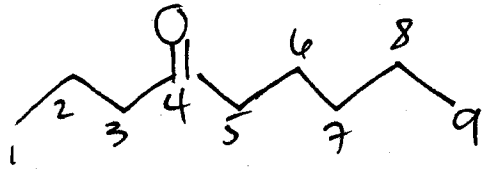
Ketone nomenclature

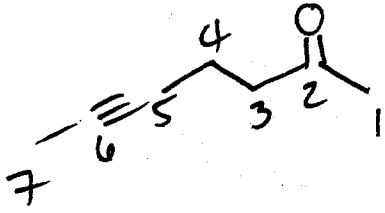


4-nonanone

number the chain so the C=O has lowest possible #.

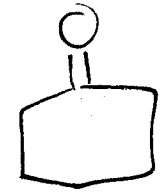
change "e" to "one"

use # to indicate position of C=O.



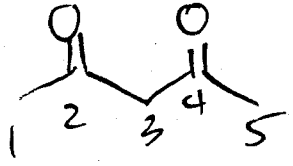
C=O takes priority in numbering

5-heptyn-2-one



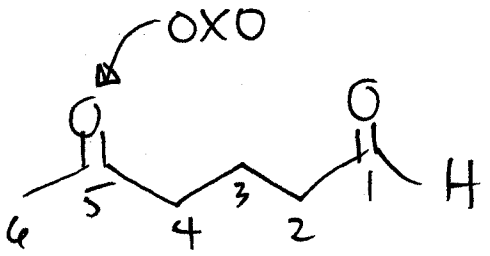
cyclohexanone

(C=O is #1 when it's part of a ring)



2,4-pentanedione

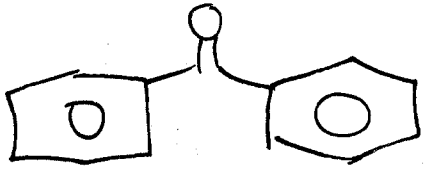
Aldehyde > Ketone



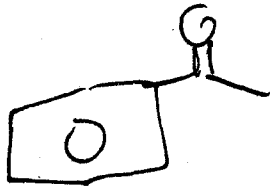
5-oxohexanal

common names:

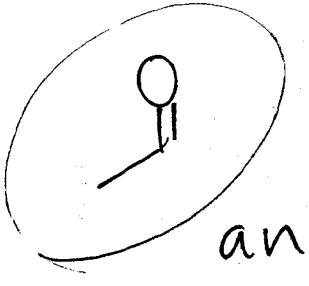
acetone



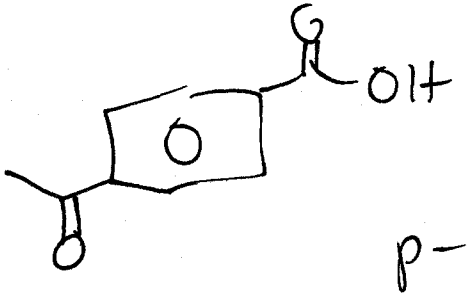
benzophenone



acetophenone

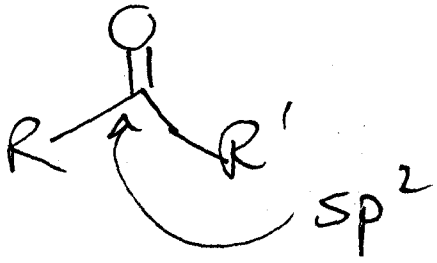


an acetyl group



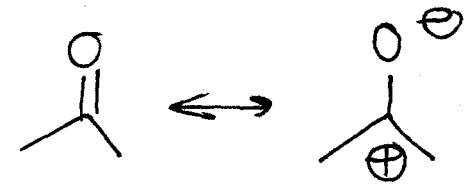
p-acetylbenzoic acid

Structure + Bonding



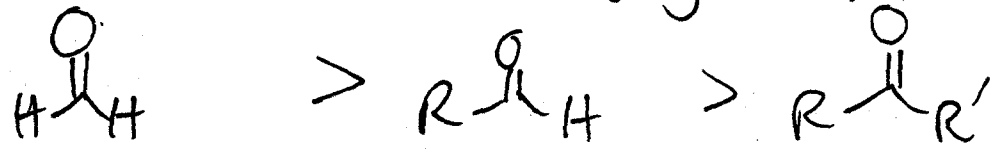
bond angles ~120°

C=O is polar



susceptible to nucleophilic attack - more so than carbox. acids + derivs.

