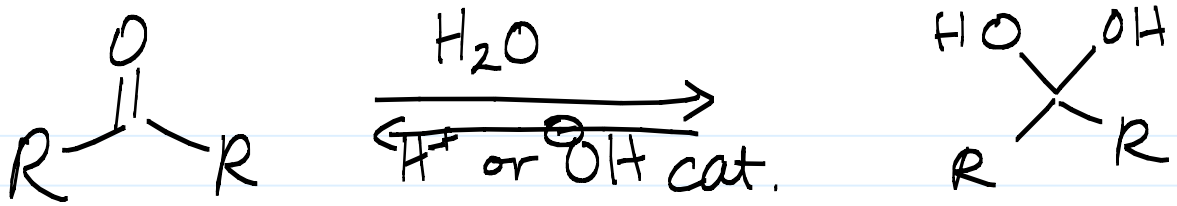
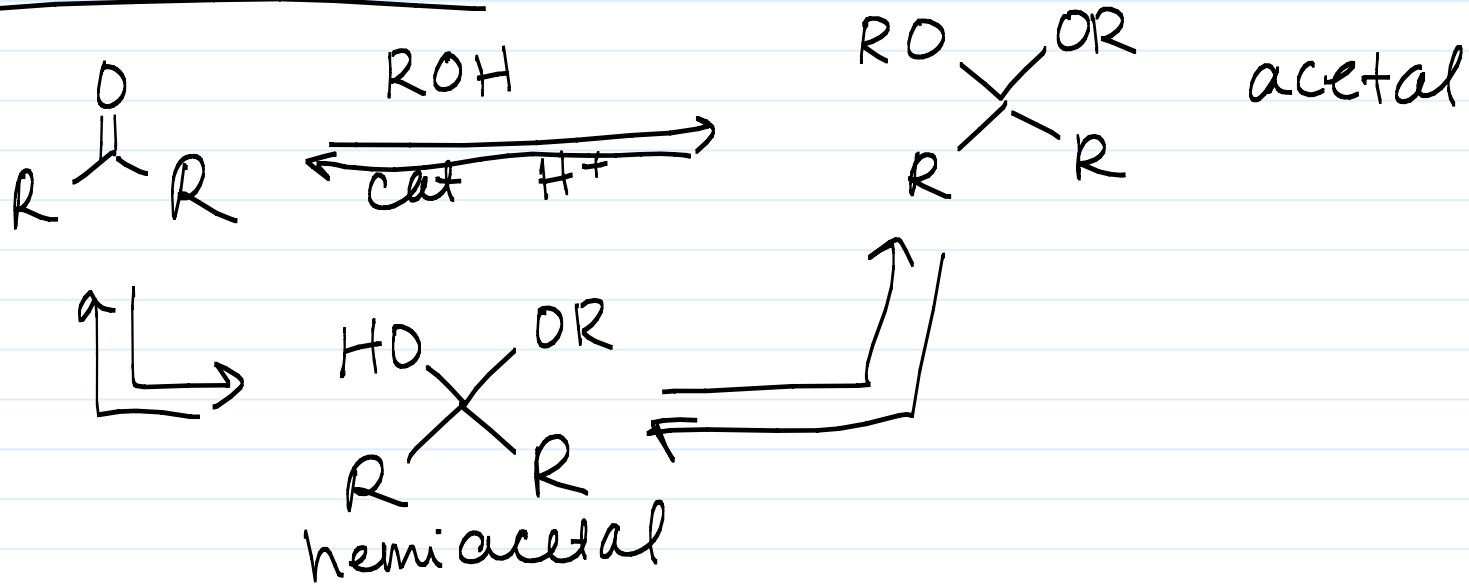
Carbonyl Chemistry

