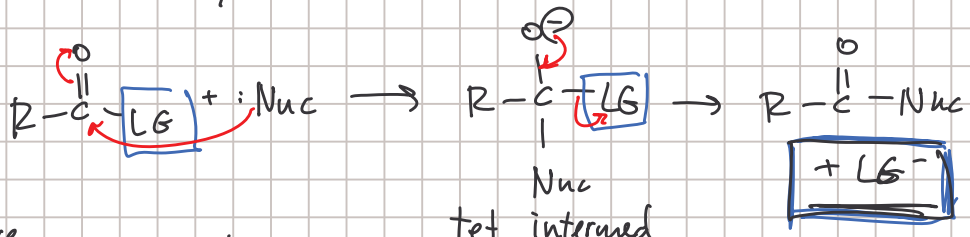
Ch 21 21-3 / 21-4 study (review)

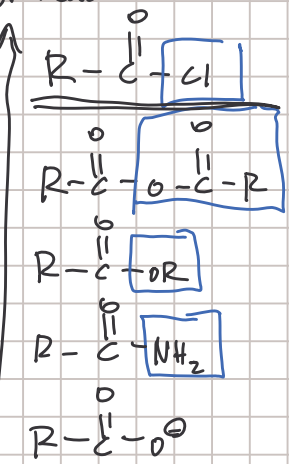
Note Title 4/14/2006

Interconversion of carbox. acid derivs.

Addition / elimination mech.

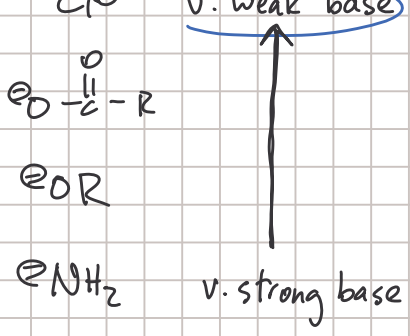


most reactive



least reactive (to add'n/elim)

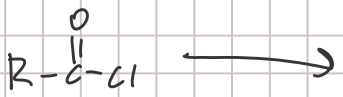
Leaving group



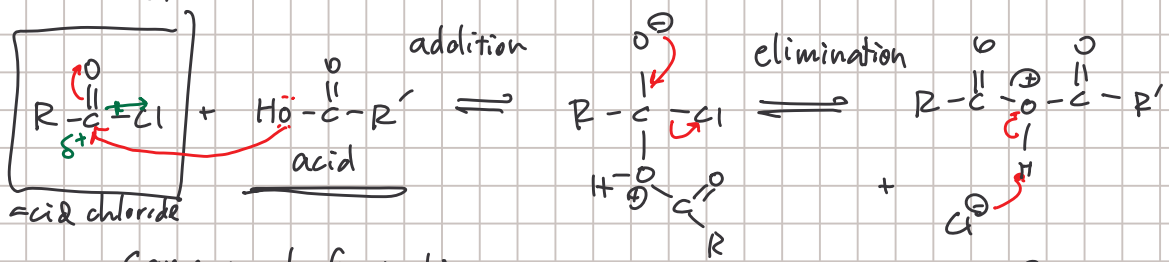
best leaving group

worst leaving group

Convert a deriv into a less reactive deriv



acid chloride (most reactive



=cid chloride

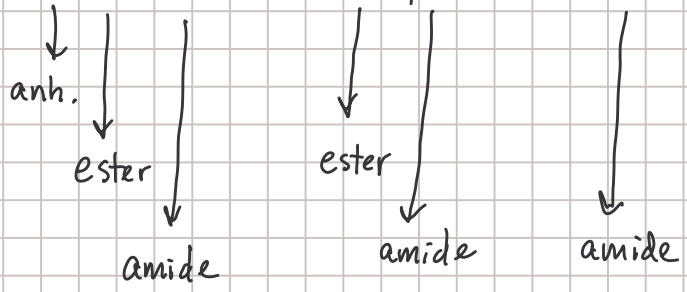
acid

Same mech for making

- ester (+ R'OH)
- amide (+ R'NH2)

anhydride

Acid chloride, anhydride, ester: sufficiently electrophilic to be attacked by neutral nucleophiles (in neutral rxn conditions)

