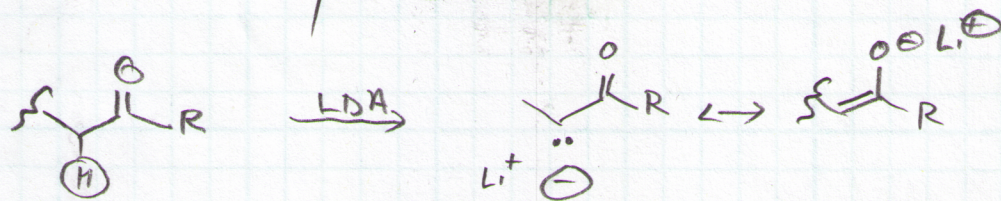
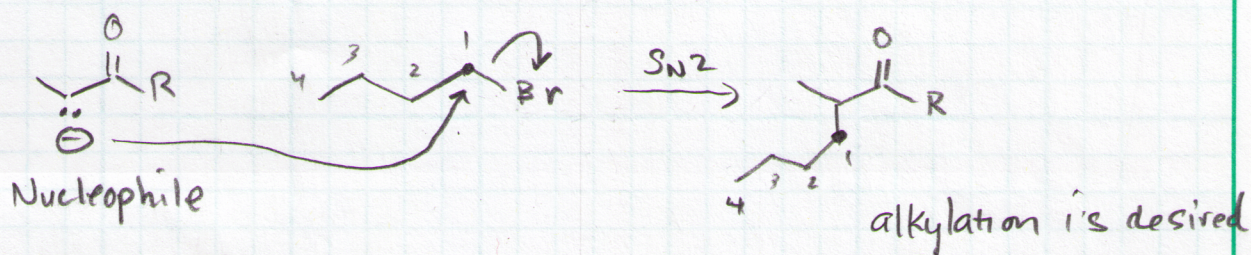


Alkylation at α -C of aldehydes / ketones

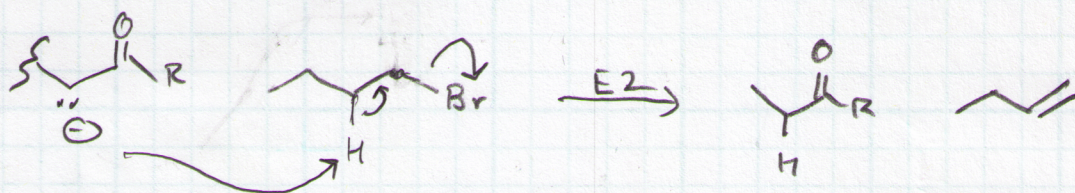
We know the C_{α} -H is rel. acidic and can be removed with a sufficiently strong base



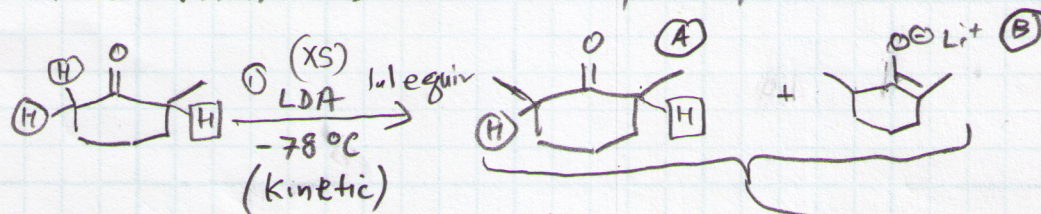
Let's look at what we want to do



NOTE: $\text{S}_{\text{N}}2$ nucleophiles (neg charge) can also be good bases.



MORE COMPLICATIONS INVOLVED W/ ALKYLATING $\text{C}=\text{O}$ COMPOUNDS



+ CH_3I (1 equiv)

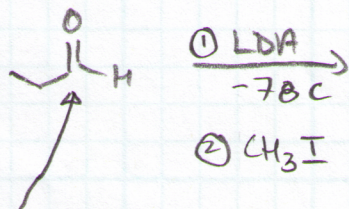
[All in a single rxn vessel]

A mixture of these two are in the rxn when, e.g. 10% CH_3I is added.

