Course Chem 345 Lecturer Tallman
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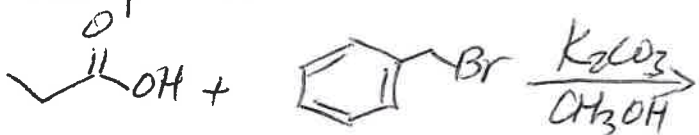
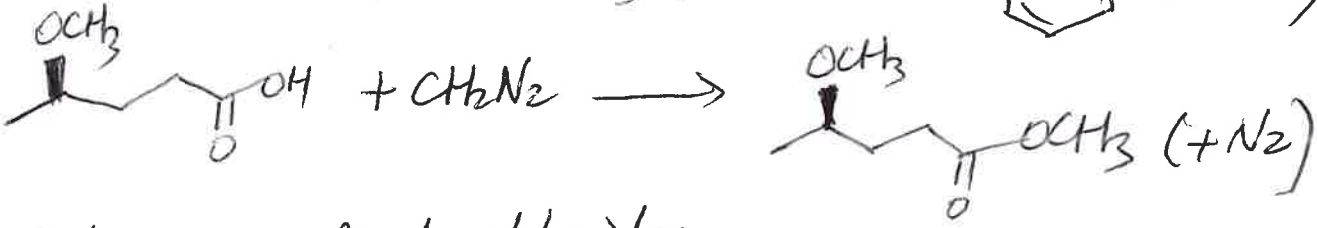
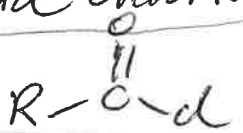
Carboxylic acid Derivatives:

Ester formation via S_N2:

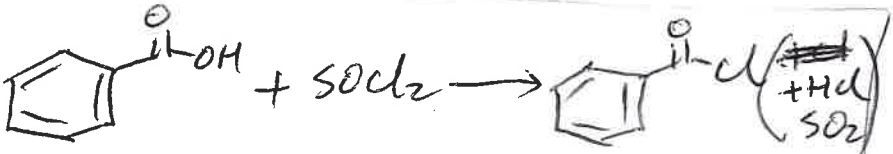


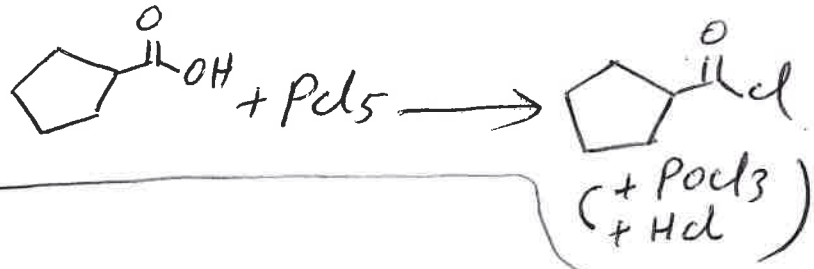


C.A. → Acid chlorides

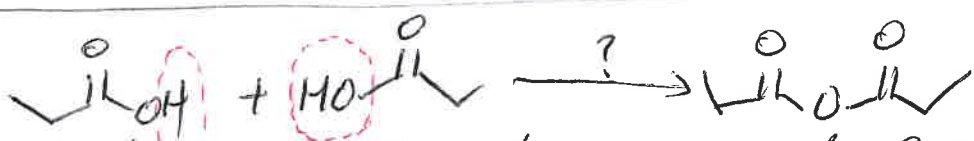


- * are very reactive
- * usually prepared in order to use them in a specific rxn.
- * Standard Methods involve either of 2 reagents

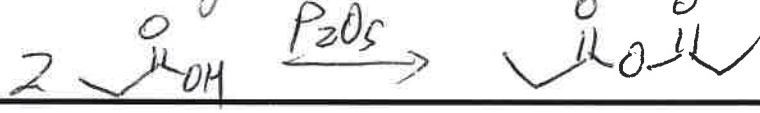




C.A. → anhydride "without water"



