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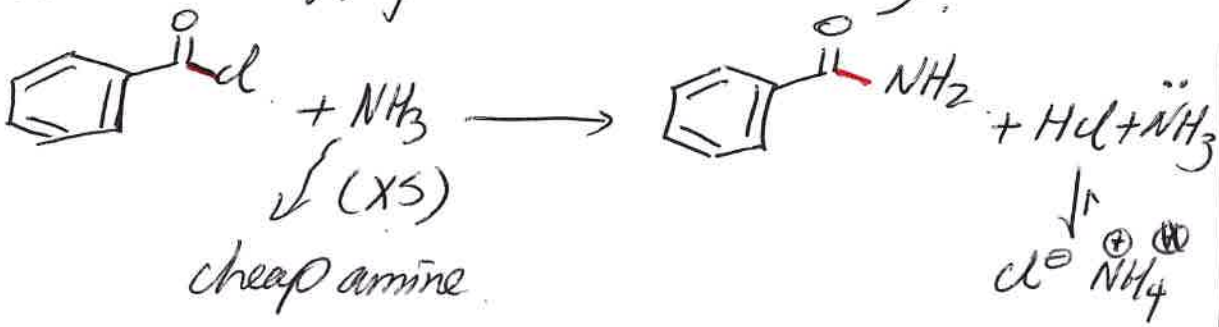
Recall: Acid chloride + amine → Amide
(Harness reactivity of acid chloride)

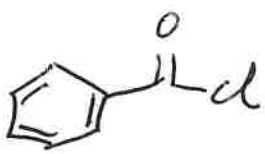
Ex:



Problem – what if amine is valuable?
Solution – Use a second amine that is cheap & cannot form a stable amide (no N-H)

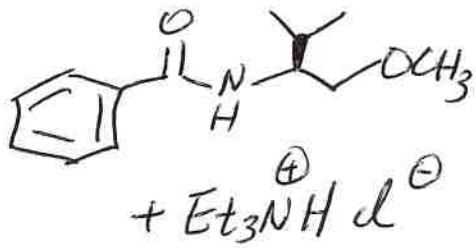
→  or 
(Et_3N) (pyridine)

Thus,


+

(1 eq.)
(Valuable)

Et_3N



$+ Et_3NH^{\oplus} Cl^{\ominus}$

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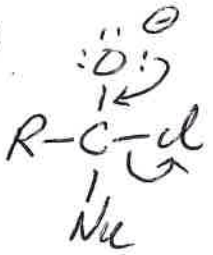
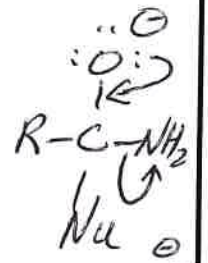
Reactivity perspective –

1)  vs. 

More susceptible to nucleophilic attack (no resonance)

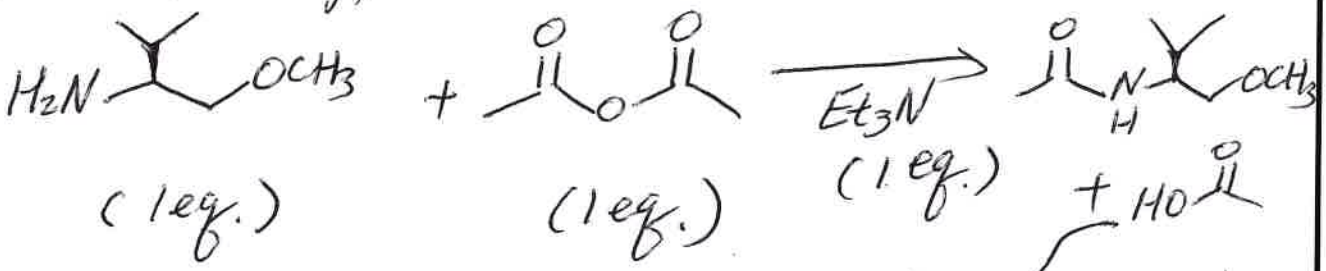
2)  vs. 

