VOLUNTEER!

Tutoring Refugees to Understand English

T.R.U.E is a service organization that tutors English to refugees for one hour every week.

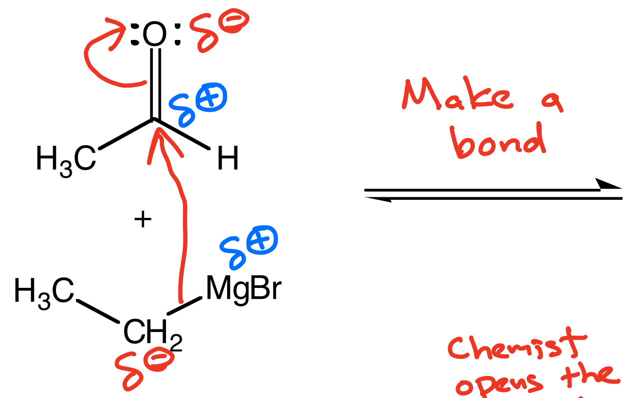
SCAN TO JOIN TODAY!

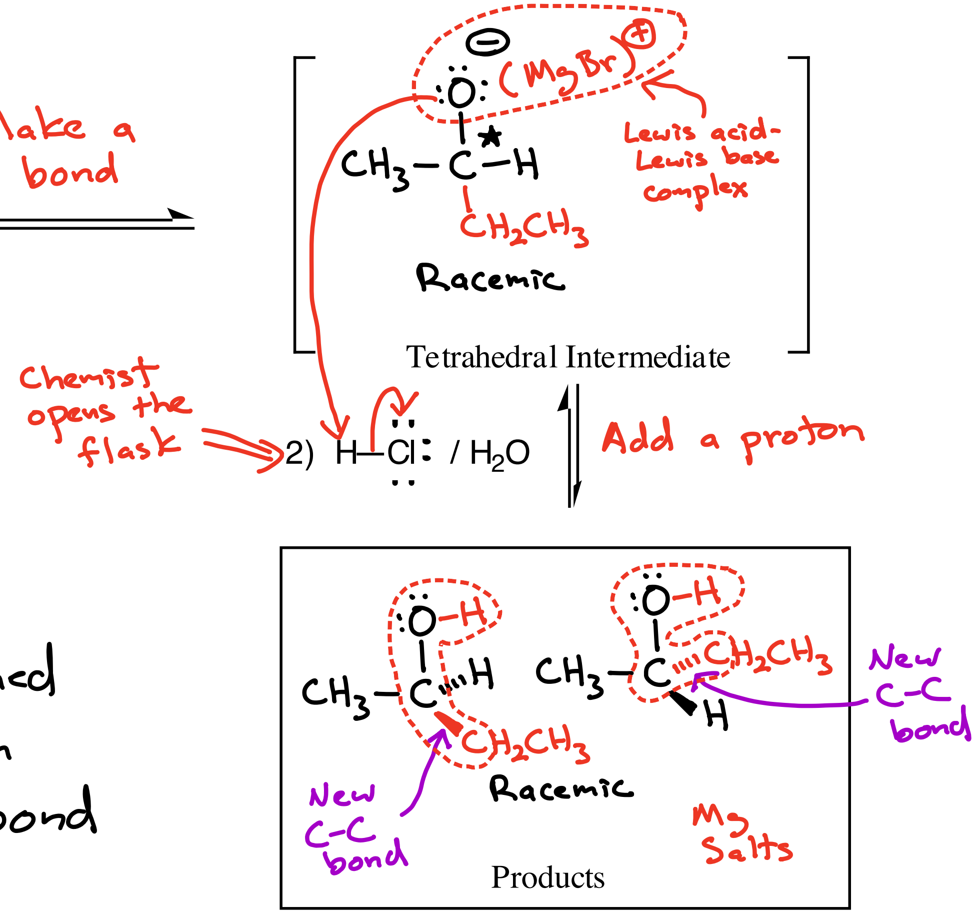
Lesson for Today:
"The Song"

Strong nucleophiles react directly at the electrophilic C atom of carbonyls to make a bond as the carbonyl π bond breaks. A proton is added to the O atom.

MECHANISM A!

