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hm 102

/Eng09/004

Aeronautics Engineering

Formic Acid - HCOOH

butyric Acid - $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$

Caproic Acid - $\text{CH}_3(\text{CH}_2)_4\text{COOH}$

Valeric Acid - $\text{HOOCH}_2\text{CH}_2\text{CH}_2\text{COOH}$

Physical appearance of carboxylic acids

The molecules of carboxylic acids are polar due to the presence of two electronegative oxygen atoms. They also participate in hydrogen bonding due to the presence of a carbonyl group ($\text{C}=\text{O}$) and the hydroxyl group.

Boiling Point of carboxylic acids

carboxylic acids have high boiling point

It is because of the hydrogen bond which operates in a different way. In a pure carboxylic acid, hydrogen bonding can occur between two molecules of acid to produce a dimer.

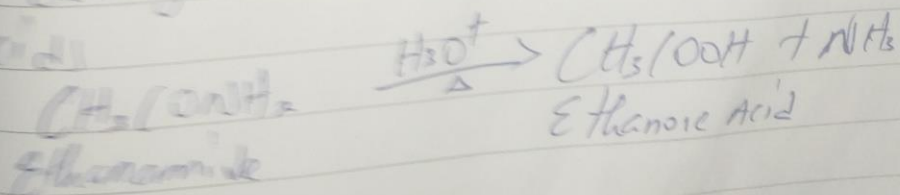
Solubility of Carboxylic acids

Carboxylic acids with up to four carbon atoms will mix with water in any proportion. When you mix the two together, the energy released when the new hydrogen bond forms is about the same as is needed to break the hydrogen bonds in the pure liquids.

Preparation of Acid Chloride

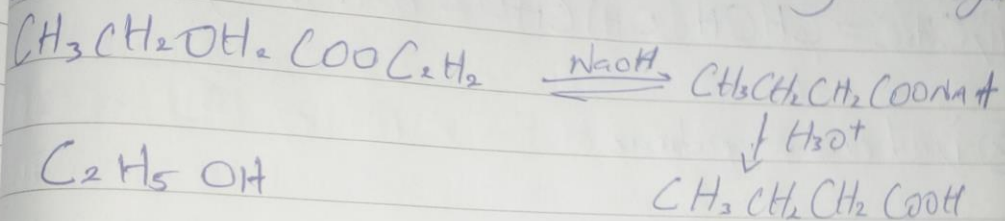
Preparation from Amides

Amide undergoes hydrolysis in the presence of catalyst H^+ or OH^- to form carboxylic acids.

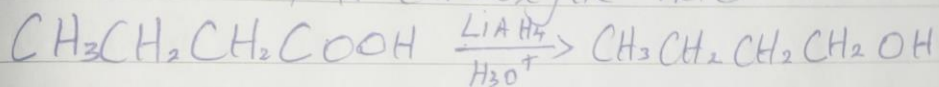


Preparation from Esters

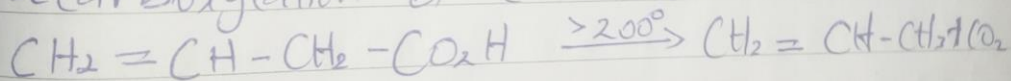
Acidic hydrolysis of ester leads to the formation of carboxylic acids. However, hydrolysis of the ester produces carboxylates followed by acidification leads to the formation of corresponding carboxylic acids.



Reduction of Carboxylic Acids



decarboxylation of carboxylic acid



esterification of carboxylic acids

