

Nucleophilic Addition Of Hard Anions To Aldehydes And Ketones

from chapter(s) _____ in the recommended text

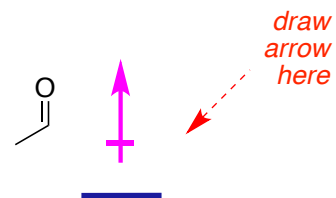
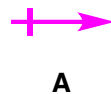
A. Introduction

B. Types Of Additions To Carbonyls

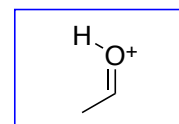
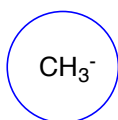
Polarity Of Carbonyls

positively polarized.

to carbonyl *carbons*
oxygen.



Reactivity Of Nucleophiles And Carbonyls At Different pH Values



more reactive

more reactive than ones that are not.

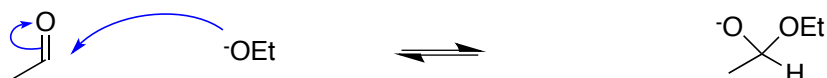
hard because

are likely to
cannot be used

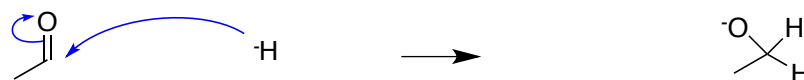
completely wrong to show
neutral or basic conditions.

cannot be reversible.

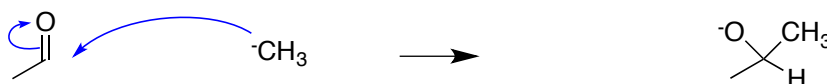
Formation Of Tetrahedral Intermediates



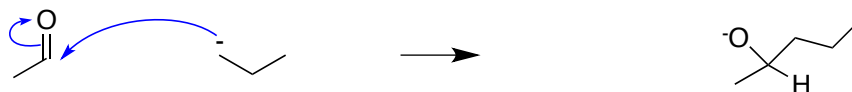
tetrahedral intermediate



tetrahedral intermediate



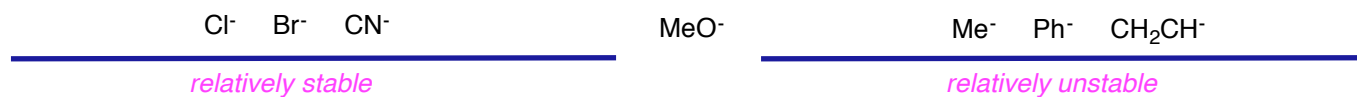
tetrahedral intermediate



tetrahedral intermediate

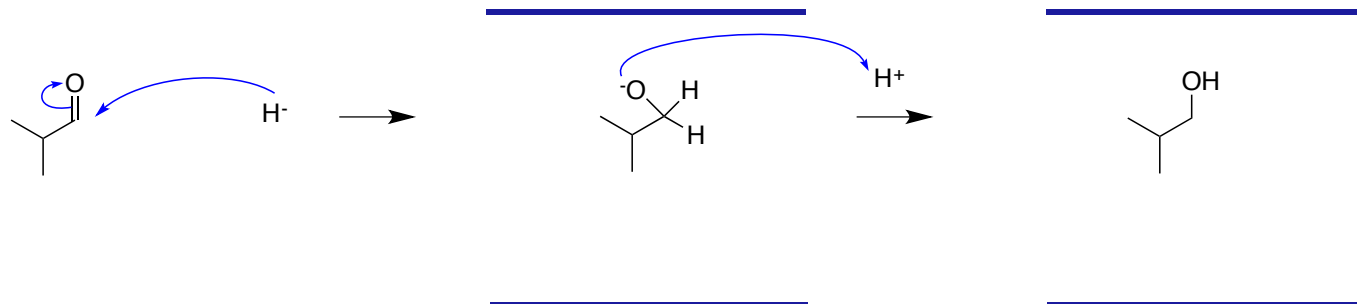
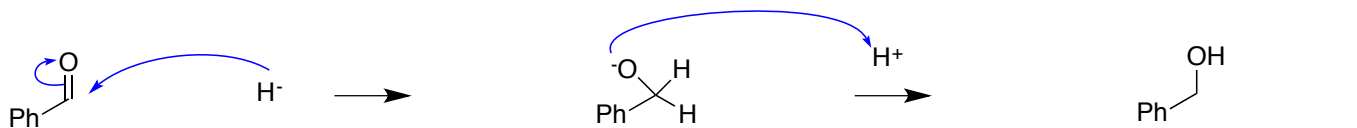
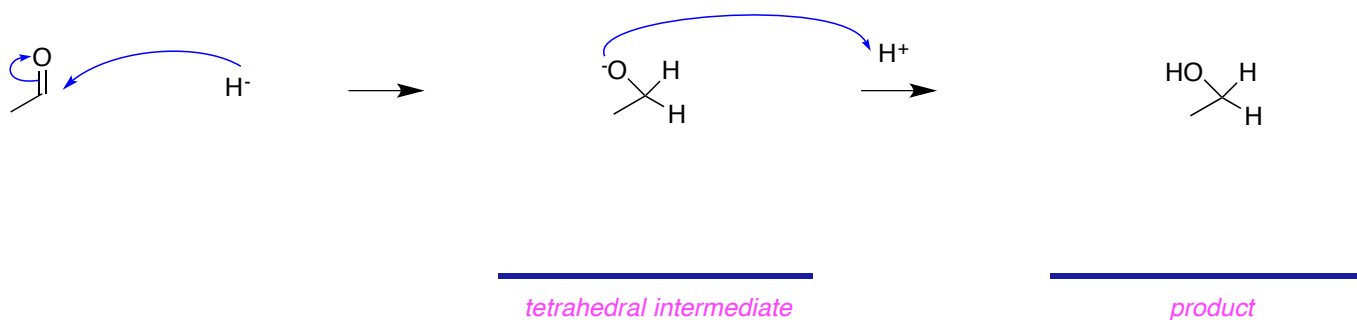
sp^3 hybridized.
 give *alcohols*.
 (this is *kinetics*),
 (*thermodynamics*).