Grignard Reagent Reacting with an Aldehyde or Ketone

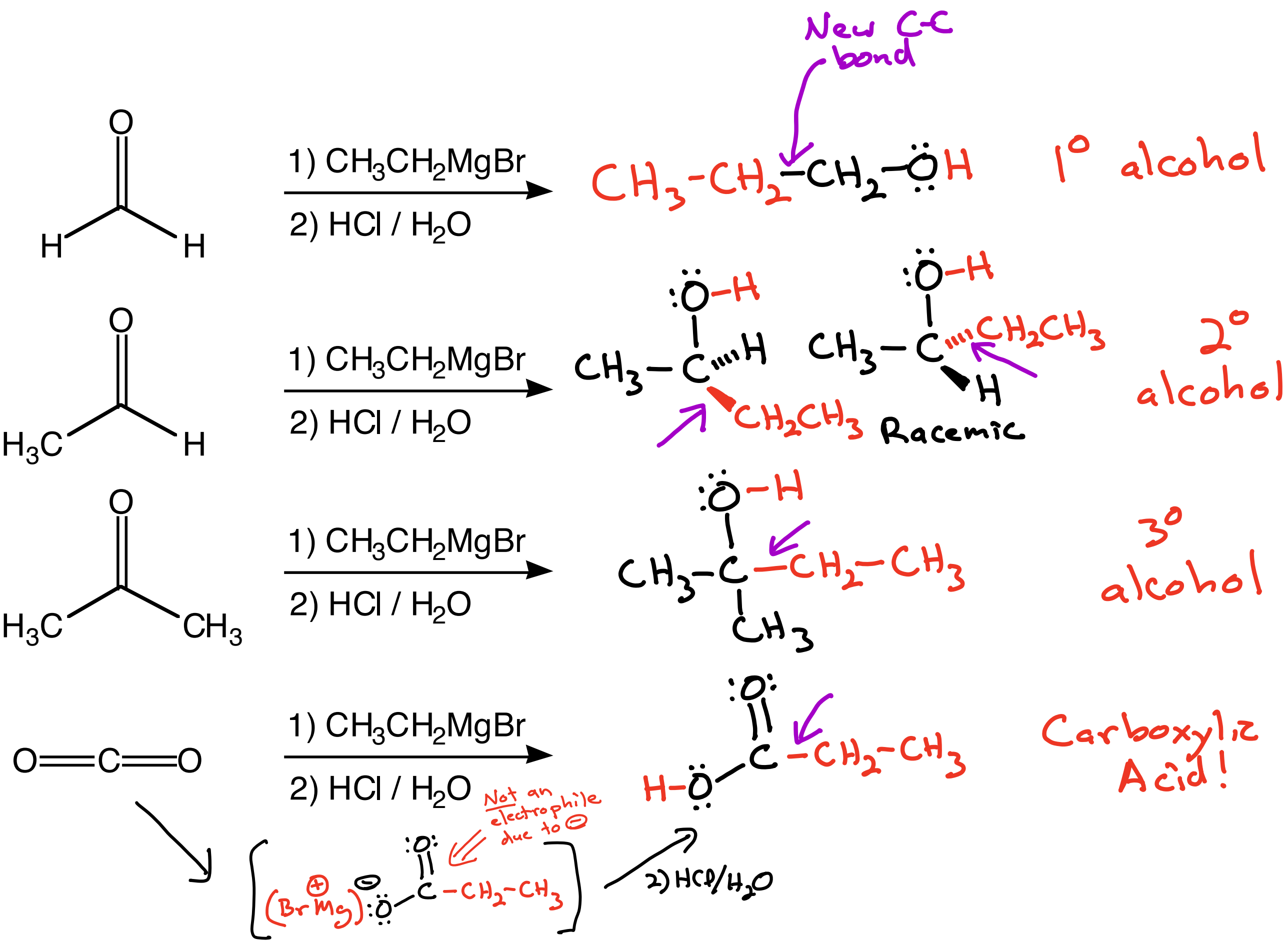




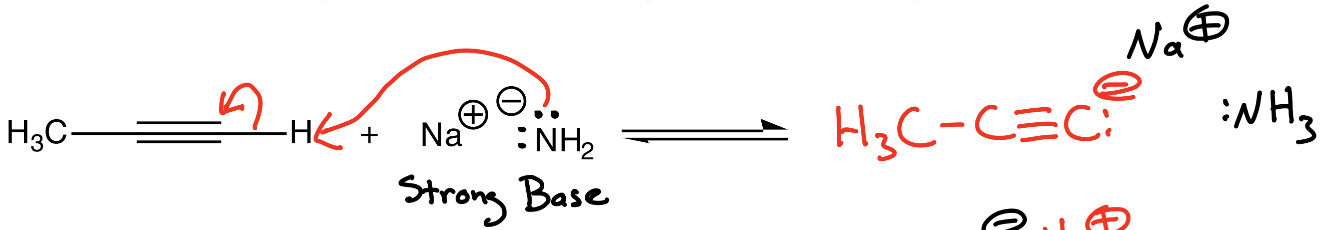
Mechanism A

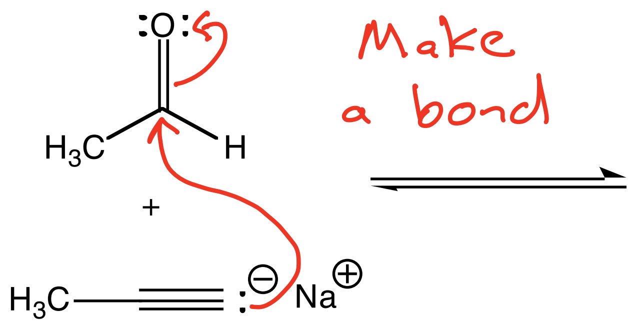
Key Recognition Element (KRE):

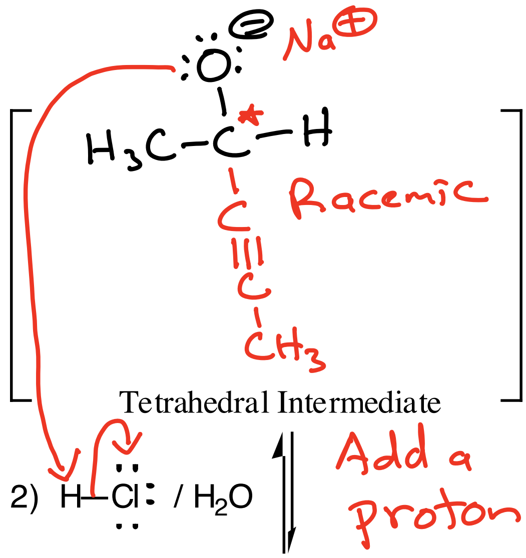
-OH group attached the same C atom as a new C–C bond



Alkyne Anion Reacting with an Aldehyde or Ketone



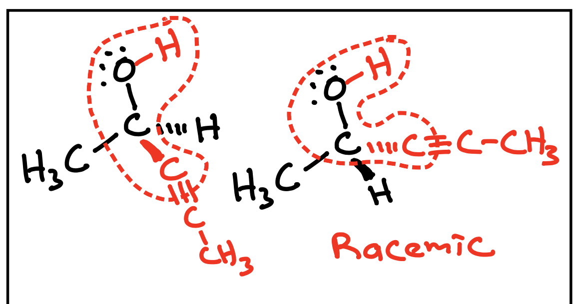




Mechanism A

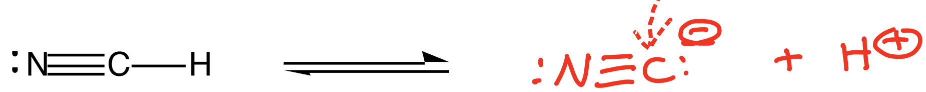
Key Recognition Element (KRE):

