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MATRIC NUMBER: 19/MHS01/230

COLLEGE: MHS

DEPARTMENT: MBBS

- 1) HCOOH – METHANOIC ACID
- 2) $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ – BUTANEDIOIC ACID
- 3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ – BUTANOIC ACID
- 4) $\text{HO}_2\text{C}-\text{CO}_2\text{H}$ – ETHANEDIOIC ACID
- 5) $\text{CH}_3(\text{CH}_2)_4\text{COOH}$ – HEXANOIC ACID
- 6) $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$ – 4-HEXANOIC ACID

2) BOILING POINT: Carboxylic acid tend to have higher boiling points than water because of their greater surface areas and their tendency to form stabilized dimers through hydrogen bonds must be broken or the entire dimer arrangement must be vaporized increasing the enthalpy of vaporization requirements significantly.

ii) Solubility: carboxylic acid are polar because they are both hydrogen bond acceptors and hydrogen bond donors they also participate in hydrogen bonding together the hydroxyl and carbonyl group form the functional group carboxyl carboxylic acids usually exists as dimers in non- polar media due to their tendency to self-associate smaller carboxylic acids are soluble in water whereas higher carboxylic acids have limited solubility due to the increasing hydrophobic nature of the alkyl chain. These longer chain acids tends to be soluble in less polar solvent such as esters and alcohols. Aqueous sodium hydroxide and carboxylic acids even hydrophobic ones react to yield water soluble salt

iii) Physical appearance: the smaller members of the carboxylic acids are colorless, volatile liquids with strong odors. Carboxylic acids with shorter carbon chain are very soluble in water while those with longer carbon chain are less soluble there are great many carboxylic acid which are all crystalline solid.

3) GRINARD REAGENT: this reacts with carbon dioxide to give magnesium salts of carboxylic acid which are converted to acids themselves upon treatment with acid .this method adds one carbon skeleton grinard reagent is prepared from an alkyl or aryl halide

II) THE OXIDATION OF PRIMARY ALCOHOLS: this is a common method for the synthesis of carboxylic acids this requires a strong oxidizing agent the most common being chromic acids. Aldehydes are oxidized to carboxylic acid more easily but this is not often useful because the aldehydes are usually less available than the corresponding acids regardless of the number of carbon atoms in the side chain or presence of any group attached to them if the first carbon in the alkyl chain is bonded to at least one hydrogen all but one of the carbon are removed and only a COOH group remains bonded to the aromatic ring

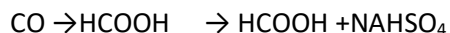
4)

i) 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 acid with methanoic, propanoic and butanedioic acids as by products

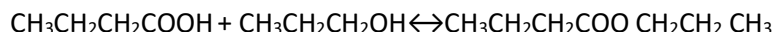


Acids O_2 \ high temperature and pressure

ii) FROM CARBON (II) OXIDE: methanoic acid is manufactured by adding carbon (ii) oxide under pressure to hot aqueous solution of sodium hydroxide the free carboxylic acid is liberated by careful reaction with tetraoxosulphate (iv) acid.



5) ESTERIFICATION: IN the presence of a strong catalyst carboxylic oxide react with alcohols to form esters



II) DECARBOXYLATION: This involves removal of the carboxyl group from the acid to give a hydrocarbon or its derivative. Thermal decarboxylation; carboxylic acids with a strong electron attracting group e.g. $-COOH$, $-CN$, NO_2 decarboxylated readily on heating on heating to $100-150^\circ C$ while others decarboxylate when their salts are heated with soda lime



KOLBE SYNTHESIS

