

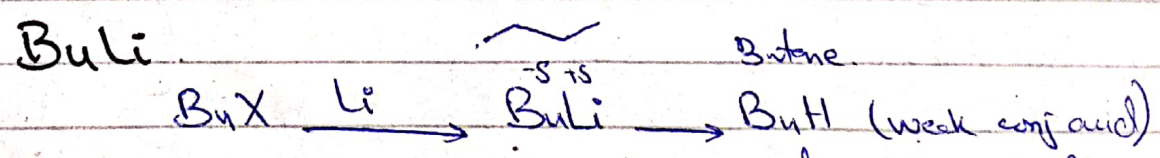
The size of R group is v imp e.g
 general $\left\{ \begin{array}{l} CH_3O^- Na^+ \longrightarrow CH_3OH \quad 1 \\ C_2H_5O^- Na^+ \longrightarrow C_2H_5OH \quad 2 \end{array} \right.$

$\left\{ \begin{array}{l} tBuO^- K^+ \end{array} \right\}$ commercially available (require moist conditions)
 $\longrightarrow tBuOH \quad 3 \quad 1, 2, 3, 4$
 $PhOK \longrightarrow PhOH \quad 4 \quad \text{all conjugate acid}$

PhOH is more acidic due to resonance
 $tBuOH$ $tBu \rightarrow e^-$ donating decrease acidity
 so weak acid

More strong conjugate acid more chances of reversibility of reaction. e^- withdrawing effect increase acidity so strong acid.

due to this reason $tBuOH$ is weak acid & PhOH is strong acid. if we want reversible reaction we use PhOH



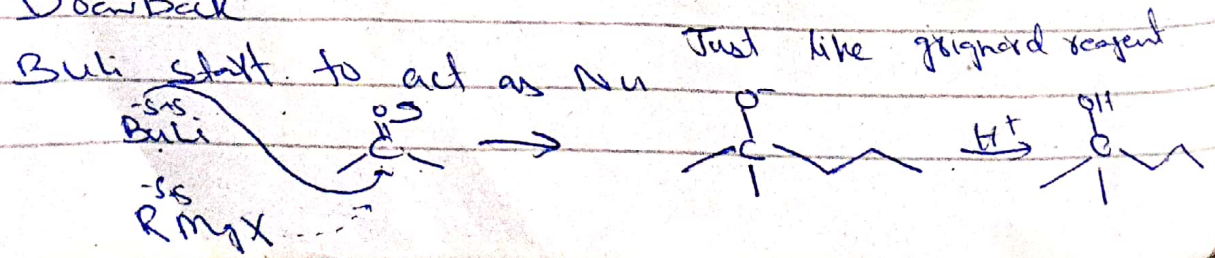
① C is strong Base highly reactive need highly dried inert condition

Butane in gas form reversible.

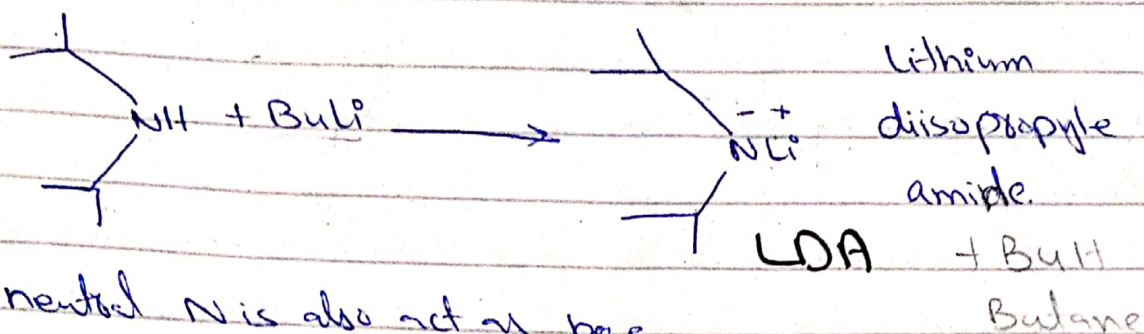
We use Buli bcz 1 & 2

- 1 C^- as Base highly reactive bcz it wants to take proton.
- 2 weak conjugate acid so not reversible of reaction.

