

⑩ OLAWUYI FAWAZ DELGLADE

MECHATRONICS ENGINEERING

19/EN605/052

CHEM 152

① $\text{HCOOH} \longrightarrow$ Methanoic acid

② $\text{HCOOCH}_2\text{CH}_2\text{CH}_2\text{COOH} \longrightarrow$ Pentan-1,5-dioic acid

③ $\text{C}_2\text{H}_5\text{CH}_2\text{COOH} \longrightarrow$ Butanoic acid

④ $\text{HO}_2\text{C}-\text{CO}_2\text{H} \longrightarrow$ Ethanedioic acid

⑤ $\text{C}_6\text{H}_5(\text{CH}_2)_4\text{COOH} \longrightarrow$ Hexanoic acid

⑥ $\text{CH}_3\text{CH}=\text{CHCH}_2\text{COOH} \longrightarrow$ Hex-4-enoic acid

2. i Physical appearance :-

All simple aliphatic carboxylic acids up to 10 are liquids at room temperature although anhydrous carboxylic acid. Most other carboxylic are solid at room temperature although anhydrous carboxylic acid (acetic acid) also known as glacial ethanoic acid freezes to a ice-like solid below the room temperature.

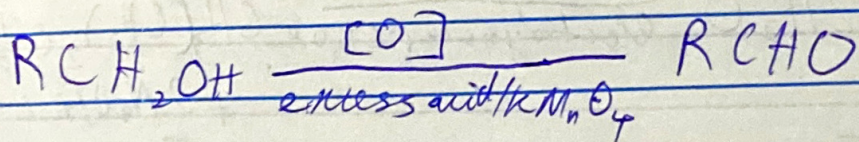
⑪ Boiling point :- boiling point increases with increasing relative molecular mass. Aromatic carbon carboxylic acid are crystalline solids and have higher melting points than their aliphatic counterparts of the same relative molecular mass.

(ii) Solubility :- Lower molecular mass carboxylic acids with up to four carbon atoms are soluble in water, this is largely due to their ability to form hydrogen bonds with water molecules.

3. ~~From ethane~~ Production of carboxylic acid from ethanal

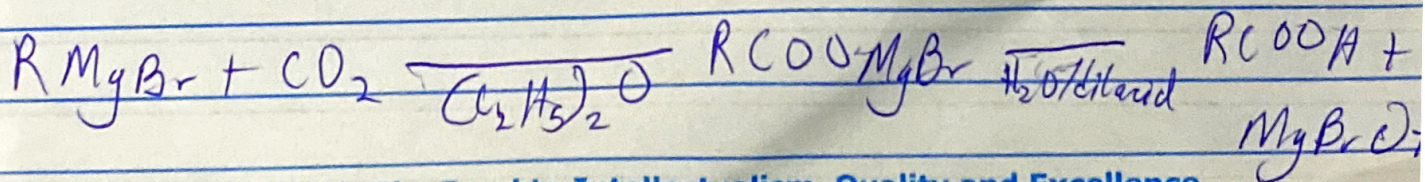
(i) Production of carboxylic acid from petroleum

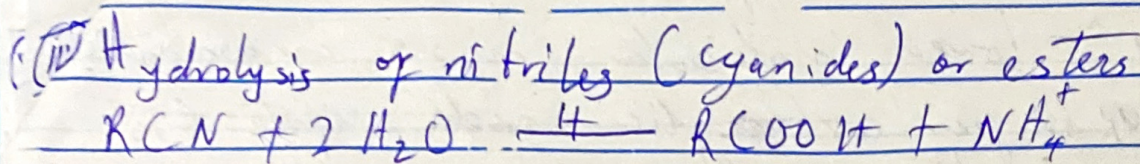
4. (ii) Oxidation of primary alcohols and aldehydes
It can be used to prepare carboxylic acids using the usual oxidizing agents in acidic solution (i.e. $K_2Cr_2O_7$ or $KMnO_4$).



(i) Carbonation of Grignard reagent

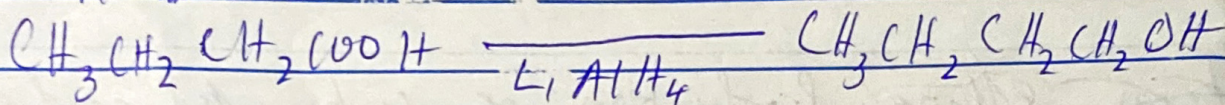
Aliphatic carboxylic acids are obtained by bubbling carbon (IV) oxide into the Grignard reagent and the hydrolyzed with dilute acid.





(5) Reduction of primary alcohol

~~4 Redox~~

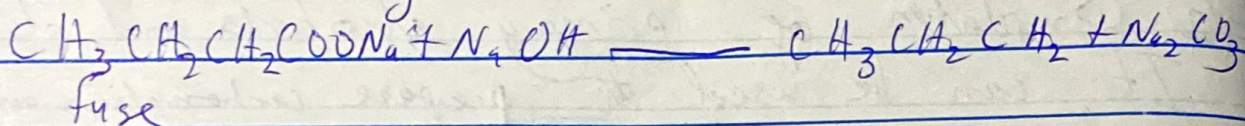


Butanoic acid

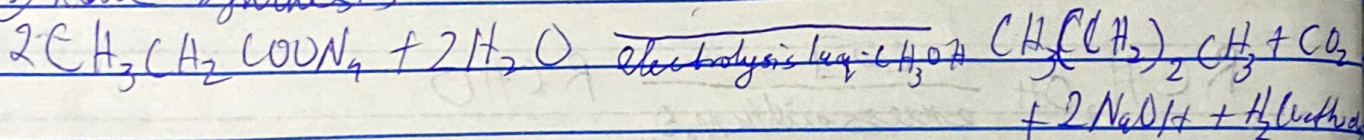
Butanol

(ii) decarboxylation

(a) Thermal decarboxylation



(b) Kolbe synthesis



3) Esterification

