Today

Aldehyde and Ketone Nomenclature
Section 16.1

Relative Reactivities
Section 16.2

How Aldehydes and Ketones React
Section 16.3

Reactions with Carbon Nucleophiles
Section 16.4

Next Class

Test 2 Chap 15

Second Class from Today

Reductions and Reactions with Hydride
Sections 16.5 - 16.7

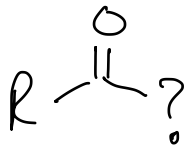
Reactions with Nitrogen Nucleophiles
Section 16.8

Third Class from Today

Protecting Groups
16.10
and
Other Reactions including α,β-unsaturated carbonyls
16.11-16.13, 16.15

Please hand in reworked test 1

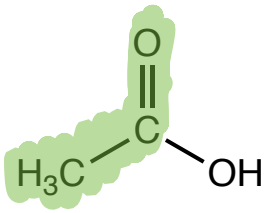
Review Session Thursday, March 23 7:30 - 9:00 in Wilson 138



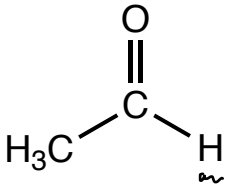
Aldehydes

Name of the acid, drop the "ic" ending and add aldehyde

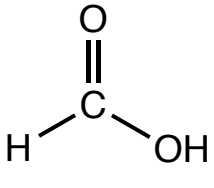
e.g.



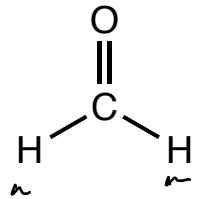
acetic acid



acetaldehyde



formic acid

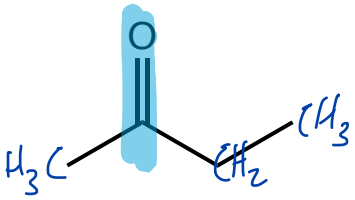


formaldehyde

Ketones

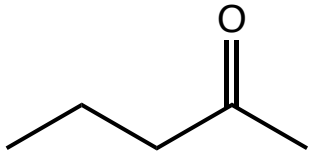
Name of the shorter alkyl substituent, name of the longer alkyl substituent, and the word ketone

e.g.



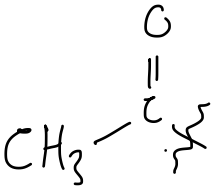
methyl ethyl ketone

MEK

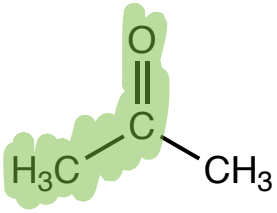


methyl propyl ketone

and then there's **acetone**...



acetyl group



it's the ketone with the acetyl group in it.

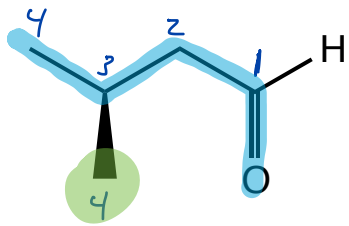
Aldehydes

#'s-(substituent names)(parent alkane)al

parent alkane is the longest C chain that starts with the aldehyde

remove the "e" from the parent alkane and add "al" to convert to aldehyde name

name and number substituents as in the past with aldehyde defined as C-1



3- methyl butanal

Ketones

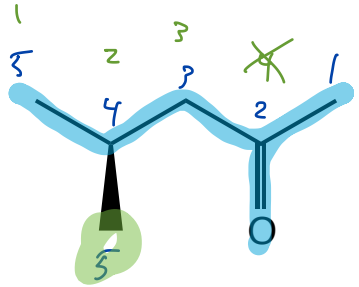
#'s-(substituent names)-#-(parent alkane)one

parent alkane is the longest C chain that contains the carbonyl

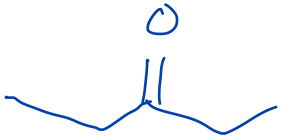
remove the "e" from the parent alkane and add "one" to convert to the ketone name

number the position of the carbonyl giving it the lowest possible number

name and number substituents as in the past with the positions determined based on the numbering of the carbonyl

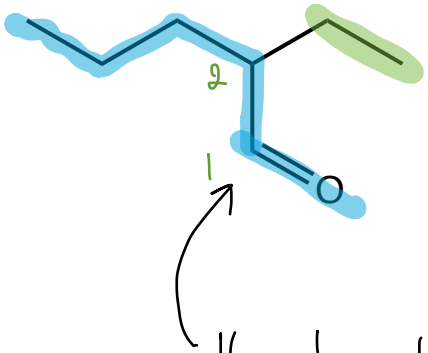


4 - methyl - 2 - pentanone



3- pentanone

2- pentanone



aldehyde or ketone?

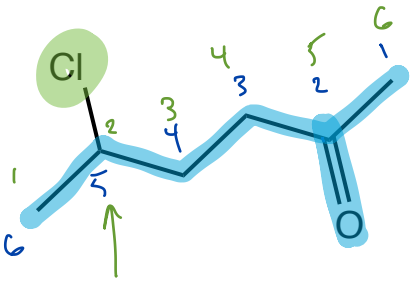
longest chain is 5 not 6... chain must contain functional group.