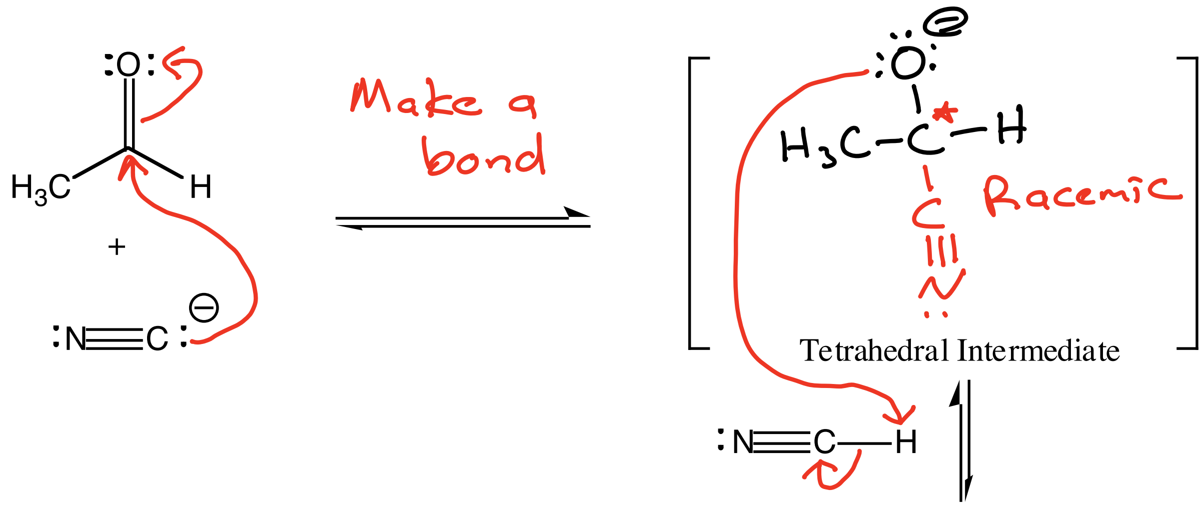
OH group on the carbon that makes a new C-C bond to an sp C atom (alkyne)



Products

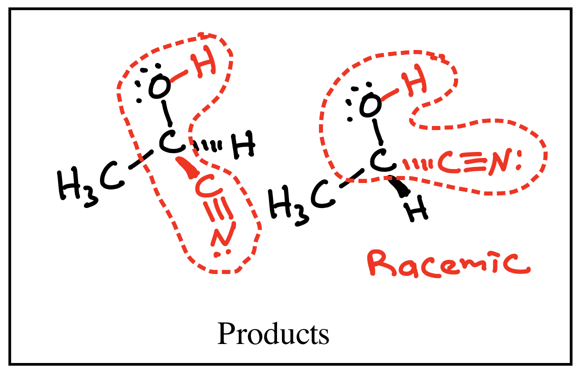
HCN Reacting with an Aldehyde or Ketone





Key Recognition Element (KRE):

Cyanohydrin → OH on a C atom that made a new C–C bond to –C≡N:



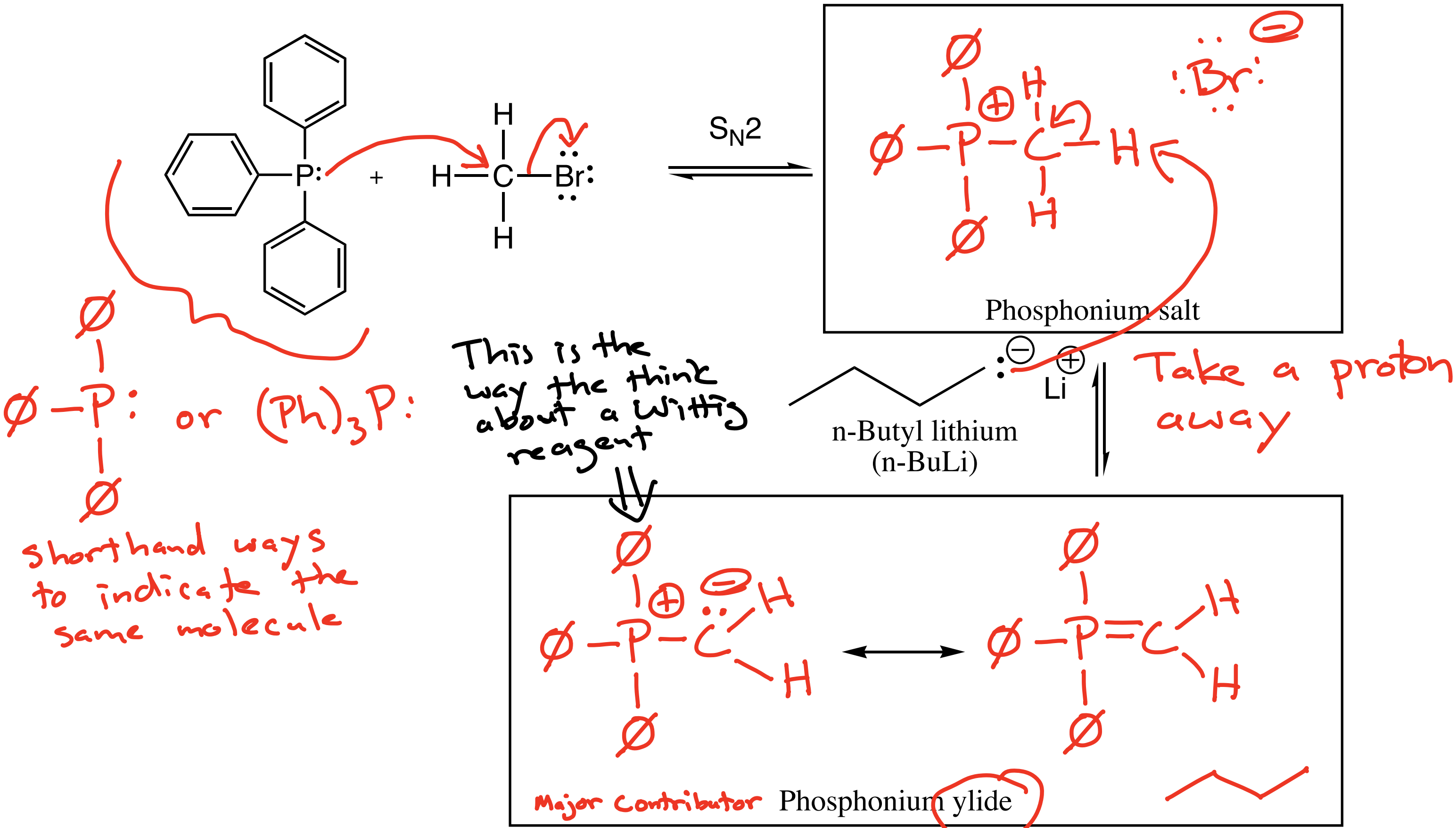
Time capsule → cyanohydrins can be hydrolyzed in H_2SO_4/H_2O to give α-hydroxyacids