Standard reagent: P_2O_5 (reacts strongly & irrev. w/ H_2O)



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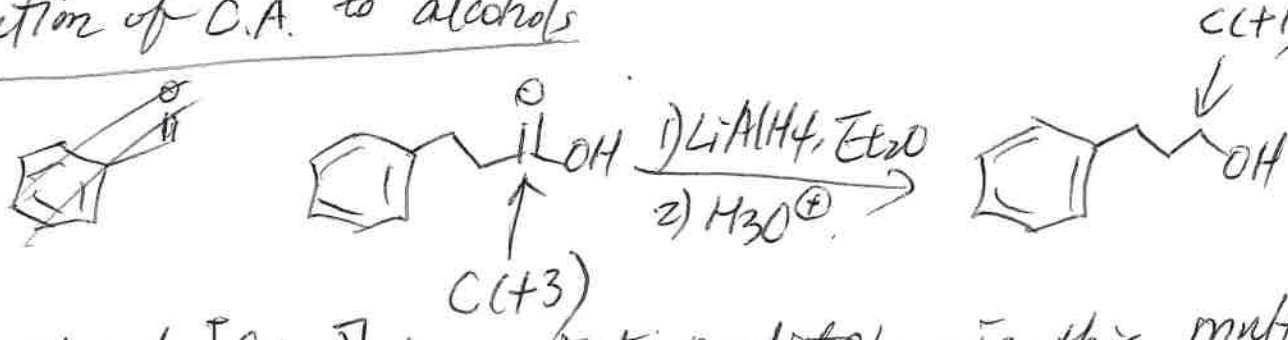
* Anhydrides similar to acid chlorides = highly reactive

Reduction of C.A. to alcohols



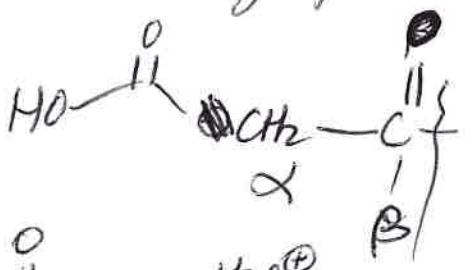
The aldehyde [C(+2)] is an ~~intermediate~~ intermediate in this multi-step process; the aldehyde is more reactive ~~than~~

⊛ NaBH4 is less ~~reactive~~ reactive than LiAlH4

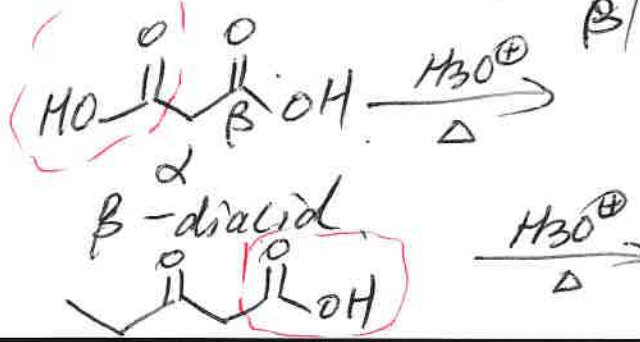
" " does not reduce C.A.

Decarboxylation (⇒ loss of ~~C~~ CO_2)

* occurs only for special cases



← C.A. that has carbonyl in the "β-position"



β-diacid

β-Ketoacid

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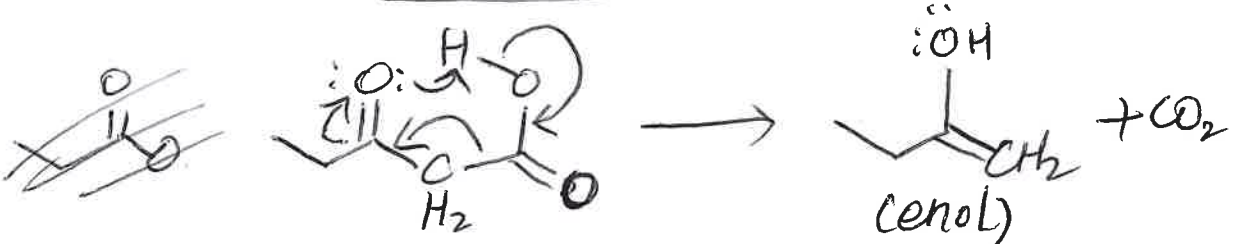
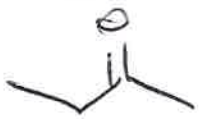
Mechanism is concerted