Alkyl substitution stabilizes a ⊕ charge by induction (hyperconjugation)

⇒ 

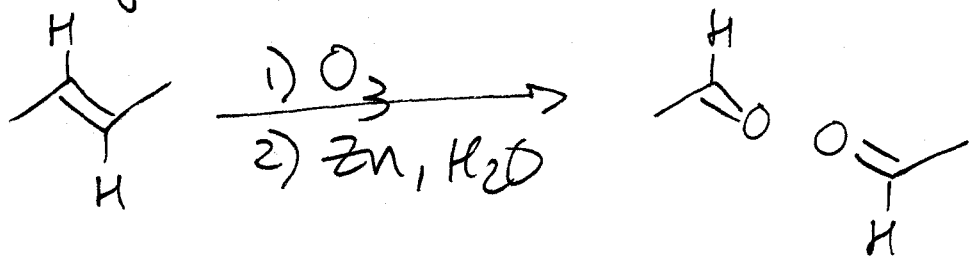
most reactive — least reactive

Physical Properties

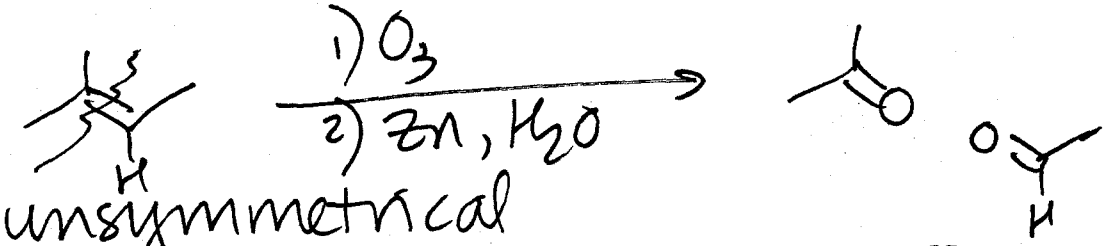
tend to have higher bp than corresponding alkanes (dipole-dipole) but lower than alcohols (no H bonds)

Synthesis of Aldehydes + Ketones

1. Ozonolysis of alkenes



symmetrical alkene → 2 equiv. of one compound



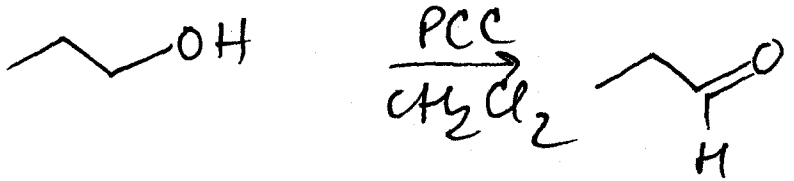
unsymmetrical alkene → 2 different compounds