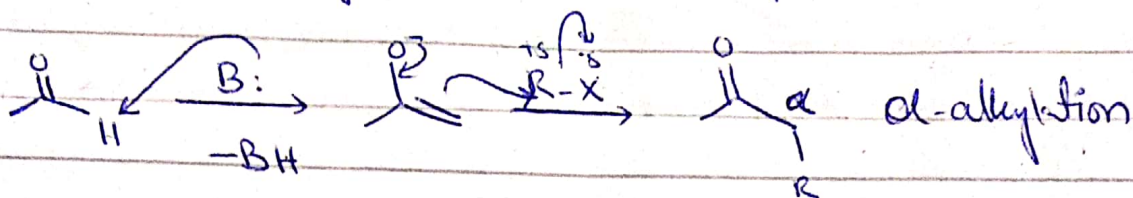
Drawback



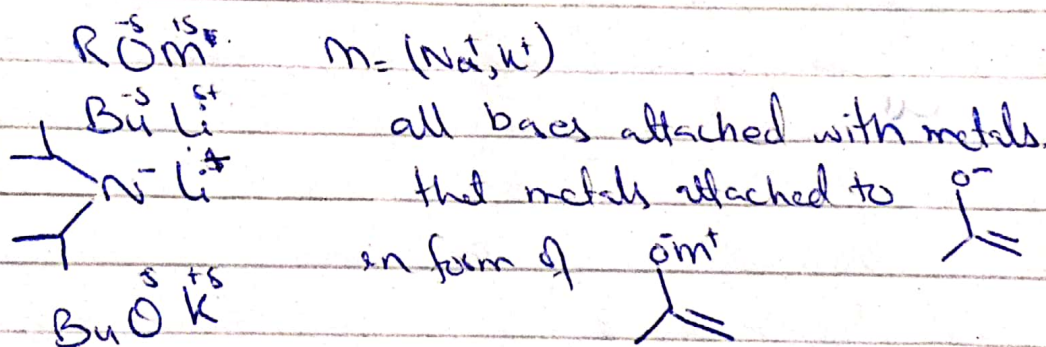
By increasing steric hindrance chance to act as Nu become lesser.



neutral N is also not a base
But this N is v. reactive bcz having -ve charge
it is strong base & non nucleophilic



Solvent:-



Polar

Non Polar

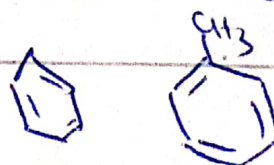
protic A-protic
 EtOH DMSO
 H₂O DMF
 MeOH

it is not mostly used
bcz we used solvent
for dissociation & cause
solvation - bcz these not have ^{tips}

Alcohols - protic have high
polarization &
help in dissociation.

H-O-R
H-O-H

Non polar not involve in
dissociation so not used.



Our purpose is to dissociate bond b/w metal and e⁻ ve atom

Oxygen help in dissociation (of metal)

Polar (protic) have more dielectric constant

Oxygen has good cation solvation

So protic solvent are good cation solvents

Hydrogen is good anion solvent

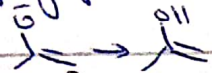
Draw back

hydrogen involve in Hydrogen bonding with enolate oxygen so availability of e⁻ of enolate decrease

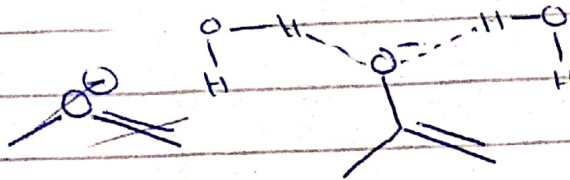
Protic can cause

reversibility by

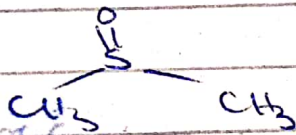
giving proton



A-protic



DMSO Dimethylsulfoxide



having O → which is good cation solvent

having H of CH₃ are good anionic solvent

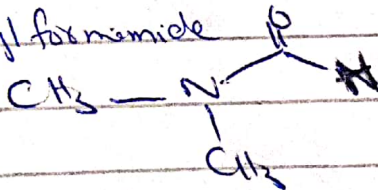
high dielectric constant more polar than

H₂O & alcohol - so dissociation & solvation

high

DMF

Dimethylformamide



In this Hydrogen bonding not

only bec only that H involve

in H-B that attach to hetero

atom But in DMSO Hydrogen

are not attach to heteroatom

so no H-B.

Draw back-

good solvent is that

that can evaporate at

the end But DMSO

& DMF having 200°C B.P

even H₂O 100°C B.P can't easily

evaporate

DMSO have High B.P

so even by Rotary evaporator

they can't remove.