Note Title 4/10/2014

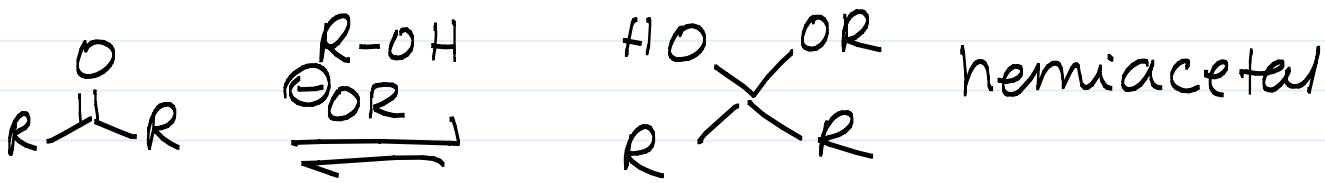
Review Session: 206 BRL
Fri 6-7 pm



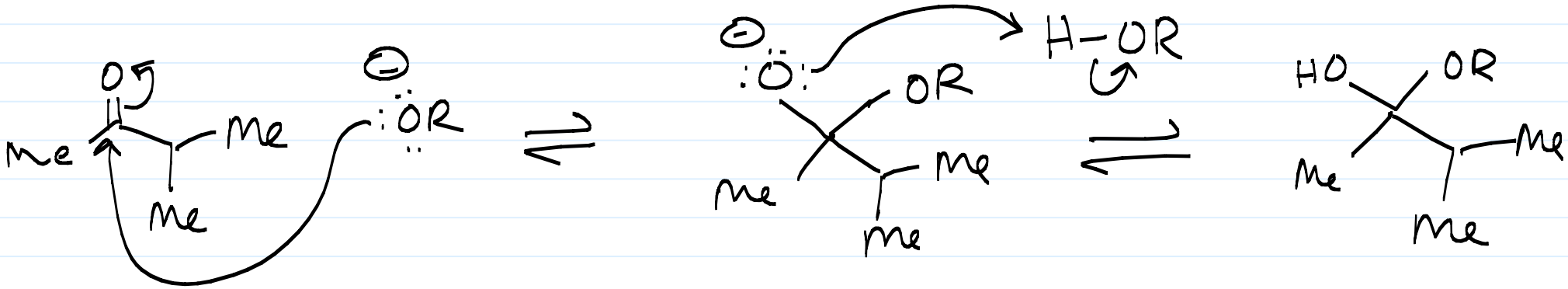
Acetal Formation



