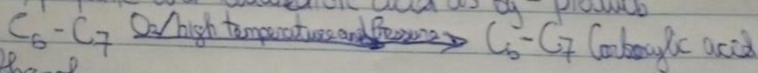
This increases with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solid and have higher melting points than their aliphatic counterparts of comparable relative molecular mass.

- Solubility

Lower molecular mass carboxylic acid with up to four carbon 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 less polar. All carboxylic acids are soluble in organic solvents.

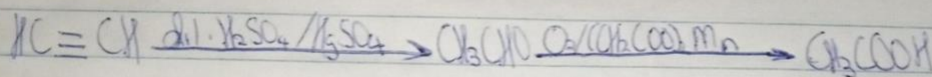
3) - From Petroleum:

Liquid Phase air oxidation of C₅-C₇ alkanes, obtainable from petroleum of high temperature and pressure will give C₅-C₇ Carboxylic acid with Methanoic, propanoic and butanoic acid as by-products

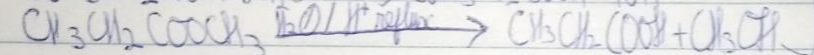
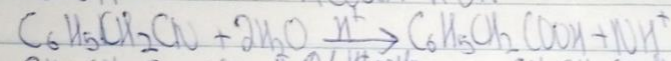
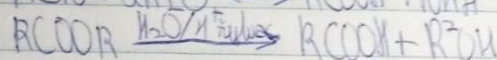
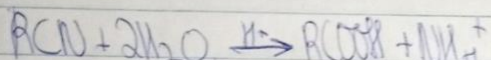


- From Ethanol

Ethanoic acid is obtained commercially by the liquid phase air-oxidation of 50% solution of ethanol to ethanoic acid using manganese(II) ethanoate catalyst. Ethanol itself is obtained from ethylene

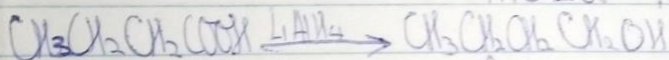
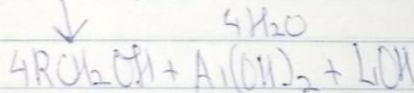
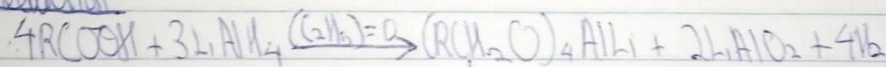


4) Hydrolysis of nitriles (cyanides) or esters



} R = alkyl

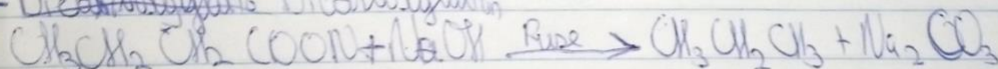
5) Reduction



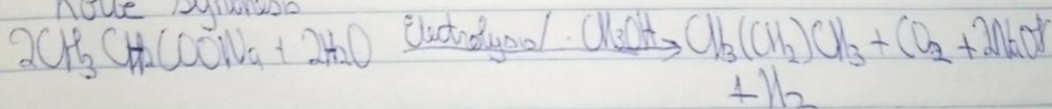
Butanoic acid

Butanol

- Dicarboxylic Dicarboxylation



Kolbe synthesis



- Esterification