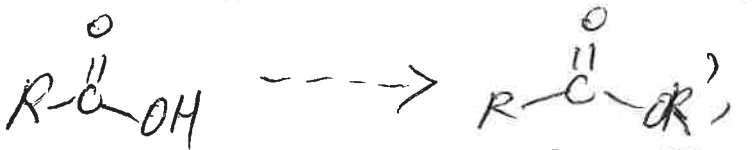
↓ P. 655, 656

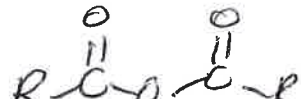


Ketone

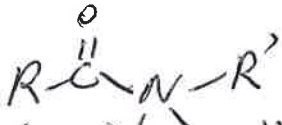
Ch 21 – Chemistry of C.A. derivatives

Recall





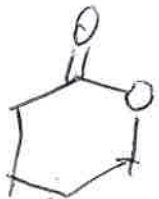
R–C≡N: nitriles



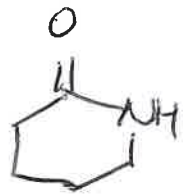
Amides

* In all cases, the central C of the functional group is (+3)

cyclic ester : Lactone



cyclic amides = "lactam"



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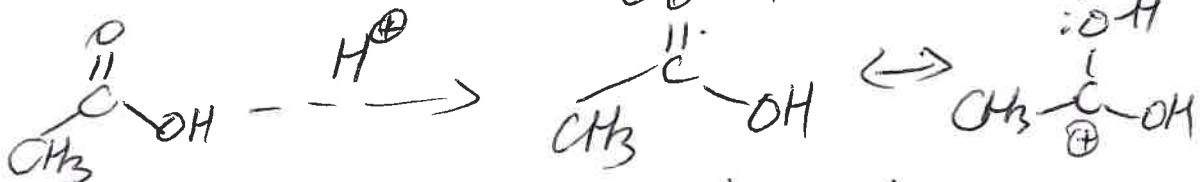
N analog of anhydride = imide

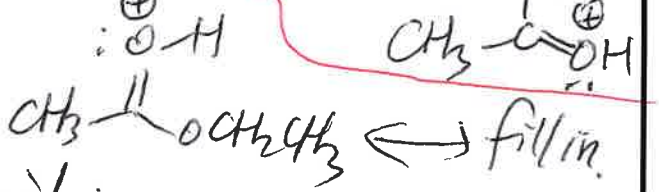
Bronsted Acid-base behavior:

<u>recall</u>:



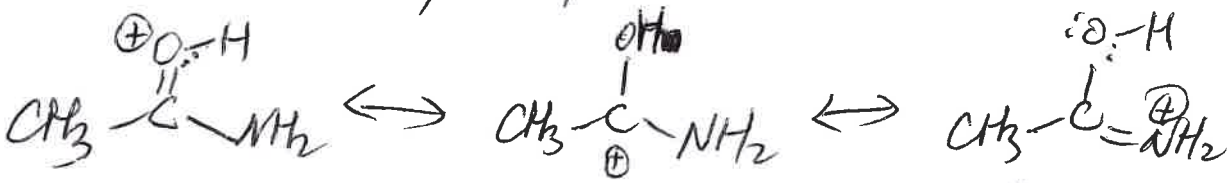
pka ~ 5 pka ~ -6.

ester = Very similar; conj. acid:



fill in.

Amides are more basic; conj. acid:



pka ~ -1

N more willing to share e⁻ than O.

Nitriles are <u>very</u> weak bases:

pka ~ 10.