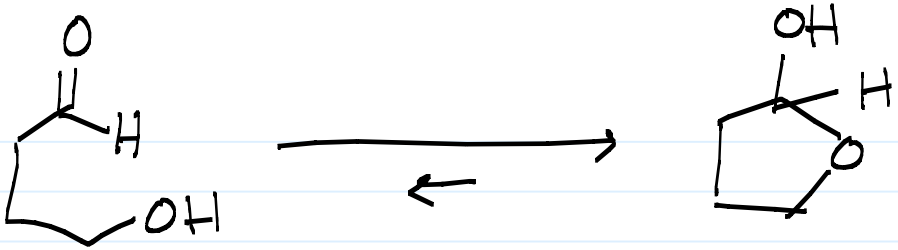
Base - Catalyzed: Hemiacetal Formation



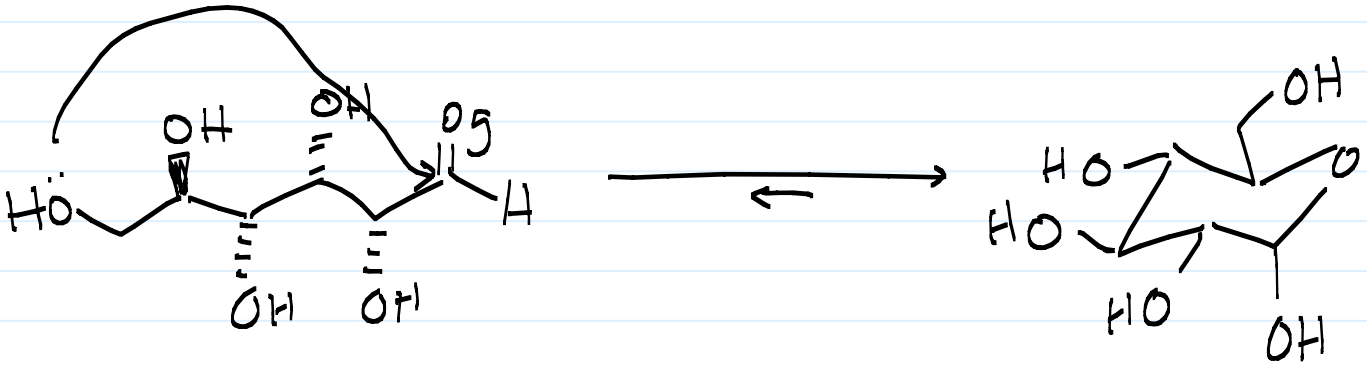
hemiacetal



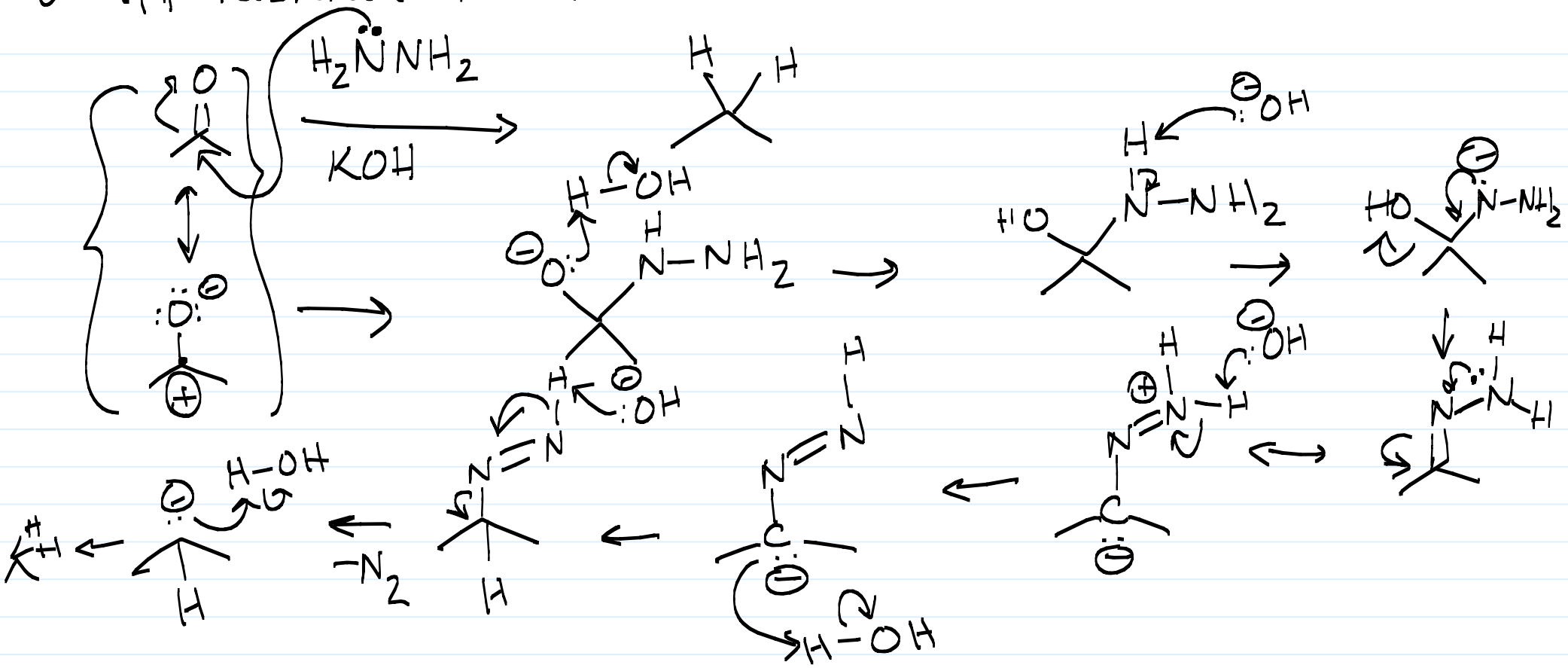
Cyclic Hemiacetals :