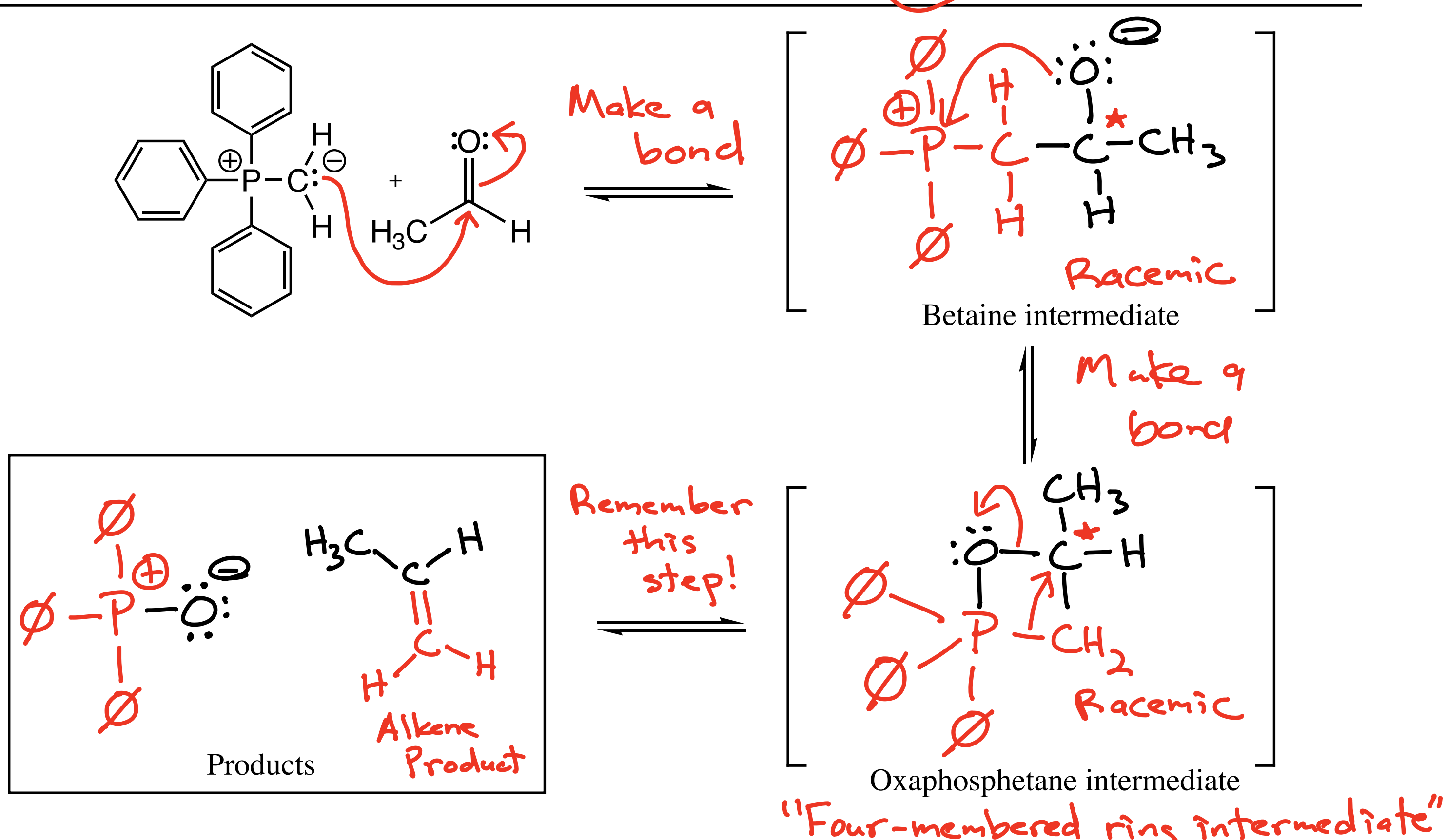
"alpha"