fast – $Cl^{\ominus}$ good leaving group

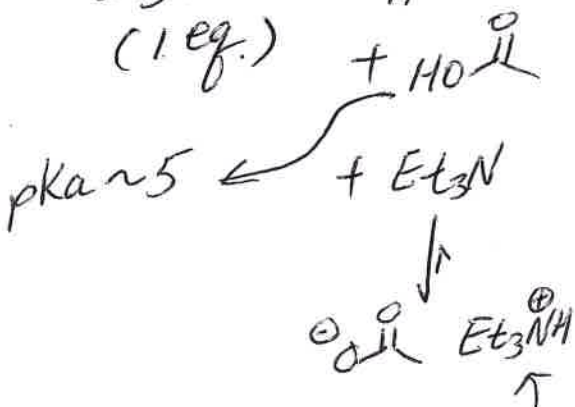
slow – $NH_2^{\ominus}$ very poor L.G.

Variations on this theme:

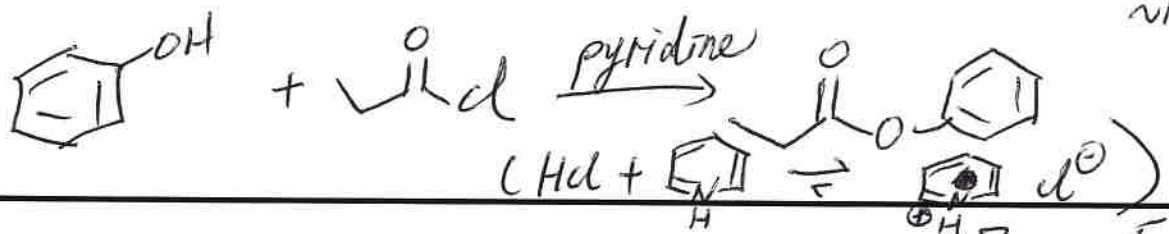
1) Amine + anhydride → amide.



you fill in mechanism!



2) Alcohol + acid chloride → ester



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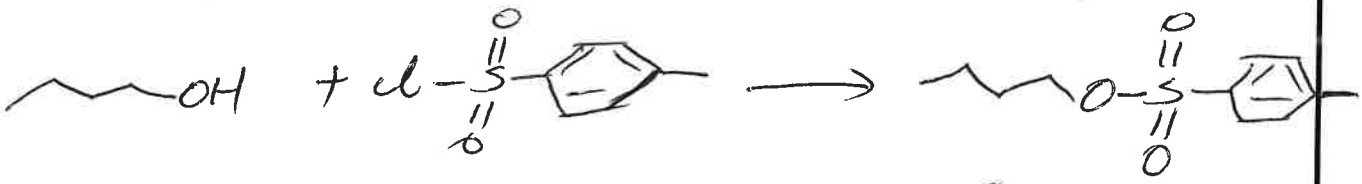
Note: Other methods for ester synthesis do not work for phenol esters, or t-alcohol esters.

(R-OH)

3) Alcohol + Tosylcl → "tosylate" (chem 343)

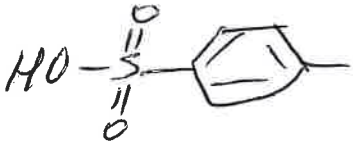
Ex:



"tosylcl" (TsCl) ("ROTs")

(+  $Cl^{\ominus}$)

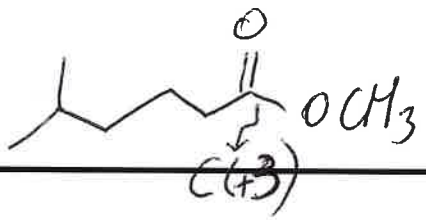
Now recognize TsCl as the acid chloride derivative of a sulfonic acid