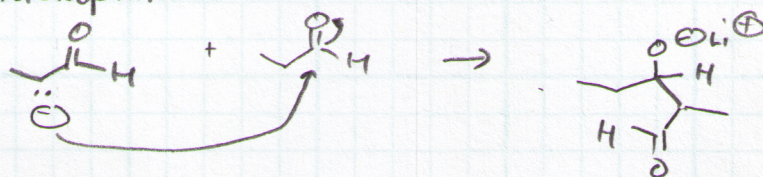
Enolate (B) acts as a base and removes (H) or (H) from (A), so the next CH_3I added can alkylate the enolate of (A)

ALKYLATING ALDEHYDES UNDER LDA CONDITIONS ARE DIFFICULT

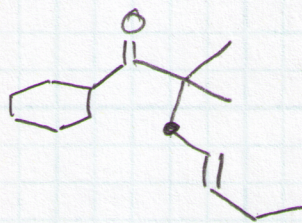
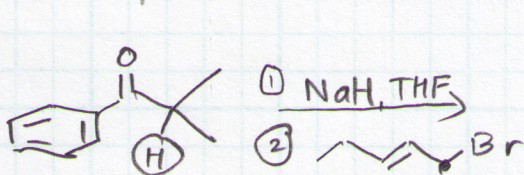
Aldehydes react w/ themselves



reactive
center for nucleophiles
such as

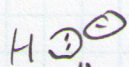


RARE ALKYLATION OF A KETONE



H₂(g)
NaBr
salt ppt
from solution

H:[⊖] is basic but not nucleophilic



1s orbital is tiny, whereas nucleophilic
e⁻ prefer to be in larger s-orbitals,
p-orbitals, sp³- or d-orbital hybrids

Also, H-H gas
is very stable product

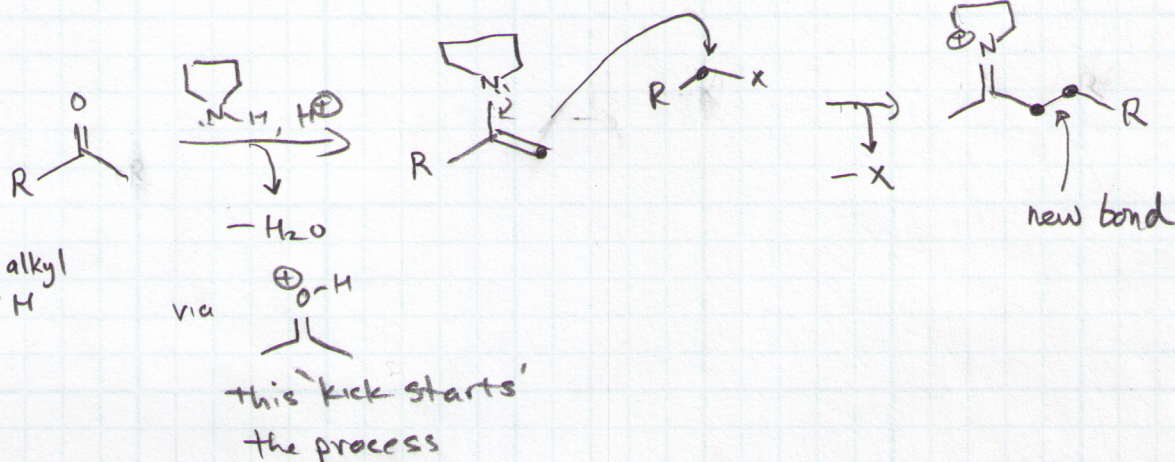
Workaround. Form an enamine w/ pyrrolidine