This is getting boring.

It is time for a TWIST

Wittig Reaction



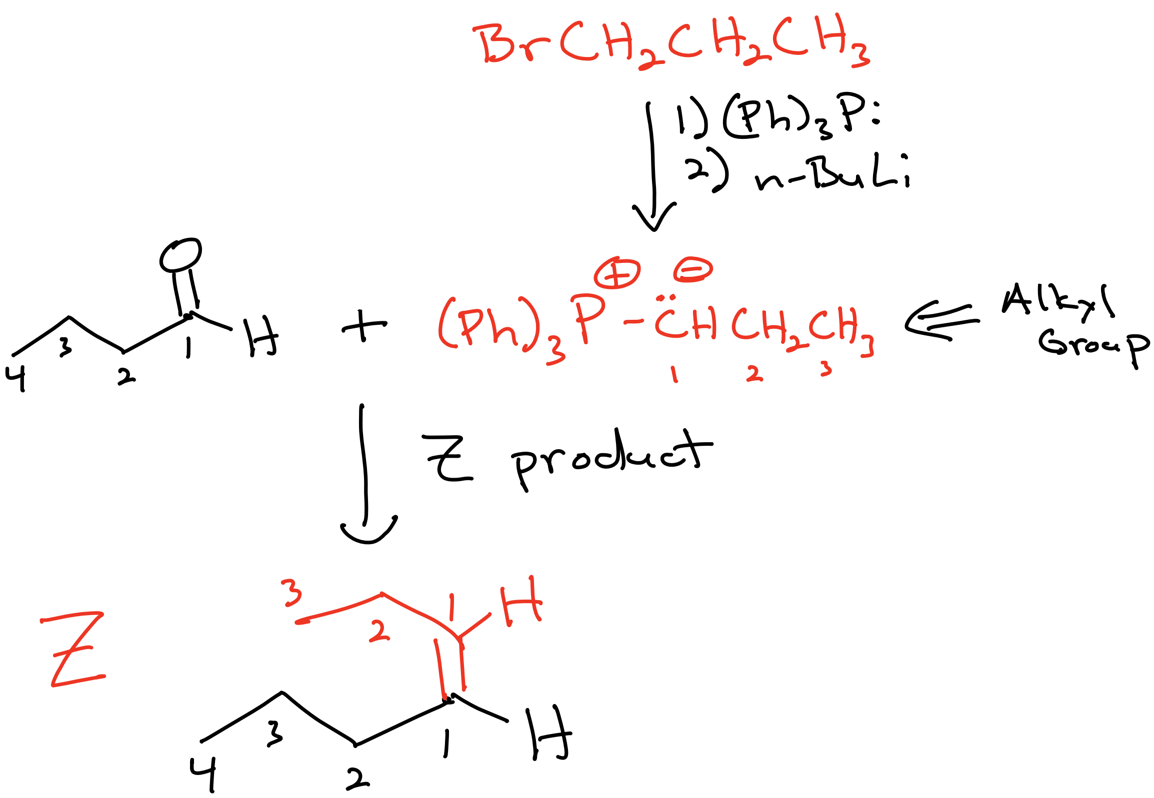


Key Recognition Element (KRE):