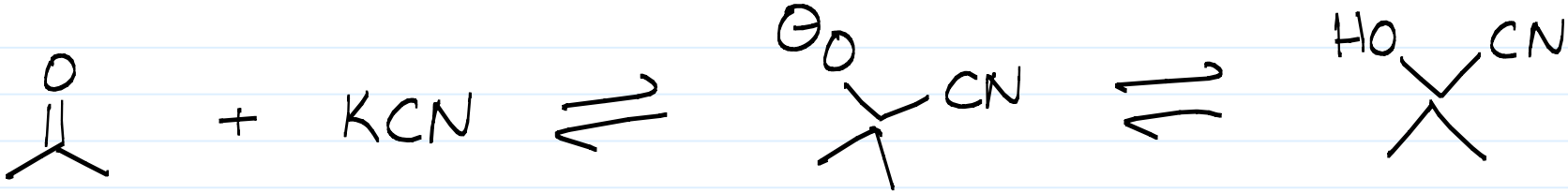
Sugars



Wolff-Kishner Mechanism



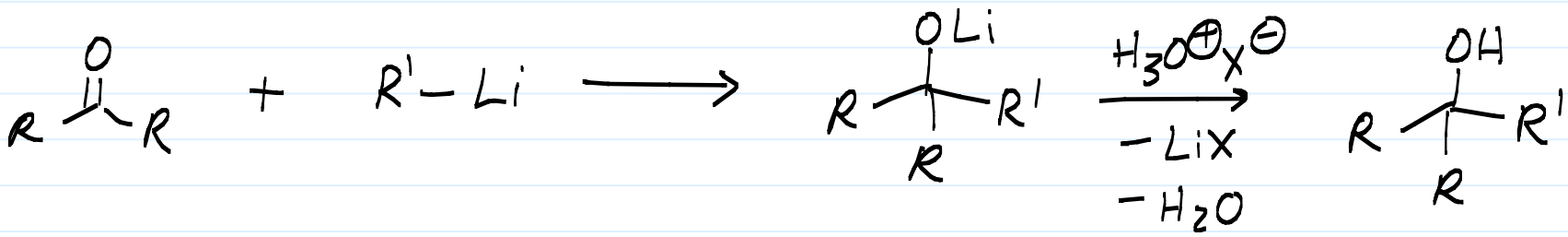
Carbon Nucleophiles

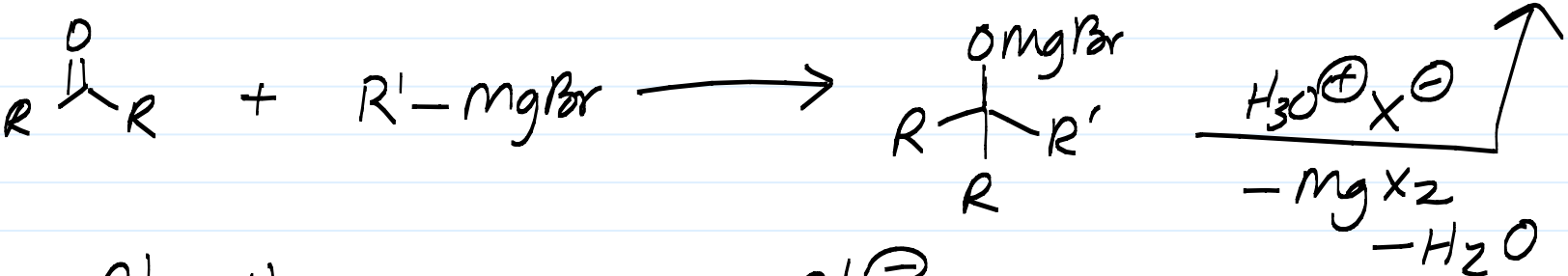


pKa of HCN ~9.4 ... $^{\ominus}CN$ is not very basic & fairly stable (a decent leaving group) ...

