

Ester Hydrolysis And Transesterification

from chapter(s) _____ in the recommended text

A. Introduction

B. Reactivity

less

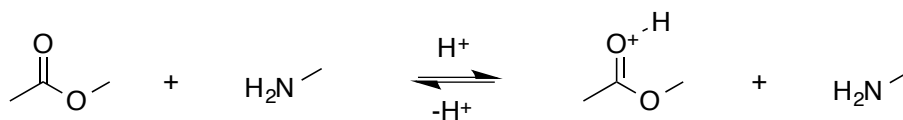
less

do not

more

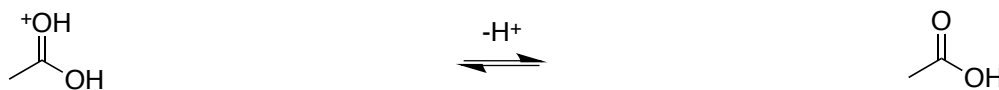
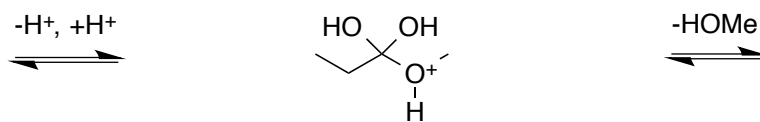
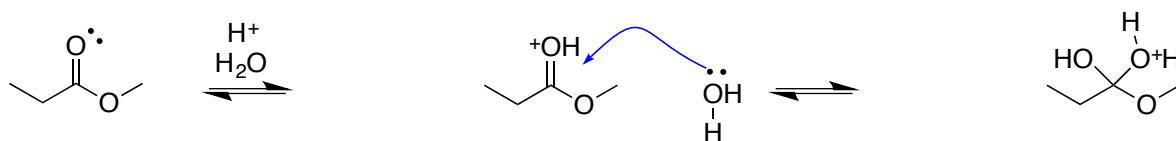
more

unlikely.

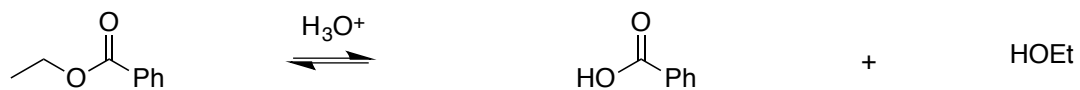
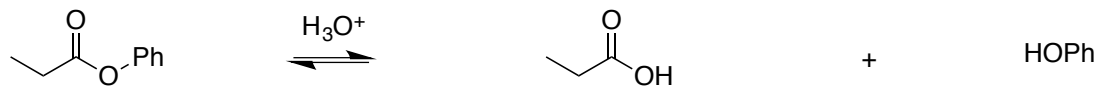
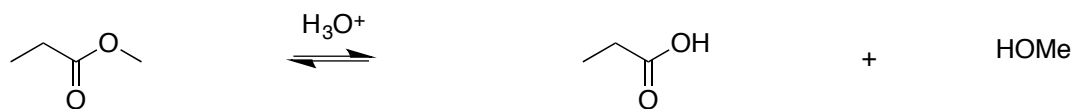


are not

C. Acid-mediated Hydrolysis

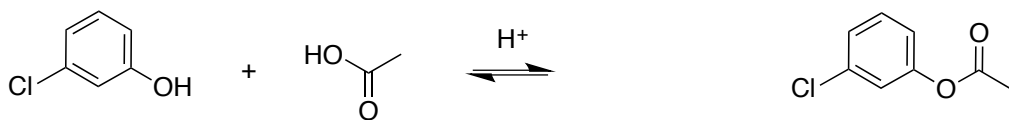
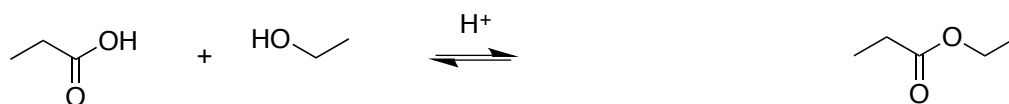