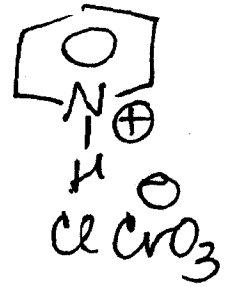
2. Friedel-Crafts acylation

⇒ aromatic ketones only

3. oxidations

a. 1° alcohol $\xrightarrow{PCC}$ aldehyde

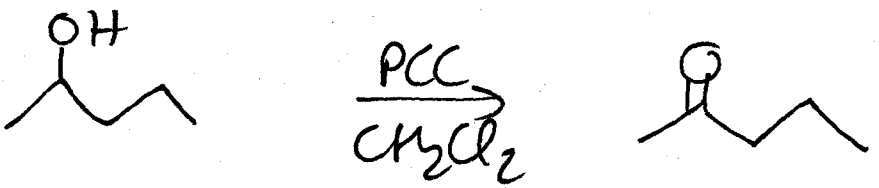




pyridinium chloro chromate

b. 2° alcohol $\longrightarrow$ ketone

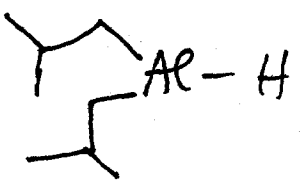
use PCC or other oxidizing agents



4. Reductions

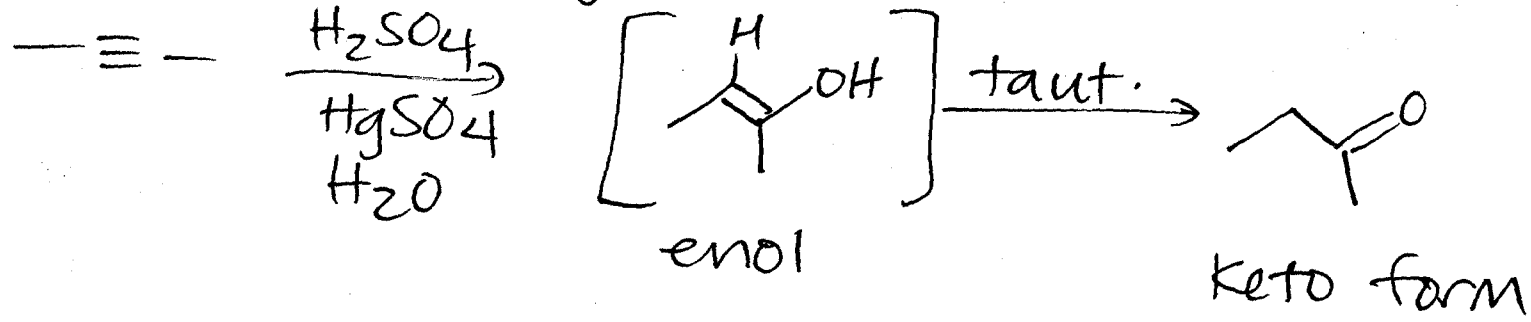
a. $R-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow[THF,\ cold\ (-78°)]{LiAlH(OtBu)_3} R-\overset{O}{\overset{\|}{C}}-H$

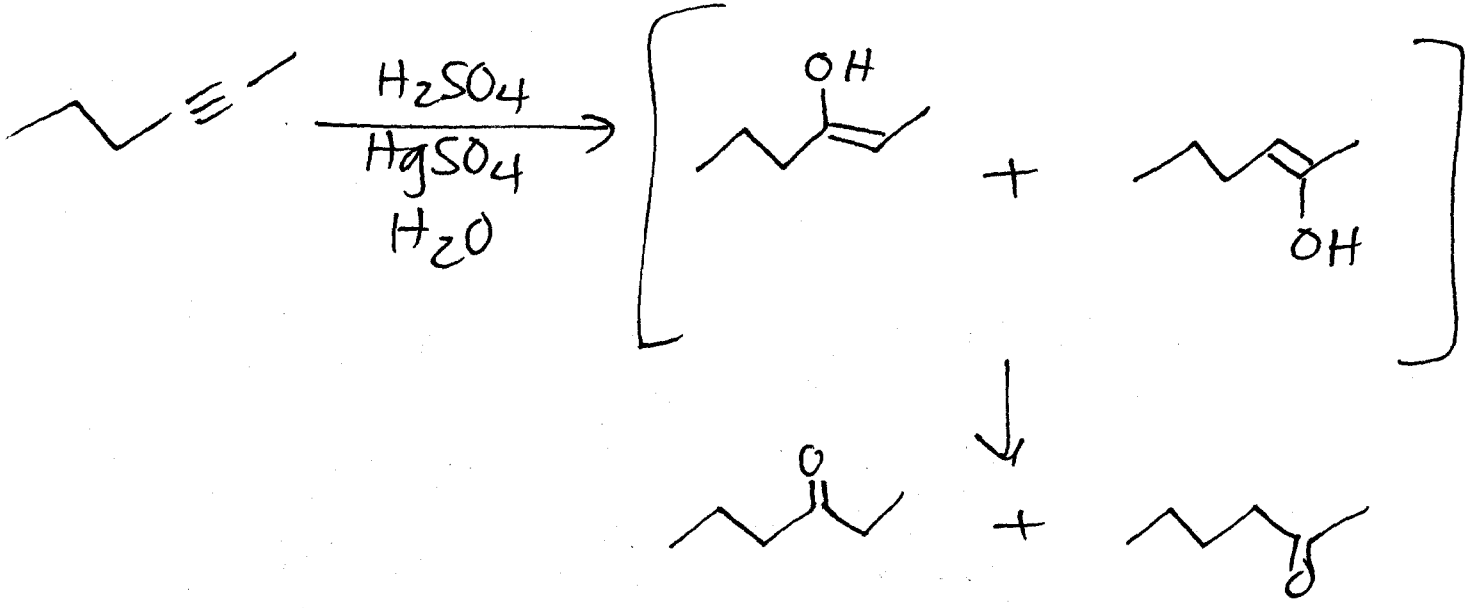
b. $R-\overset{O}{\overset{\|}{C}}-OR'$ or $R-C\equiv N$ $\xrightarrow[THF,\ cold\ (-78°)]{DIBAL} R-\overset{O}{\overset{\|}{C}}-H$