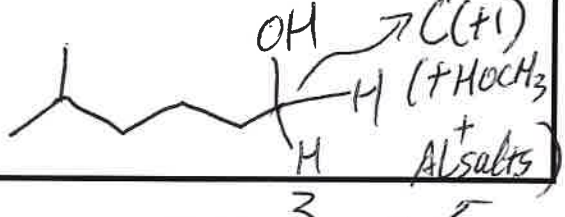
Reduction Rxns of ~~carbonyl~~ carboxylic acid derivatives

1) Ester + $LiAlH_4$ → alcohol (1°)

Ex:



1) ~~##~~ $LiAlH_4$, Et$_2$O
2) $H_3O^{\oplus}$



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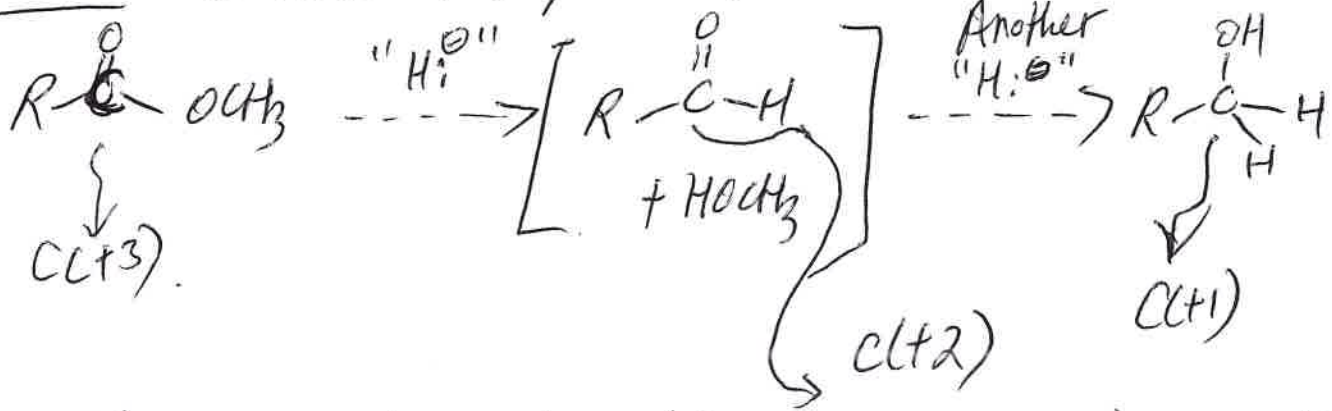
Note: 2 reduction process must occur



Possible to stop @ aldehyde (C(+2)) stage?

– NO

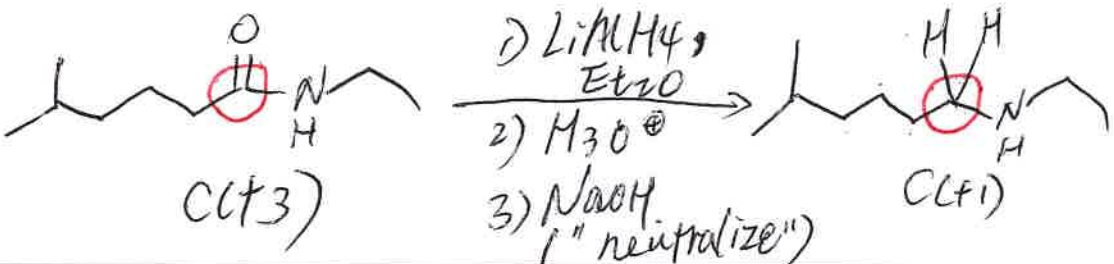
Aldehyde not res.-stabilized & therefore, intrinsically more reactive than ester

$NaBH_4$? – Esters not reduced by $NaBH_4$.

(∴ Can reduce aldehyde/ketone in presence of ester w/ $NaBH_4$)

2). Amide → Amine, via $LiAlH_4$

Ex:



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Note: After Step #2.

(pKa ~ 10)

Note contrast