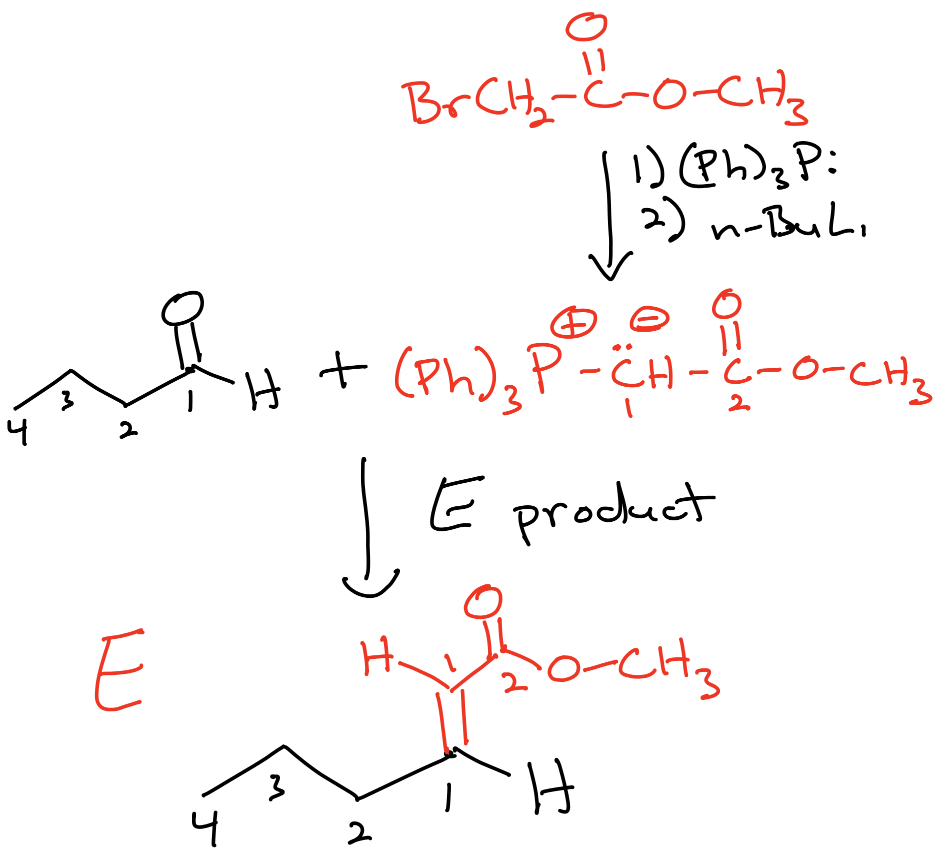
Alkene → New C=C where the C=O was!

E vs. Z → Which product alkene?

1) With alkyl Wittig reagents, the Z alkene product predominates



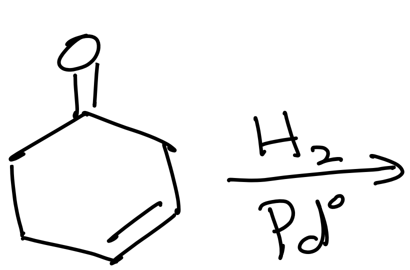
2) When using Wittig reagents that have a carbonyl attached to the C atom that is bonded to the P⊕ atom — E alkenes predominate

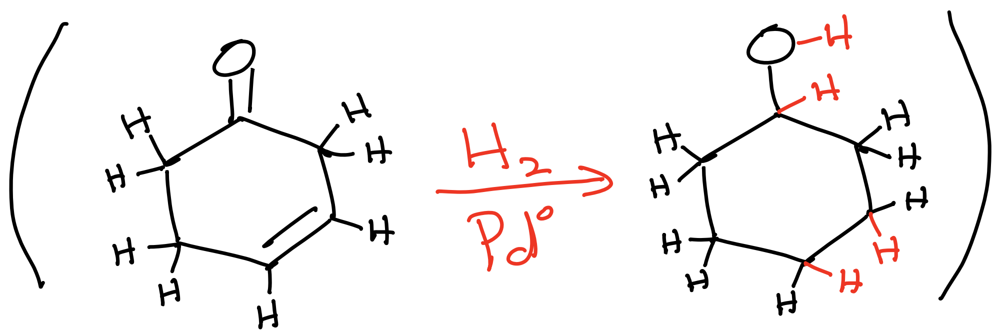


Detour - Hydrogenation of aldehydes and

ketónes

H_2 with Pd°, Pt° or Ni° reduces aldehydes and ketones to alcohols → the π bond reacts the same in C=C and C=O