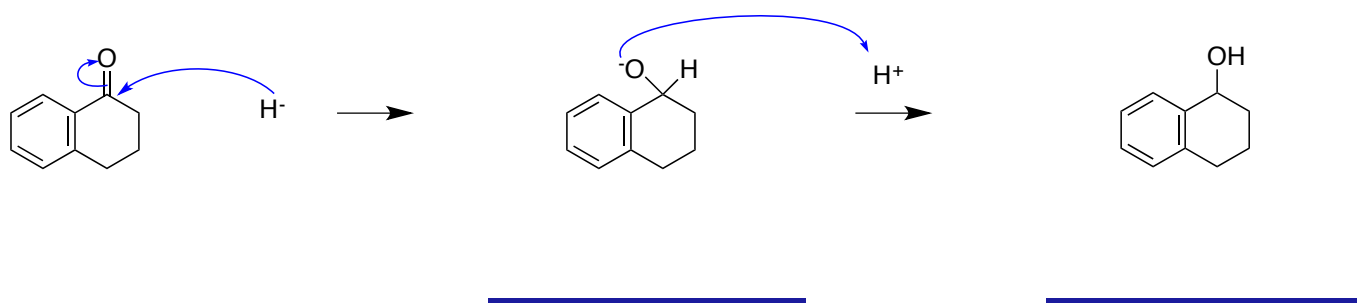
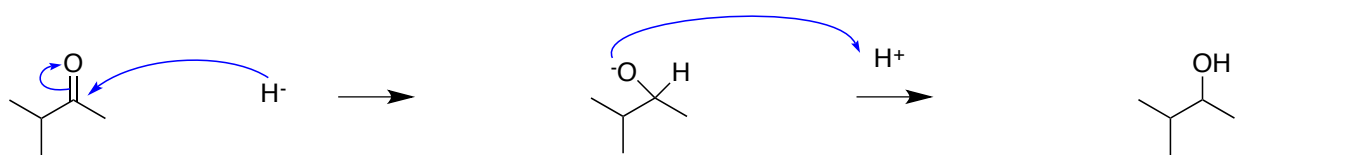
one C–O bond(s)
 one bond(s)
 the *starting materials*.
 it *will* be
 ie *irreversible* addition.