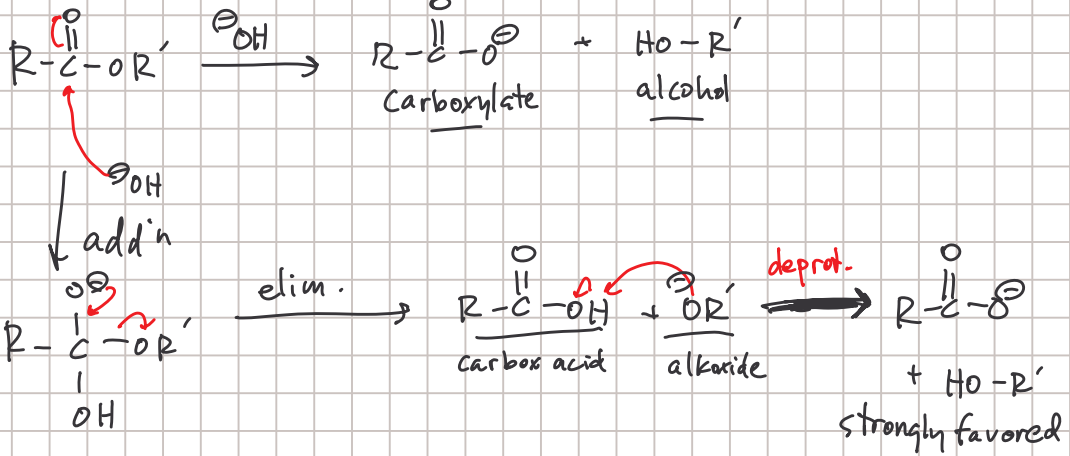


any lower-reactivity deriv must be converted to carboxylic acid first

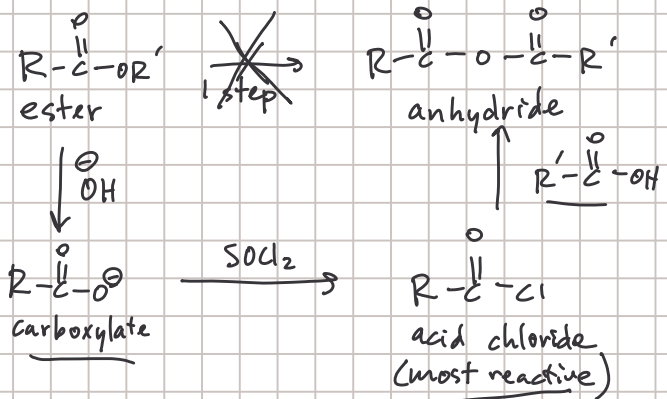
then converted to acid chloride by $SOCl_2$

Hydrolysis (addition of water)

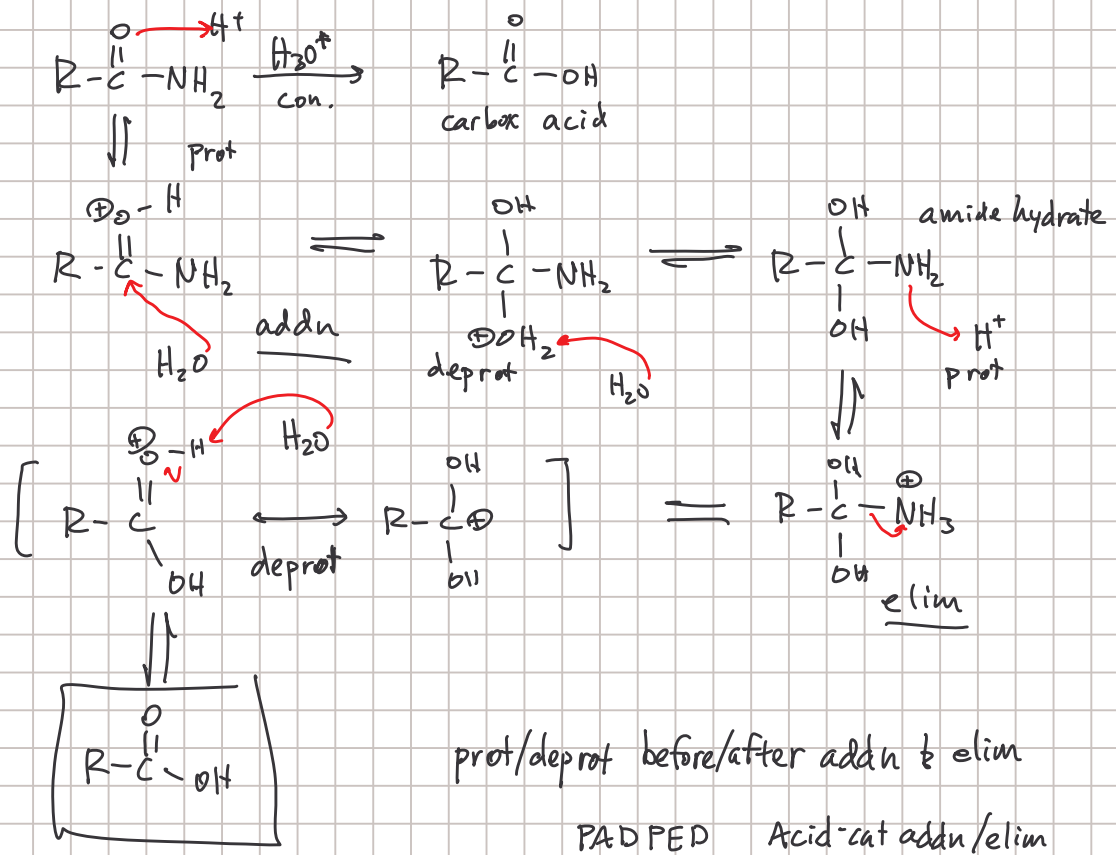
★ ester hydrolysis: base-catalyzed: saponification (soap-making)