REVERSIBLE RXN

Irreversible Rxns : Use more basic nucleophile!

(a) 

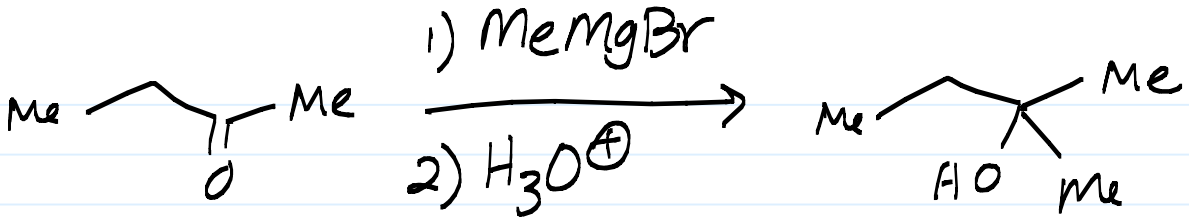
(b) 

pKa $R'-H$ ~50-55 ... $R'^{\ominus}$ is not stable

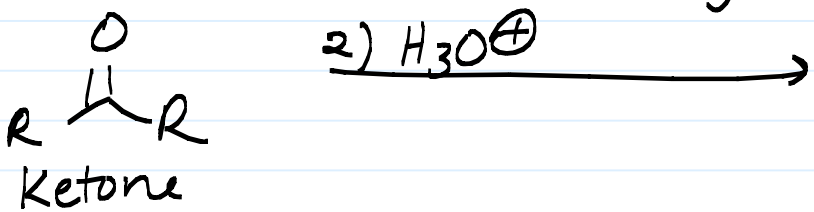
↑ alkyl

Rxn = exothermic & irreversible!

How to write conditions:

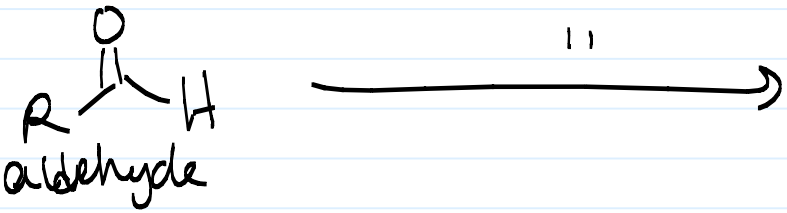


In general:

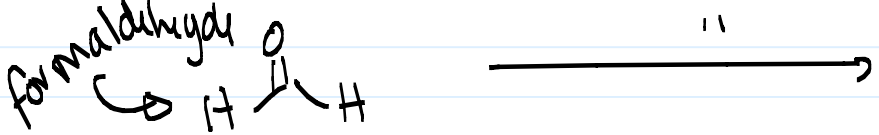


Ketone

3° ← Tertiary alcohol

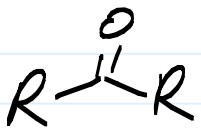
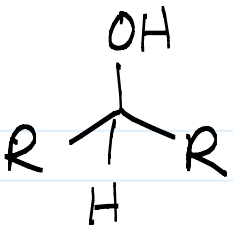


aldehyde → 2° alcohol

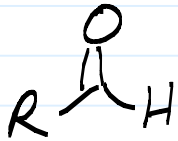
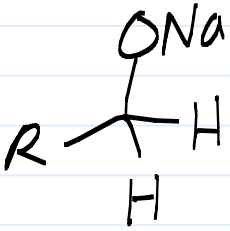
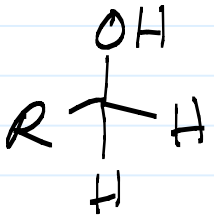