reversibly to ketones

C. Reactions of Aldehydes And Ketones With Hydridic Reducing Agents





NaBH_4

name: Sodium Borohydride

nucleophilic

NaH

Sodium Hydride

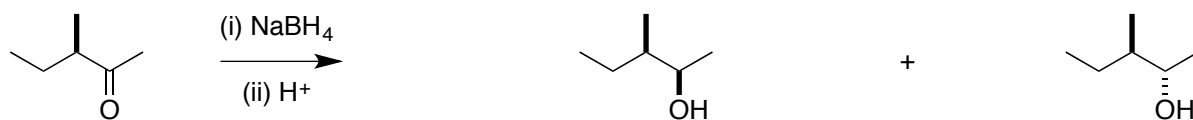
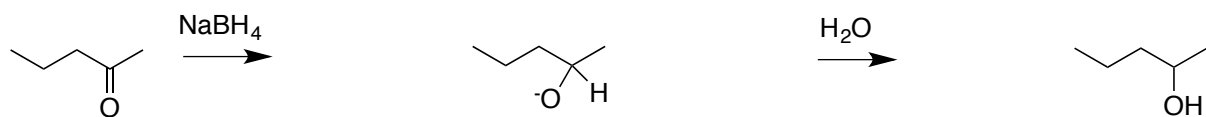
basic

LiAlH_4

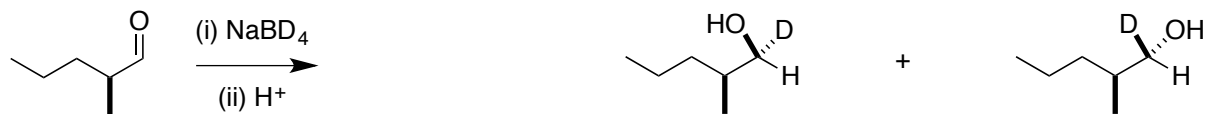
Lithium Aluminium Hydride

nucleophilic

does not do

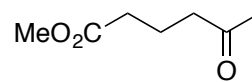
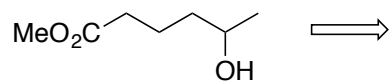
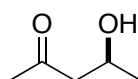
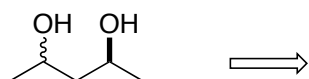
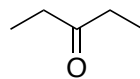
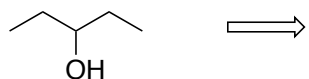
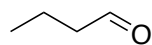
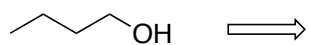


two diastereomers



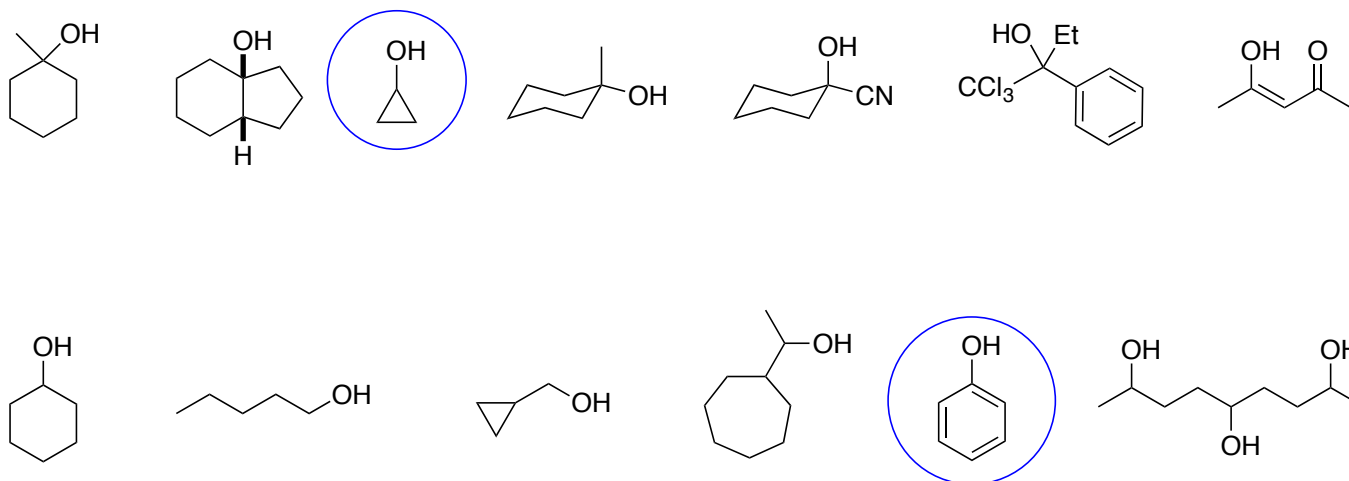
two diastereomers

reduction processes.



because:

Lithium aluminium hydride can reduce ester to alcohol, but sodium borohydride cannot.



