## Diphenyl methane.

- (1) Methods of preparation
- (i) Friedel-craft's reaction :  $C_6H_5CH_2Cl + C_6H_6 \xrightarrow{AlCl_3} C_6H_5CH_2C_6H_5 + HCl$  or Diphenyl methane

$$2C_6H_6 + CH_2Cl_2 \xrightarrow{AlCl_3} C_6H_5CH_2C_6H_5 + 2HCl$$

(ii) By action of formaldehyde on benzene in presence of conc. sulphuric acid

$$2C_6H_6 + O = CH_2 \xrightarrow{Conc.H_2SO_4} C_6H_5CH_2C_6H_5 + H_2O_6H_5$$

- (iii) **By Grignard reaction :** Phenyl magnesium bromide reacts with benzyl bromide to from diphenyl methane.  $C_6H_5MgBr + BrCH_2C_6H_5 \longrightarrow C_6H_5CH_2C_6H_5 + MgBr_2$
- (iv) By reduction of benzophenone : Reduction can be done with  $LiAlH_4$  or P and HI.

$$C_6H_5COC_6H_5 \xrightarrow{4[H]} C_6H_5CH_2C_6H_5 + H_2O$$

(2) **Properties :** It is a colourless solid, melting point 26°C.Like biphenyl, it also easily undergoes electrophilic substitution reactions.

$$\begin{array}{c|c}
\hline
 & CH_2 \\
\hline
 & HNO_3 \\
\hline
 & H_2SO_4
\end{array}$$

$$\begin{array}{c|c}
\hline
 & CH_2 \\
\hline
 & NO_2 \\
\hline
 & HO_3 \\
\hline
 & H_2SO_4
\end{array}$$

$$\begin{array}{c|c}
\hline
 & O_2N \\
\hline
 & NO_2
\end{array}$$

The methylene hydrogens of diphenylmethane are situated on carbon atom linked by two electron attracting benzene rings. Thus, these are somewhat acidic in nature.

$$C_6H_5CH_2C_6H_5 + Br_2 \longrightarrow C_6H_5CHBrC_6H_5 + HBr$$

When oxidised with  $K_2Cr_2O_7/H_2SO_4$  mixture, it forms benzophenone.

$$\begin{array}{c} C_6H_5CH_2C_6H_5 & \stackrel{[O]}{----} C_6H_5CC_6H_5 \\ O \end{array}$$

It forms fluorene when its vapours are passed through a red hot tube.