(acid-cat ester hydrolysis is reverse of fischer esterification
equilibrium-controlled, not as useful)



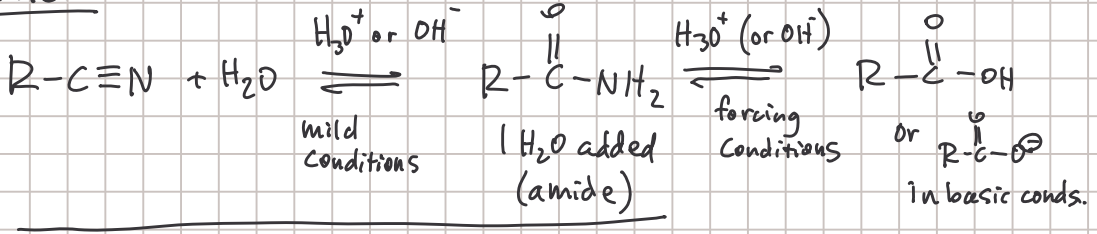
Amide hydrolysis strong acid conditions work best



prot/deprot before/after addn & elim

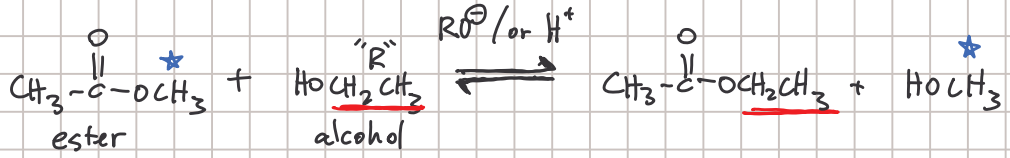
PADPED Acid-cat addn/elim

Nitriles

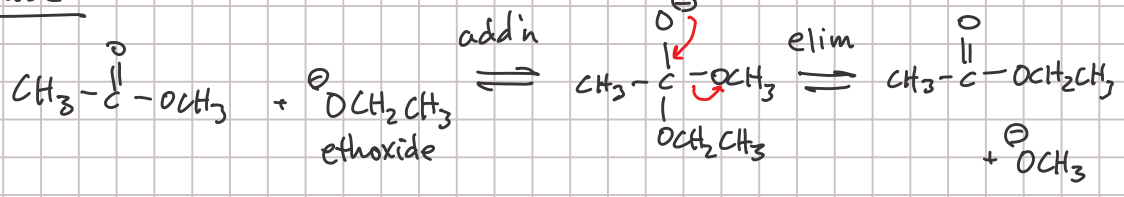


Transesterification (ester exchange)