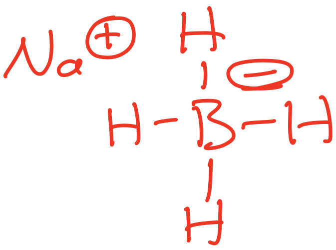




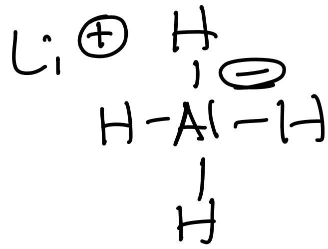
We now return to our regularly scheduled discussion of Mechanism A

Metal Hydride Reduction

⇒ Reduce C=O but not C=C

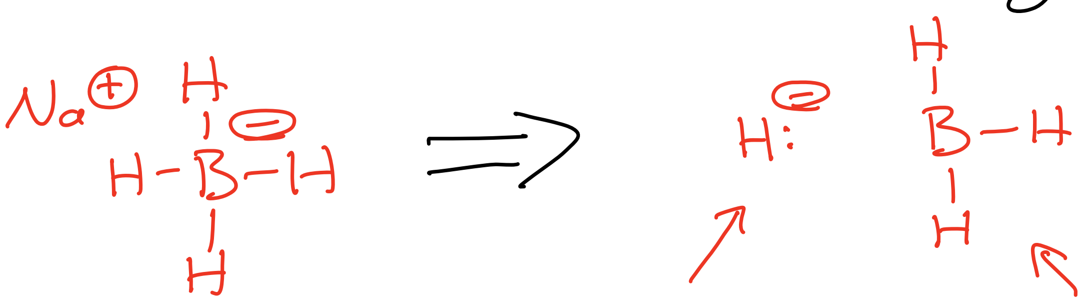


$NaBH_4$



$LiAlH_4$

How to think about the reagent:

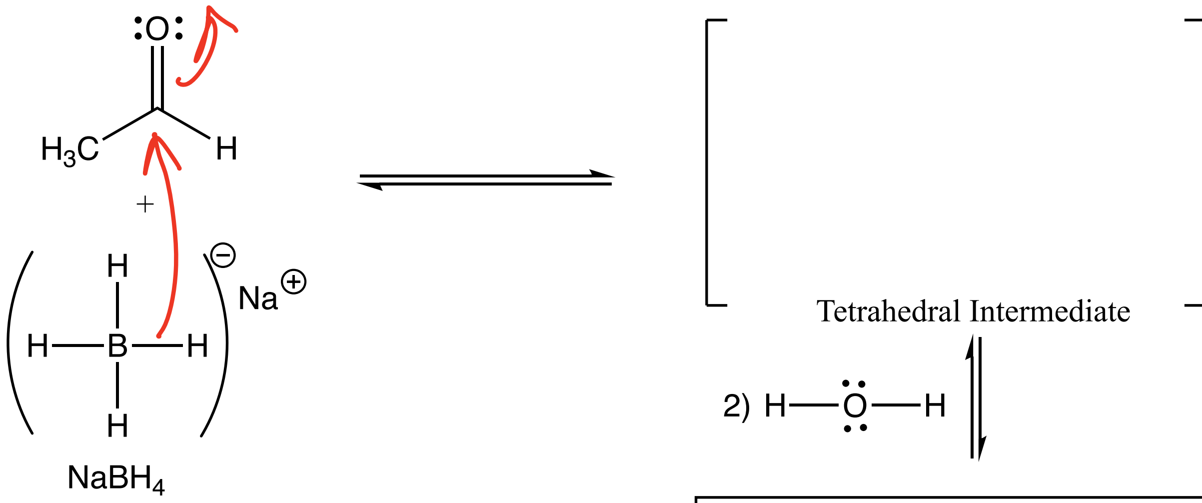


"Hydride"
A Lewis Base

A Lewis acid

You can think of $NaBH_4$ as a Lewis base–Lewis acid complex between hydride ($H:^{\ominus}$) and BH_3

Sodium Borohydride Reacting with an Aldehyde or Ketone



Key Recognition Element (KRE):