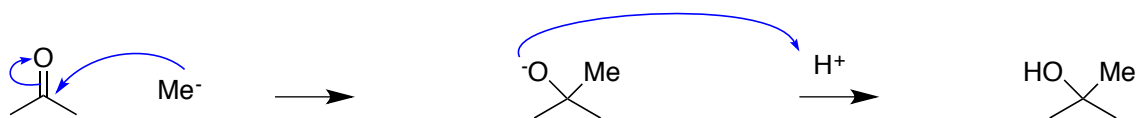
D. Addition Of Carbanions

carbonyls *irreversibly*.

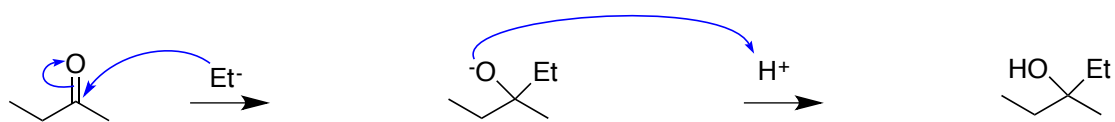
is *stronger* than

under *anhydrous* conditions.

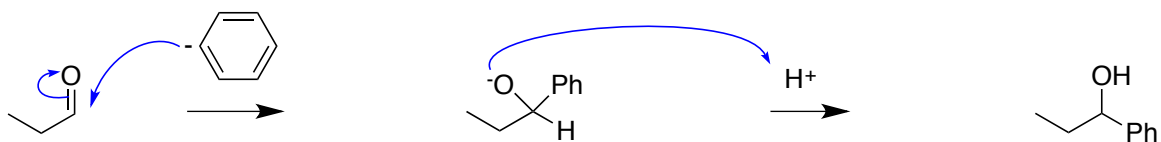
alkoxide *does not*



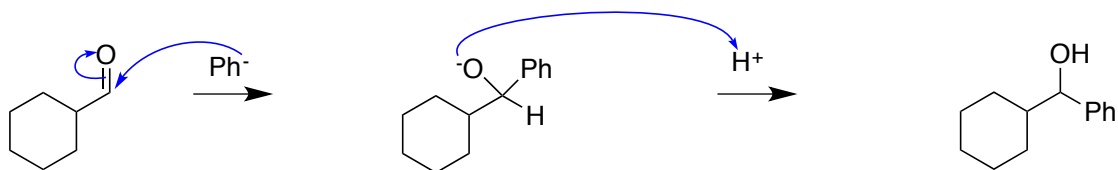
tetrahedral intermediate



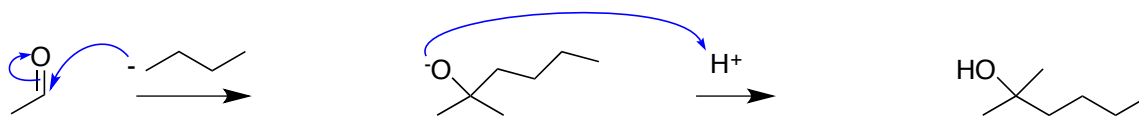
tetrahedral intermediate



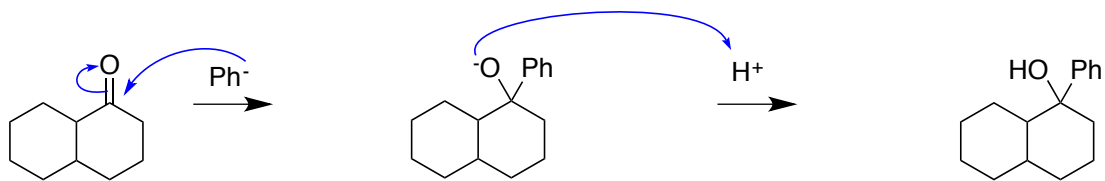
tetrahedral intermediate



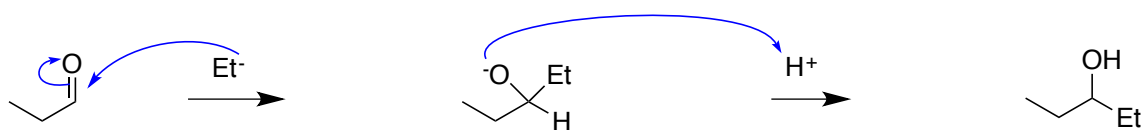
tetrahedral intermediate



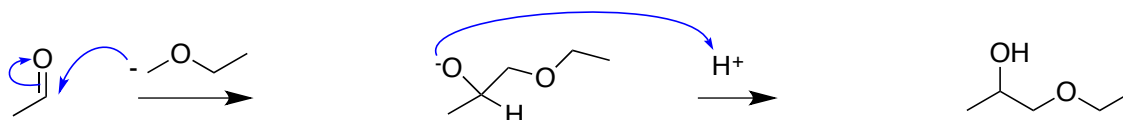
tetrahedral intermediate



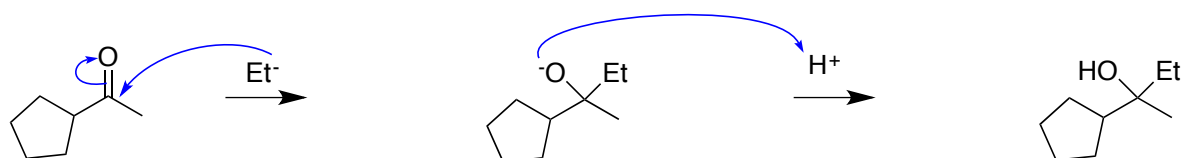