2-ethylpentanal

H atom here

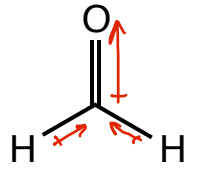
C has 3 bonds drawn

undrawn bond is to H



5-chloro-2-hexanone

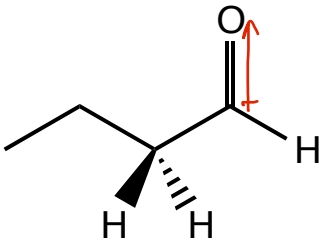
The C of the C=O is electrophilic because O atom is electronegative + draws e^- density away from the C



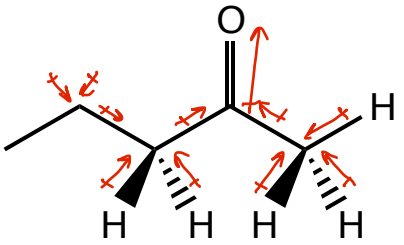
not much in the way ... easier for nucleophile to get a C

not getting much e^- density from H's

most positive C



aldehydes are more reative



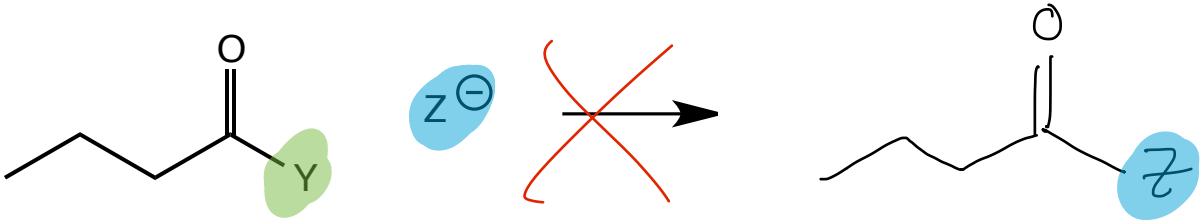
sterically crowded harder for nucleophile to access C

C is less electron deficient because inductive effect pushes e^- density toward the C least ⊕ C

Which is most reactive ... Two factors ① degree of ⊕ charge ② access ... sterics

nucleophiles will be attracted to the C of the C=O

Acyl Substitution?



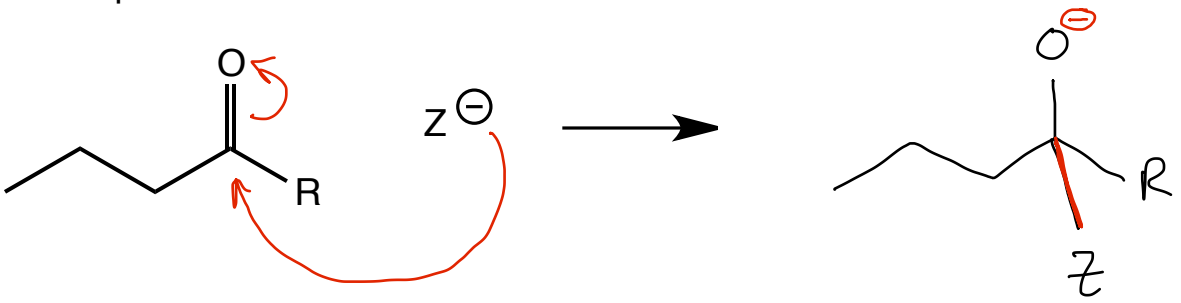
Y = H or CH_3,...

$Y^{\ominus}$

good LG's? NO

$H^{\ominus}$ ... $CH_3^{\ominus}$ these are crazy strong bases

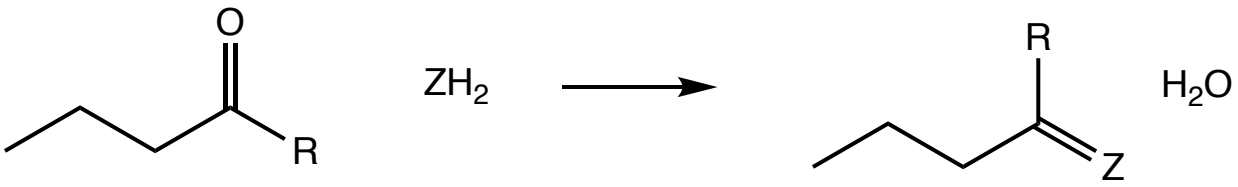
Nucleophilic Addition?



if Z ≠ O or N then

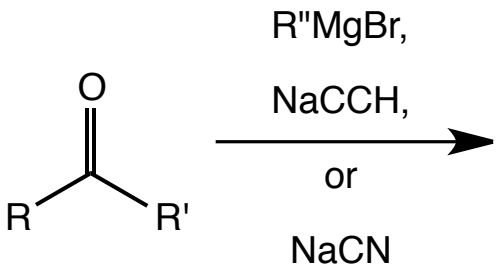
if Z = H or C then this molecule is an alkoxide, which is a deprotonated alcohol

Nucleophilic Addition-Elimination?



Z = O, ZH_2 is H_2O

Z = NH ZH_2 is NH_3



$R''MgBr$ Grignard reagent

(-1) (+2) (-1)

CH_3MgBr

$NaC{\equiv}C\text{-}H$ acetylide ion

(+) (−)

$NaC{\equiv}N$ sodium cyanide

(+) (−)