Medium polarity:-

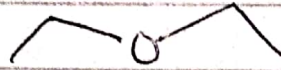
medium polar solvent THF, DEE (diethyl ether)
DME (dimethyl ether)

Tetrahydrofuran



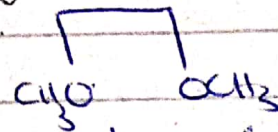
above 60° B.P

DEE



40° B.P

dimethyl ether



above 60° B.P

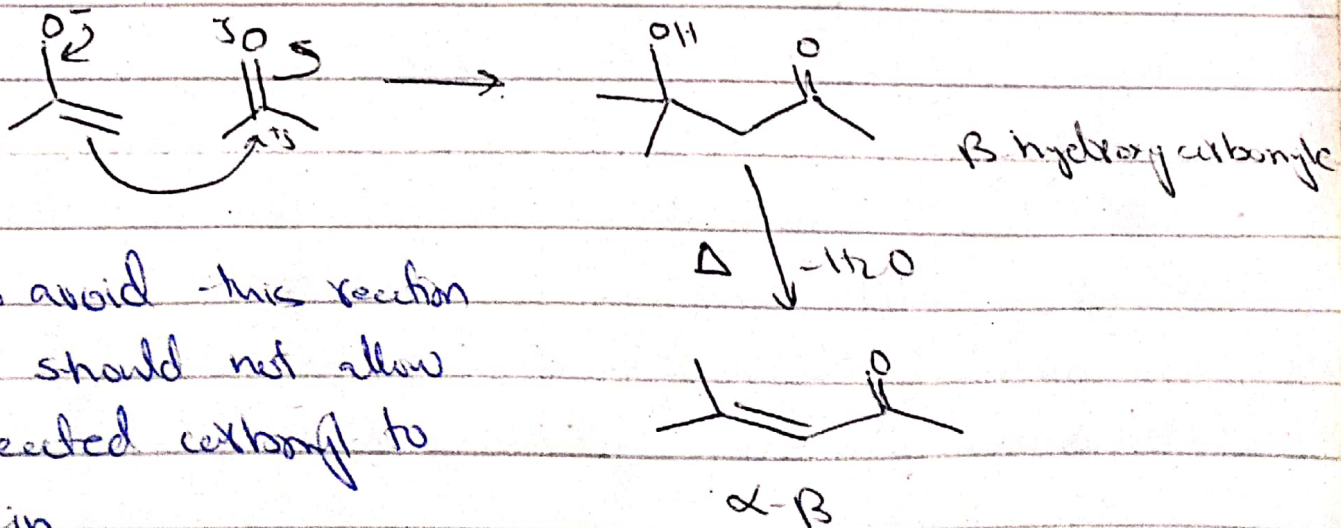
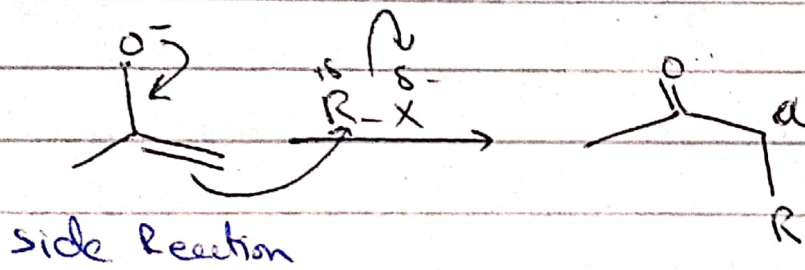
in anion, carbocation chemistry these solvents used

all have medium polarity, all are ether
medium solvation

Medium dielectric solvent.

having O & H so medium cation & anion solvents.

Reaction speed is somewhat slow but dealing
of reaction is easy.

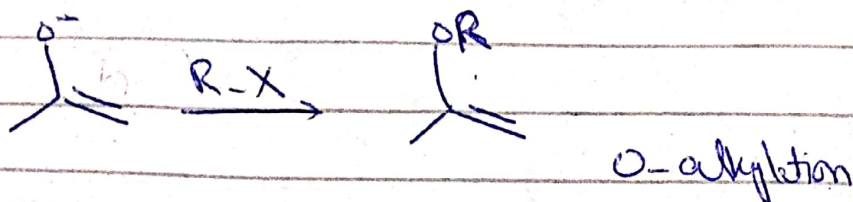


to avoid this reaction
we should not allow
unreacted carbonyl to
remain.

Ambident Nu \rightarrow Ambident Nu is an anionic Nu where -ve charge is delocalized by resonance over two unlike atoms or over two like but non equivalent atoms.
 eg $R-\overset{\ominus}{C}(=O)-CH_3$

So we use Strong Base that give favored reaction. give that condition which not allow reversibility.