① No LDA $\therefore$ no need for kinetic control

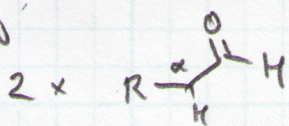
No E2 competition

No overalkylation

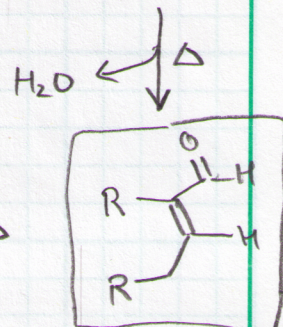
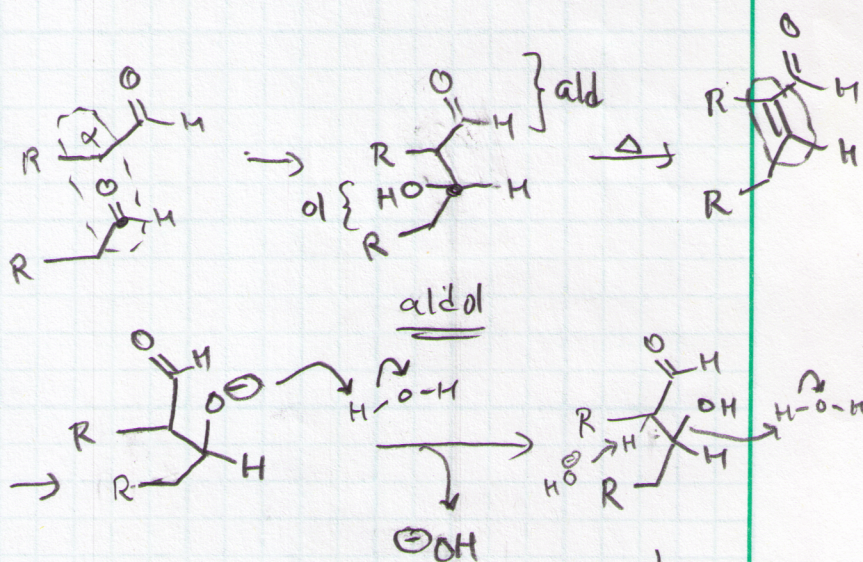
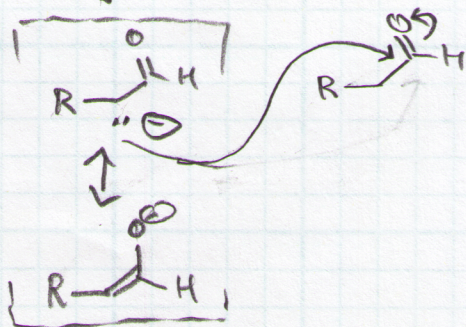
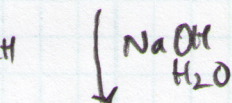