tetrahedral intermediate



tetrahedral intermediate

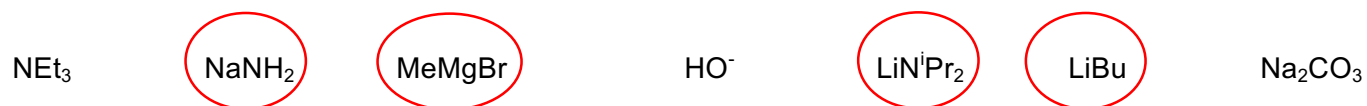


tetrahedral intermediate

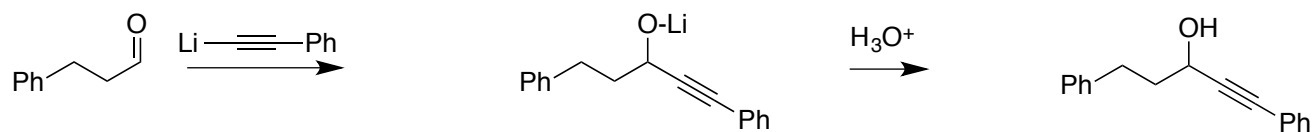


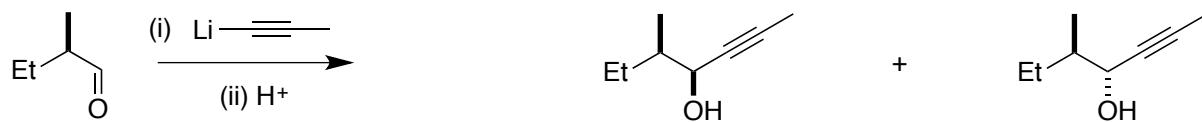
tetrahedral intermediate

E. Reactions Of Carbonyl Compounds With Acetylide Anions

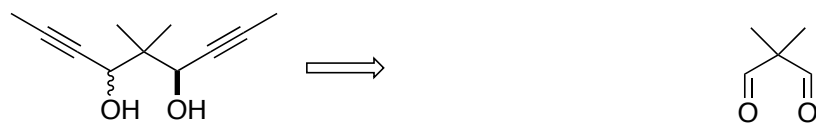
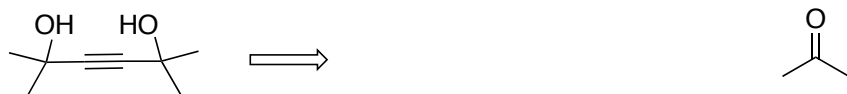


secondary or tertiary





two diastereomers



two diastereomers

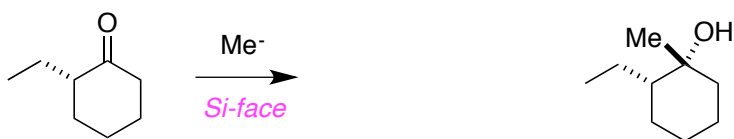
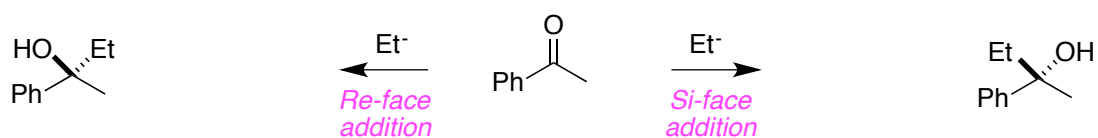


F. *Si* And *Re* Faces Revisited

enantiomers.

Re-face attack

Si-face attack.





(R)-Alcohols *are not*

(S)-alcohols *are not*

