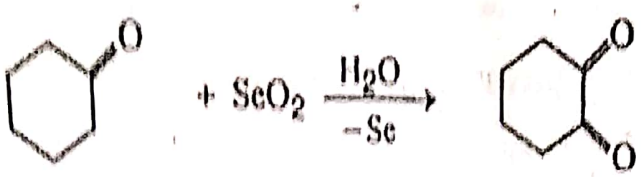
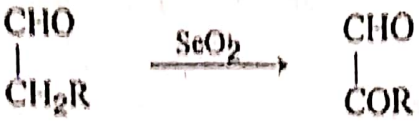
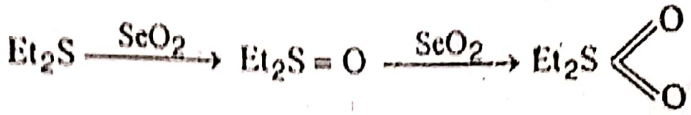
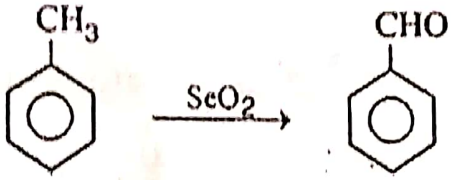




(ii) In the conversion of thioethers to sulphones—



(iii) In the conversion of toluene to benzaldehyde.



(3) Sodium borohydride :

It is prepared by the interaction of trimethylborate and sodium hydride at 250°C—

$$(CH_3)_3\,BO_3 + NaH \xrightarrow{250°C} NaBH_4$$

Uses : $NaBH_4$ can reduce aldehyde, ketones, esters etc. to alcohols. However it does not reduce –CN, $-NO_2$, –COOH, $-C \equiv C-$ and $> C = C <$ groups. So nitroalcohols, alcohols containing cyano group can be prepared from the corresponding aldehydes and ketones by $NaBH_4$ reduction. $LiAlH_4$ cannot be used as it reduces nitro and cyano groups. $NaBH_4$ does not react with proton containing solvents, so it is easy to use $NaBH_4$ in H_2O, ROH etc. $LiAlH_4$ reacts with such solvents, hence ether is generally used as solvent in its reactions.

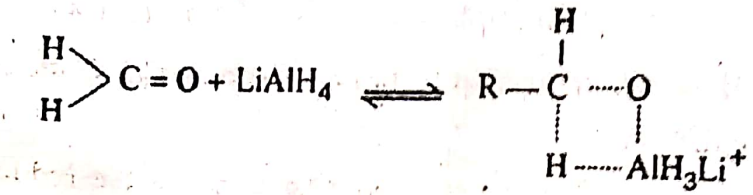
(4) Lithium Aluminium Hydride (LAH) :

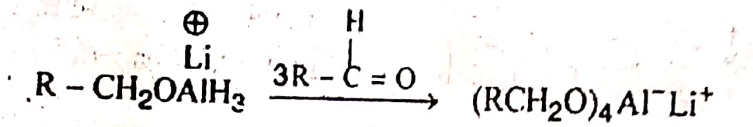
$LiAlH_4$ is prepared by the reaction of LiH and $AlCl_3$.

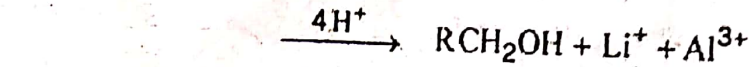
$$LiH + AlCl_3 \rightarrow LiAlH_4$$

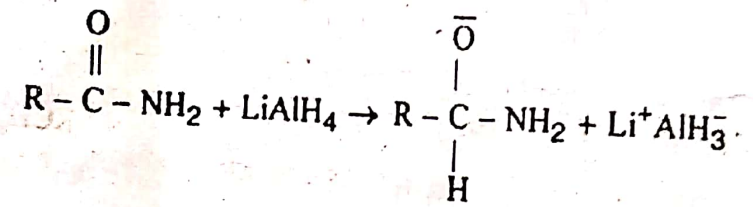
It is an excellent hydride ion donor and carbonyl compounds are g hydride ion acceptors. Hence carbonyl compounds are reduced by it. LiA reacts with protonic solvents and it is soluble in ether, hence its reaction carried out in ether. Firstly a lithium alkoxide is formed which on reduca yields products.

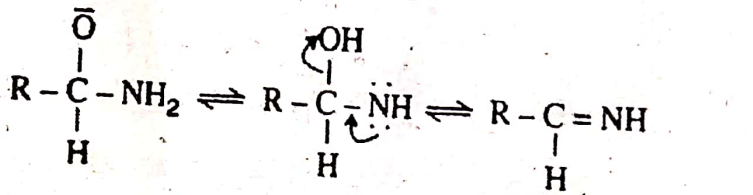
The mechanism of the $LiAlH_4$ reduction of carbonyl compou involves a four centered transition state through which the hydride ior transferred from the reagent to the electrophilic carbon atom.

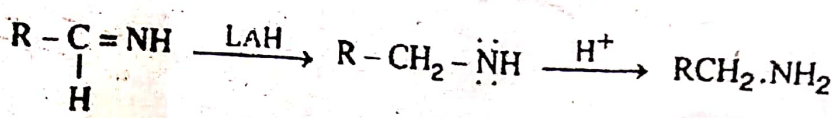












Since LAH does not usually reduce C – C multiple bond, hence unsaturated alcohols are prepared from unsaturated carbonyl compounds, acids and esters.