Aldol condensations

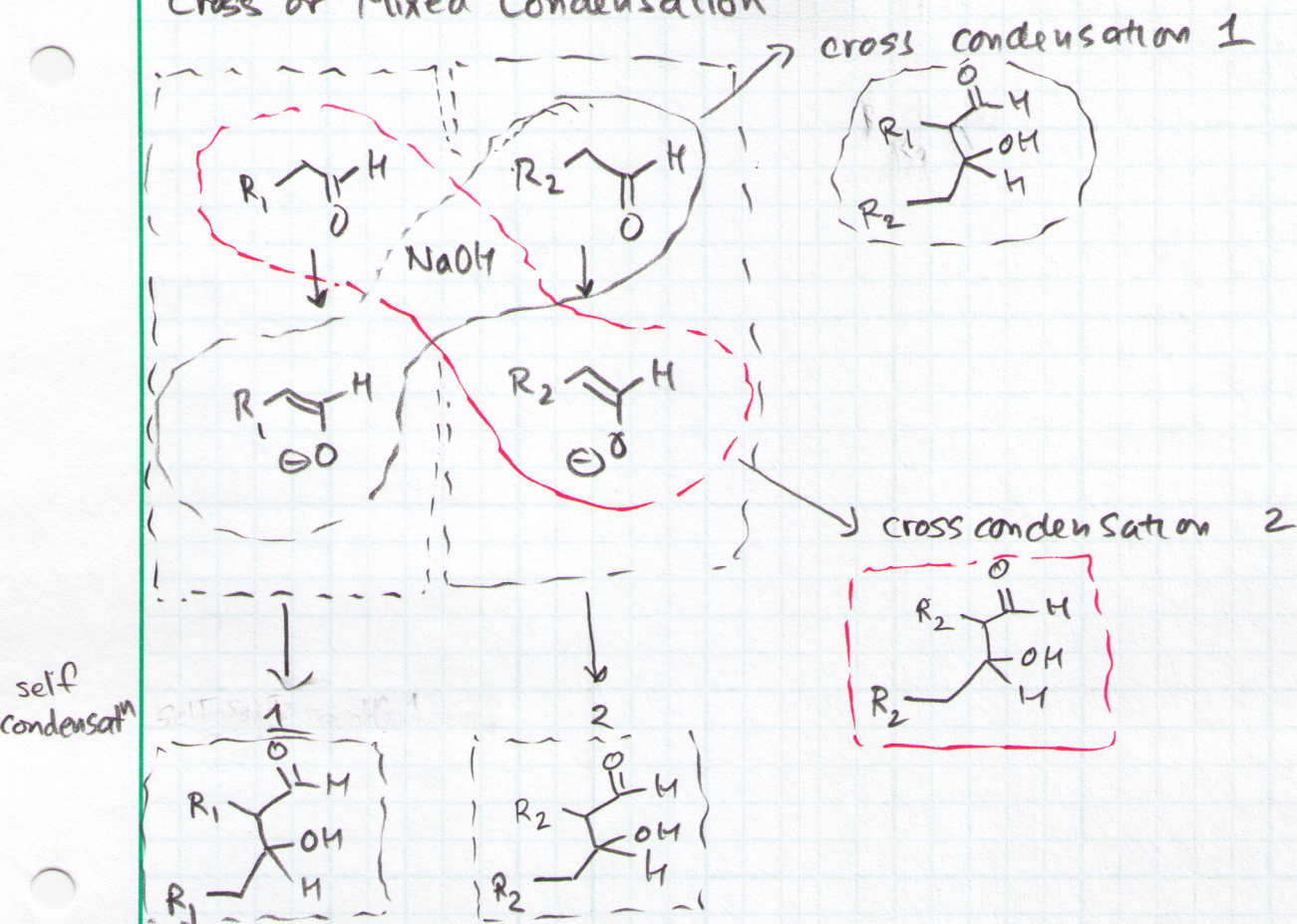
self
condensation



MECH

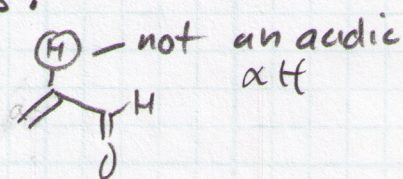
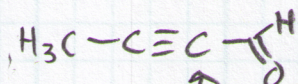
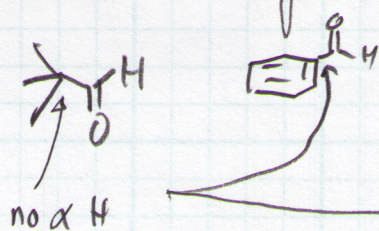


Cross or Mixed Condensation

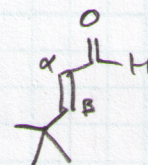
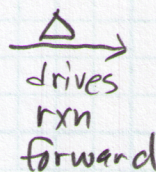
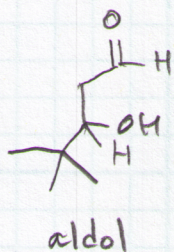
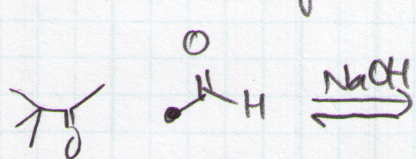


Cannot control mixture. So what has to be done. LIMITS!

Use one aldehyde that does not have α -Hs!



$\therefore$ and use aldehyde that contains α -H



α,β -unsaturated aldehyde.