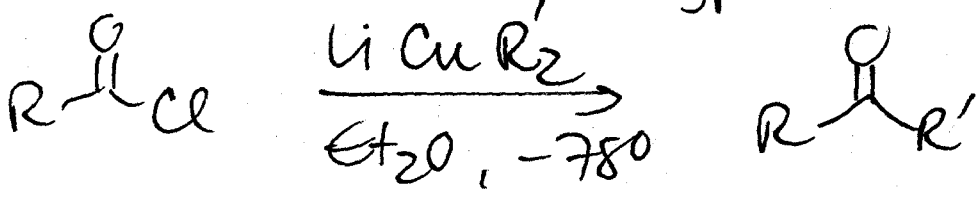
~~di-isopropyl~~ di-isobutyl aluminum hydride

5. Hydration of Alkynes



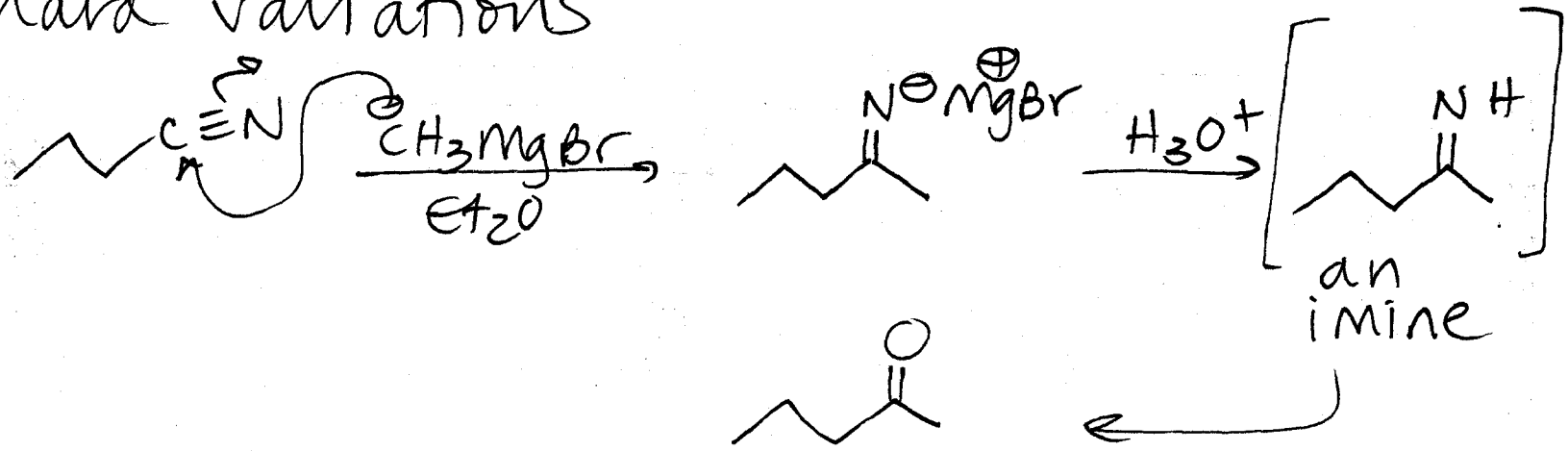


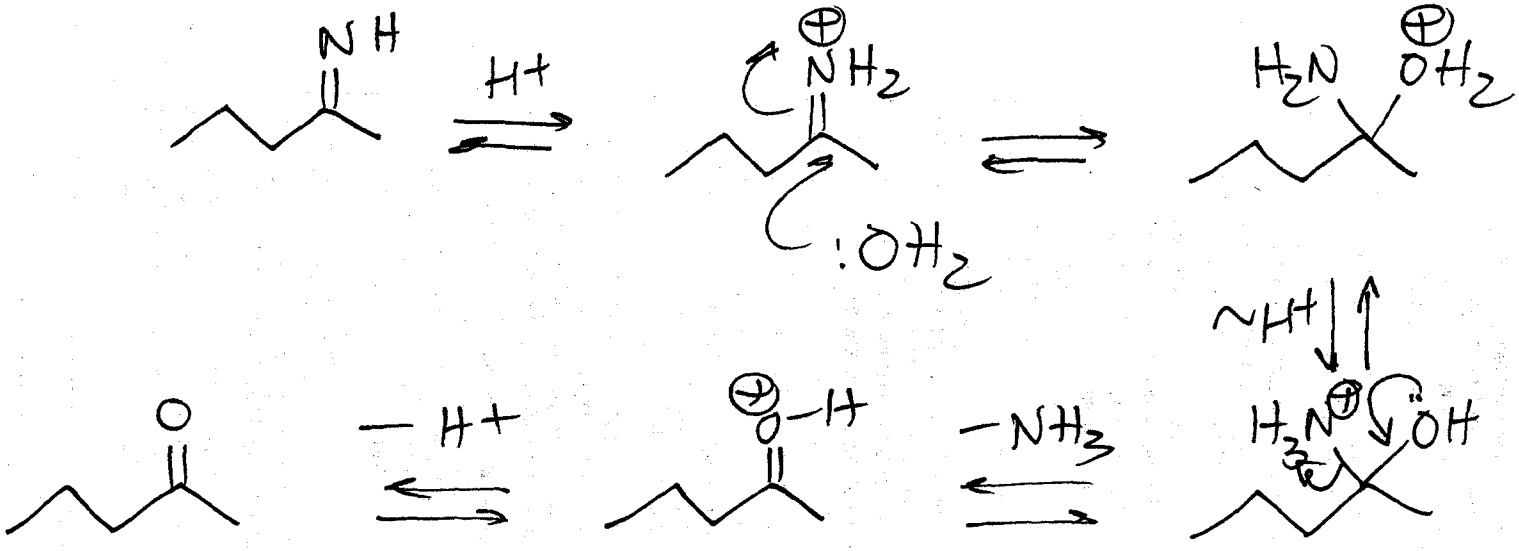
6. Another Gilman-type rxn