1° alcohol

Hydride Nucleophiles (Reduction)

a) $LiAlH_4$ +  ⟶  $\xrightarrow{H_3O^{\oplus}}$ 

Ketones

b) $NaBH_4$ +  ⟶  $\xrightarrow{H_3O^{\oplus}}$ 

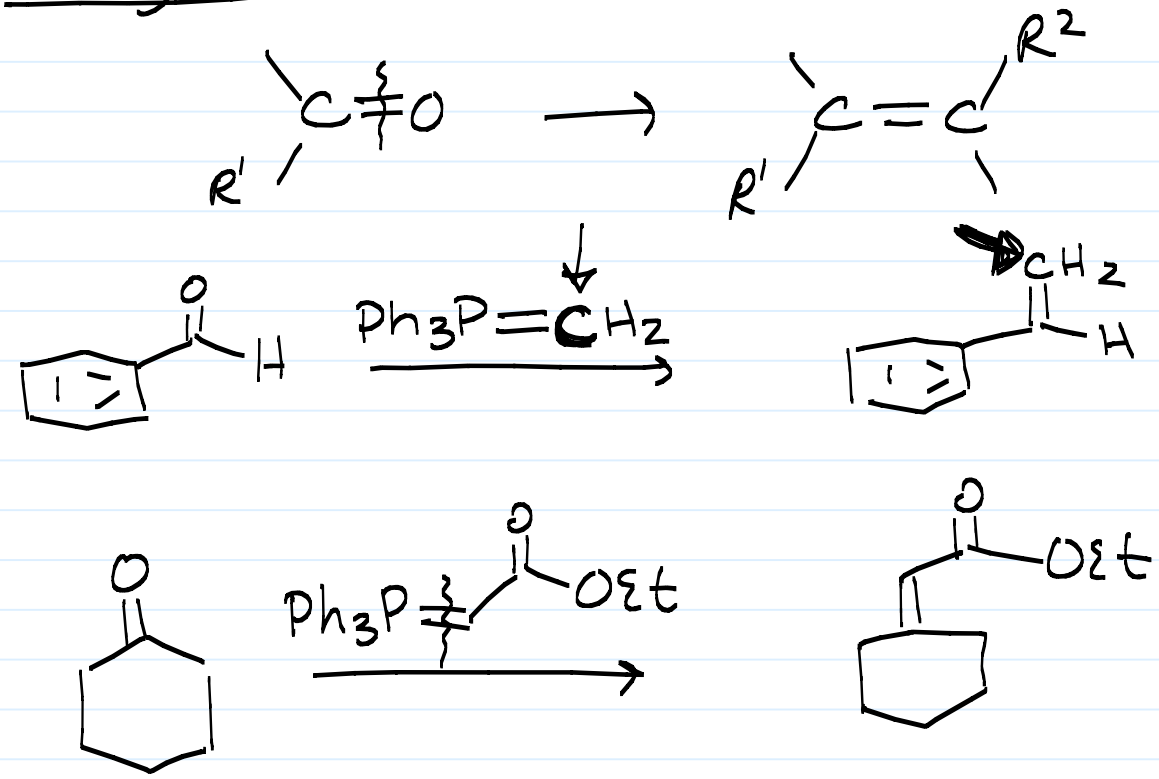
(more mild)