2nd side reaction

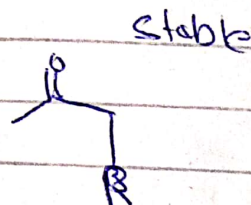
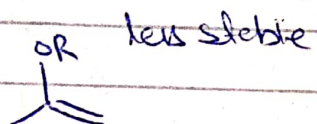


O^- is good Nu then C^-

neutral specie less Nucleophilic as compared when it attain -ve charge.

for example H_2O is Nu but OH^- (after removing H^+) is v. good Nu.

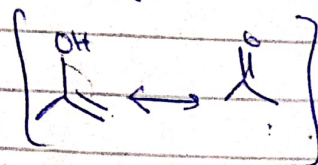
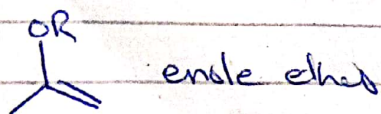
enolate \rightarrow ambident nucleophile,



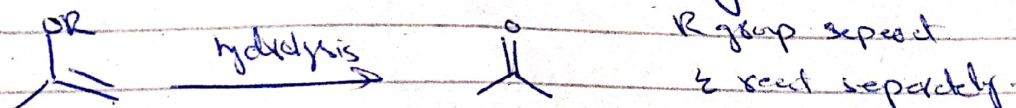
$C-O$ bond energy low
 $C=C$ bond energy low
 950 kcal/mole

$C=O$ high Bond energy
 $C-C$ bond energy
 110 kcal/mole

the compound having high bond energy are more stable



these are less available mostly form as intermediates



By polar-aprotic solvent enolate present that is well prepared and react $R-X$ to O^-

In medium protic solvent dissociation is slow slowly so enolate form still present in cluster. By increasing cluster availability of O^- decreases so it leads to C-C alkylation.

Nature of $R-X$ is also important.

in enolate.

O - hard Nucleophile C soft Nucleophile

like disolve like

hard Nu \rightarrow hard E

Soft Nu \rightarrow soft E

$R-X$

Cl

Br

I

↓ soft

I give C alkylation

$R-I \rightarrow$ C alkylation both are soft

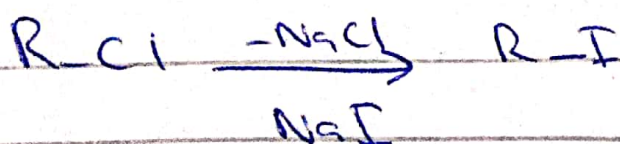
Cl give O alkylation.

$R-Cl \rightarrow$ cheaper

$R-I \rightarrow$ expensive.

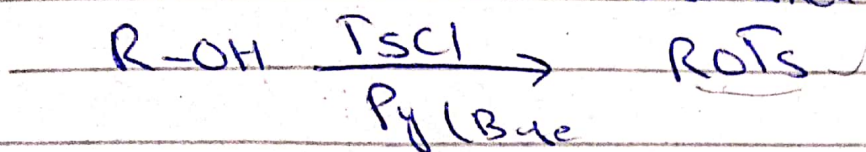
Halogen exchange reaction

finkelstein reaction

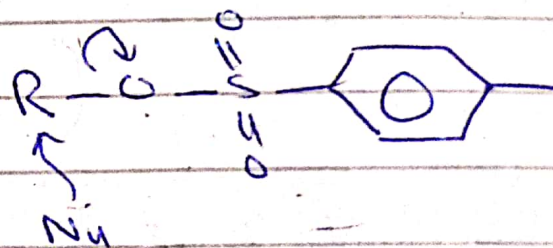
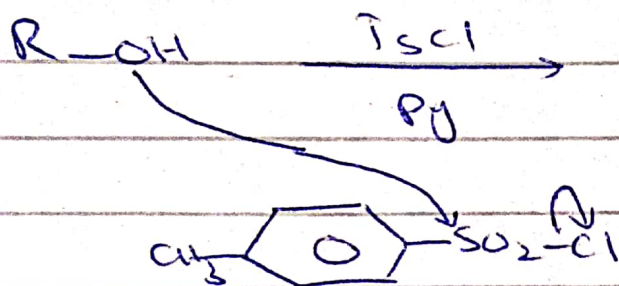
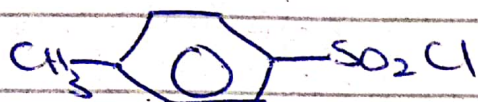


Reaction towards O-alkylation

Basic condition



para toluene sulfonyle chloride



O. nucleophile
R-OTs