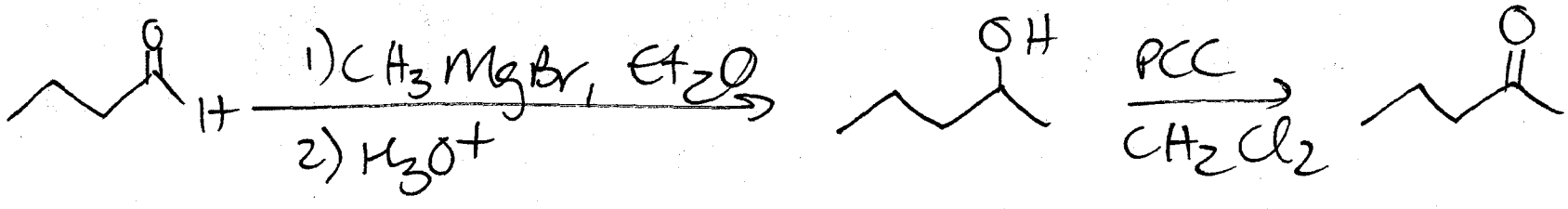
7. Grignard variations

a.

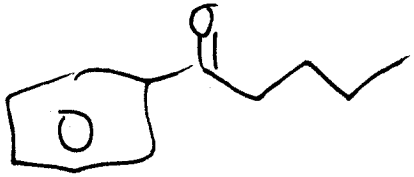




b. aldehyde → ketone



make:



General rules:
start w/ benzene + any 3-carbon or less alcohol or alkyl halide + any inorganic reagent.

Solution #1