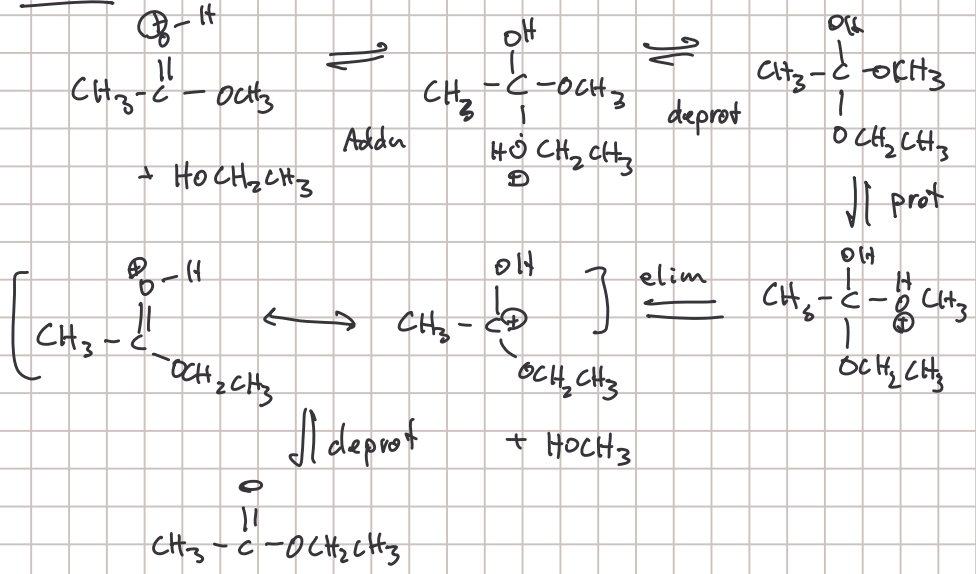
acid or base-cat - equilibrium-driven

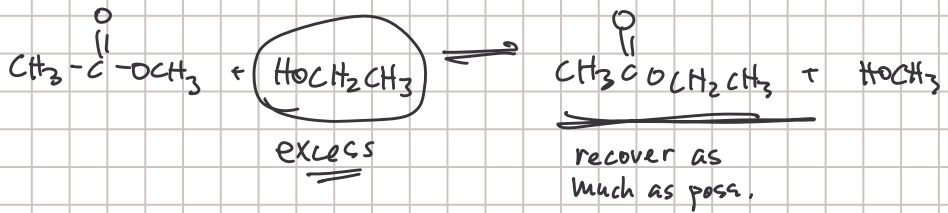


base



acid

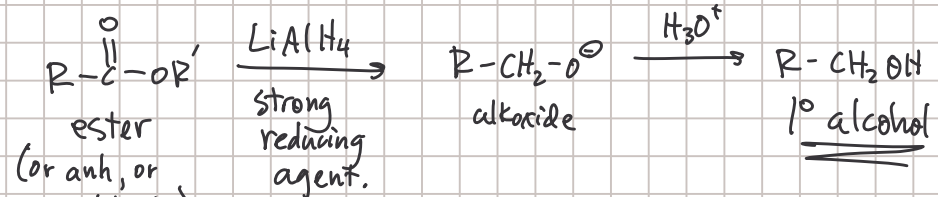


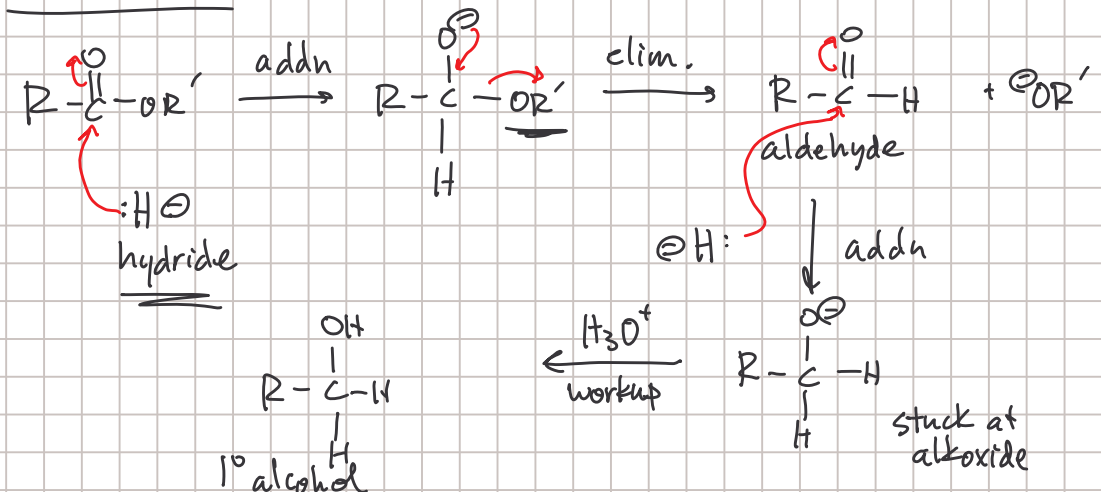


Reductions

- to alcohols

ester, anh, acid chloride (good leaving groups)





reduction to amines