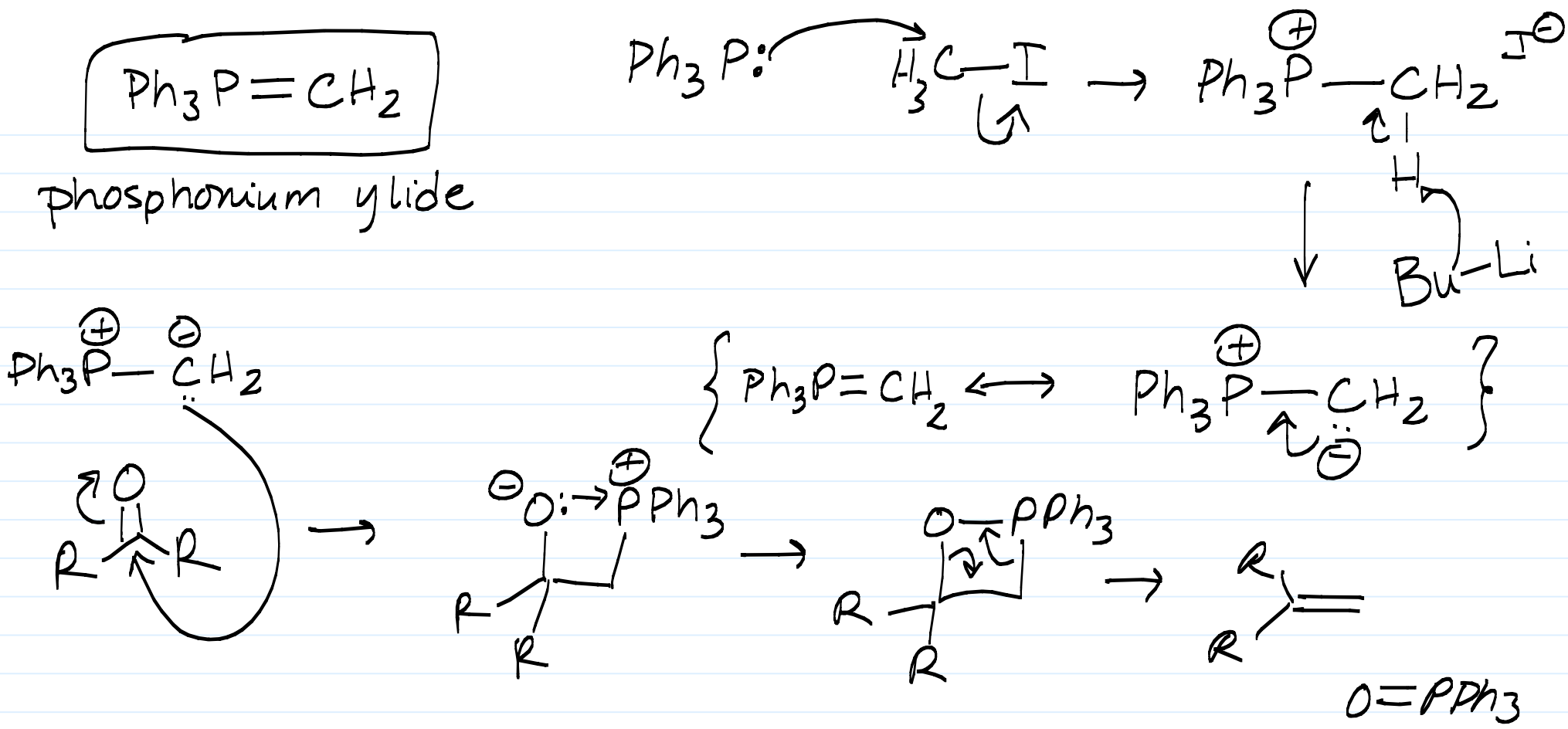
Aldehydes

Mechanism?

ex. 

Wittig Reaction (Nobel Prize 1979)




Ph3P=CH2
phosphonium ylide
Ph3P:
H3C—I
Ph3P—CH2
I
H
Bu—Li
Ph3P—CH2
{ Ph3P=CH2 ⟷ Ph3P—CH2 }
R
R
O:→PPh3
O—PPh3
O=PPh3