Aldehydes & Ketones - 05

Preparation of Ketones

① From Acid chlorides / Acyl chlorides :

Ketones can be prepared by the action of dialkyl cadmium on acid chlorides

$$2R'-\overset{O}{\overset{\|}{C}}-Cl + R_2Cd \longrightarrow 2R'-\overset{O}{\overset{\|}{C}}-R + CdCl_2$$

Acid chloride — dialkyl cadmium

$$CH_3-\overset{O}{\overset{\|}{C}}-Cl \quad \left.\begin{matrix} \\ \\ \end{matrix}\right\} + Cd\begin{matrix} CH_3 \\ CH_3 \end{matrix} \longrightarrow 2CH_3-\overset{O}{\overset{\|}{C}}-CH_3 + CdCl_2$$

$CH_3-\overset{O}{\overset{\|}{C}}-Cl$ — Acetyl chloride; dimethyl cadmium; Acetone

$$CH_3-\overset{O}{\overset{\|}{C}}-Cl \quad \left.\begin{matrix} \\ \\ \end{matrix}\right\} + Cd\begin{matrix} C_2H_5 \\ C_2H_5 \end{matrix} \longrightarrow CH_3-\overset{O}{\overset{\|}{C}}-C_2H_5 + CdCl_2$$

$CH_3-\overset{O}{\overset{\|}{C}}-Cl$ — Acetyl chloride; diethyl Cadmium; butanone

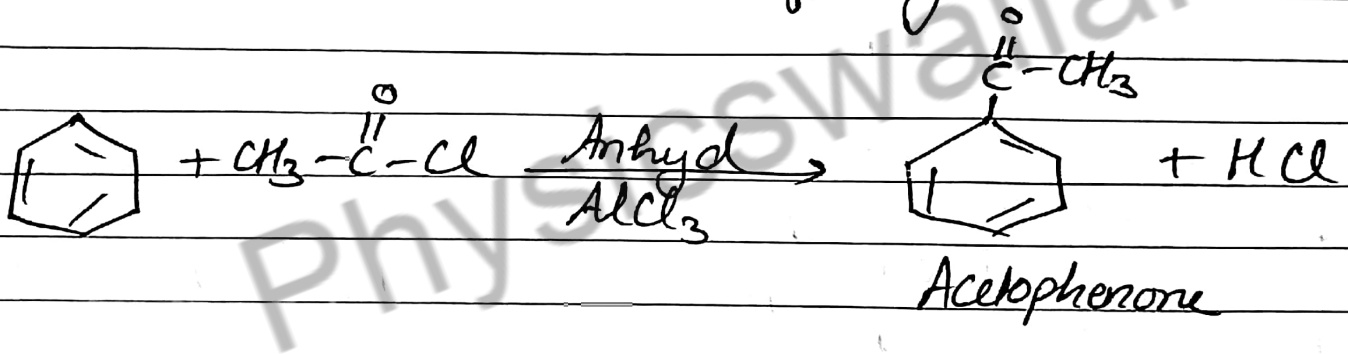
$$C_6H_5-\overset{O}{\overset{\|}{C}}-Cl \quad \left.\begin{matrix} \\ \\ \end{matrix}\right\} + Cd\begin{matrix} CH_3 \\ CH_3 \end{matrix} \longrightarrow C_6H_5-\overset{O}{\overset{\|}{C}}-CH_3 + CdCl_2$$

$C_6H_5-\overset{O}{\overset{\|}{C}}-Cl$ — Benzoyl Chloride; dimethyl Cadmium; Acetophenone

dialkyl cadmium is prepared by reaction of anhydrous $CdCl_2$ with Grignard's Reagent

$$2R-Mg-X + CdCl_2 \xrightarrow[ether]{dry} R_2Cd + 2Mg\overset{X}{\underset{Cl}{}}$$

② From Benzene: Friedel Craft Acylation



Acetophenone

Mechanism: $E^{\oplus}$ Substitution