Diagram

This method has an advantage of being based on a cheaper $^{h}/_{c}$ i.e diagram then the acetylene process. This route has the major drawback of converting half the chlorine set to it to HCl of this severely limited use of ethane or ethylene in vinyl chloride manufacture.

(3). **THE BALANCE ROUTE PROCESS**

One elegant way to go around those disadvantages of the ethylene dichloride process is to use the so called balance route. In this, acetylene based of ethylene based process is reacted in parallel, the HCl produced by ethylene do chloride pyrohysis is being fed to the acetylene based process.

Diagram

The balanced route has been operated in bp inUK. However, this solution to the problem of HCl by-product is not as attractive as it appears at first soght for two reasons.

Firstly, the process requires three reaction stages, so that capitals of operating cost are increased.

Secondly, half the $^{h}/_{c}$ fed is still the expensive acetylene in this form described, it is not a favoured way of making vinyl chloride.

(4)**. KNETE PROCESS**

Modified form of the above process was developed. In this a mixture of acetylene produced by $^{h}/_{c}$ cracking is reacted first with HCl under such conditions that only acetylene reacts.

The resultion rmyl chloride is removed from the gas stream. The remaining ethylene is then reated with chloride to give ethylene dichloride which is then pyrolysed to give vinyl chloride of HCl.

Diagram

The essential difference between this process of the balanced-route describe is that substantial savings in the separation cost of ethylene of acetylene are made. However, high capitals of energy cost are still incurred of the conversation of acetylene or ethylene mixture still requires three stages. The route is not commercially atttractive.

(5). **OXY-CHLORINATION-DEACON'S PROCESS (MOST ACCEPTED)**

This involves the conversation of HCl to chlorine (deacon process) by oxidation which air or a copper chloride at 720k. one way of avoiding wastage of chlorine will be to use Deacon's process to convert HCl by-product from ethylene dichloride pyrolysis back to chloride.

Diagram

However, this method involves an extra stage to the process, with the resultant increase in capital and operating cost.

A more elegant approach is to carry out the oxidation of the HCl in the presence of ethylene.

A more recently developed process have been able to carry out the reaction of has been found to be the most successful way of producing vinyl chloride.

Diagram

CHLOROPRENE: - (2-CHLOROBUTAN-1, 3-DIENE)

Diagram

It is a monomer for neoprene one of the highest synthetic rubber. The original has seen the major method of manufacture is by addition of HCl which vinyl chloride made by dimensation of acetylene.

Diagram

This process is now subject to competition for processes based on raw materials other than acetylene e.g from butadiene as raw material.

Diagram

Butadiene is chlorination in gas phase at 570k to give it's of trans 1, 4-dichlorobut-2-ene of 3, 4-dichlorbut-1-ene.

Diagram

The reaction is a free-radical mechanism of conditions must be carefully designed to avoid the occurrence of the variety of side reaction. The 3, 4-dichlorobut-1-ene (b.p 396k) which is the product required for the final stage of the process is separated from the mixture of 1, 4-dichlorobut-2-ene (b.p 428k).

The 1, 4-dichlorobut-2-ene are subject to isomerisation on the presence on the presence of Cu of other salts to produce further 3, 4-dichlorobut-1-ene.

Diagram

In the final stage of the process, the intermediate carbonium ion can be re-arranged to give 3, 4-dichlorobut-1-ene is dehydrochlorinated (btHCl) by heating with alcoholic KOH.

Diagram

PREPARATION OF INSECTICIDE OF DDT

Insecticides are important group of organic chemical in the industry of they make the major contribution to the quality of life by increasing agricultural efficiency of output.

They also control insect-born diseases. DDT was found to be a highly effective insecticide. It is highly potent of kills a wide range of insect by both contact of ingestion.

It is of low acute iconicity to warm blooded animals. The major disadvantage is that it is chemically stable of therefore persistent.

Diagram

SPECIAL TOPICS

ASCENT OF HOMOLOGOUS SERIES (INCREASING THE NO OF ATOMS IN AN ORGANIC COMPOUND)

Diagram

(2). ARNDT – EISTERT REACTION

It increases the homologous of carbon atoms (length of carbon atom chain) by using diazomethane (step up process of carboxylic acid).

Diagram

1. Reduction of aldehyde can also be affected by reduction with aluminium isopropoxide Al(isopropyl). It is known as meerwen pondoff reduction.

   Diagram

   DESCENT OF HOMOLOGOUS SERIES

   $RCH_2COOH \longrightarrow RCOOH$

   $RCH_2OH \longrightarrow ROH$

   $RCH_2COO\square t \longrightarrow RCOO\square t$

1. **BARBIER – LORQUIN – WISLAND DEGRADATION REACTION**
   (i) Diagram
   (ii) Diagram
   (iii) If we make use of Ba salt of the carboxylic acid with barium acetate, there will be reduction in the no of carbon atoms.

   Diagram

2. **GALLAHER – HOLLANDER REDUCTION: -**

   This knocks off two carbon atoms

   Diagram

3. **HOFFMAN'S DEGRADATION**

   Diagram

4. **SCHMIDT DEGRADATION REACTION**

   Diagram

RING CONTRACTION

1. **ZELINSKY'S REACTION**

Diagram

2. Action of nitrons acid on cyclic amines

Diagram

3. Action of silver nitrate on cyclic halides

Diagram
4. Action of caustic alkali on cyclic of chloro ketones
Diagram

5. Diagram
6. Action of GRIGNARD'S REAGENT

Diagram

RING EXPANSION

1. OXIDATION OF CYCLIC KETONE
   The oxidants are usually $KMnO_4$, O_3, of nitric acid HNO_3
   Diagram
2. BY HYDROGENATION

Diagram

3. RING FUSSION BY ISOMERISATIOON (AL_2O_3)

Diagram

USE OF ANHYDRIDE

Diagram

Pythalic anhydride is used for protecting certain compounds when introducing another group e.g the protection of the amino group

(1). Diagram

(2). PREPARATION OF PERACETIC ACID (ADD ONE ATOM OF OXYGEN)

Diagram

(3). FRIEDEL CRAFTS REACTION: -

Diagram

(4). PREPARATION OF ALCOHOL

Diagram

(5). PERKIN'S REACTION

Diagram

(6). PREPARATION OF COUMARIN

Diagram

1. Preparation of 1-tetralone and tetralin

Diagram

2. Preparation of naphthalene derivative

Diagram

3. Preparation of phenanthrene

Diagram

PHTHALIC ANHYDRIDE

1. Diagram
2. Diagram
3. It is used in the preparation of indicators e.g phenolpyhalein

Diagram

4. Preparation of □osin

Diagram

5. Preparation of Quinizarrn

Diagram

6. Preparation of triphenyl methane

Diagram

INSECTICIDE (Δ) DDT

(2). BENZENE HEXACHLORIDE: -

It has insecticidal properties

Diagram

Benzene hexachloride has a mishy smell of causes tainting of food which it comes in contact with

CHLORIDINE

Preparation: -

It flows Dier – Alder's reaction of hexa chloro cyclopenta diene with certain alkene

Diagram

(b). diagram

PREPARATION OF PIERIC ACID

Diagram

(c). diagram.