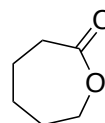
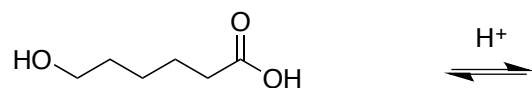
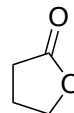
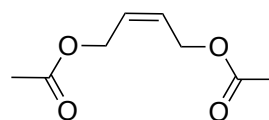
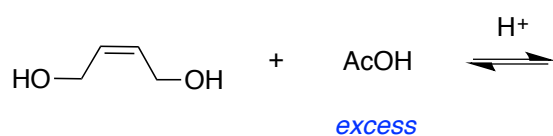
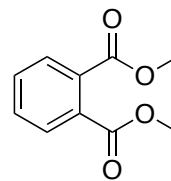
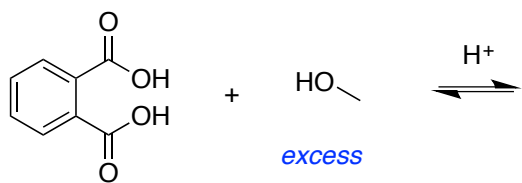
carboxylic acids
water.

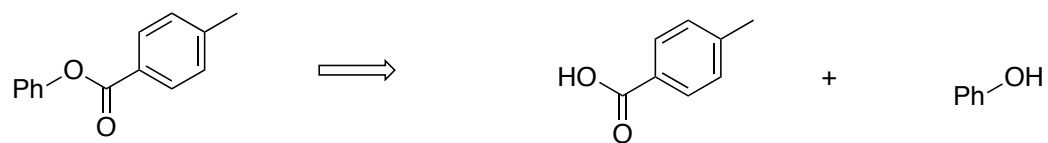
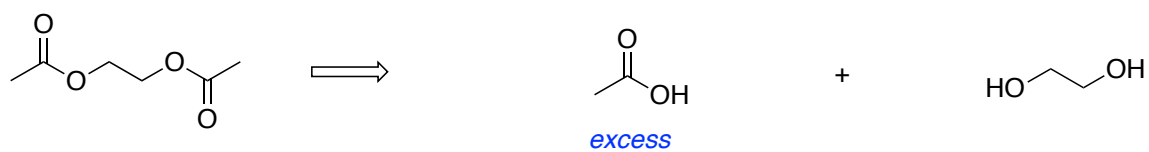
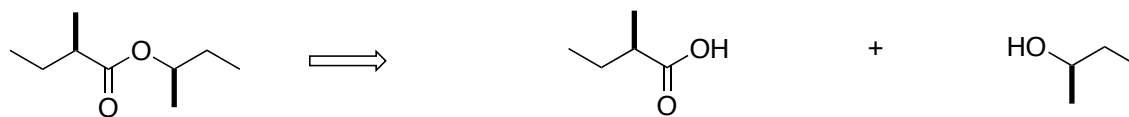


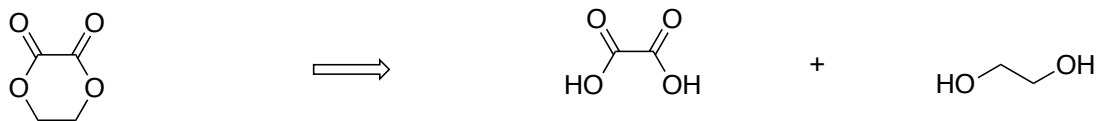


reversible,







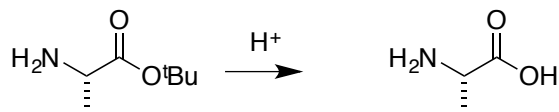
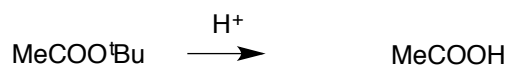
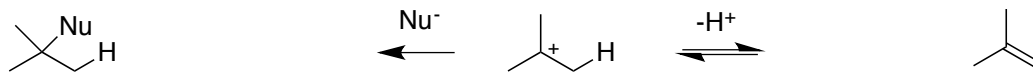


possibilities: forming a five-membered ring is more favorable than three- or four-membered ring due to ring strain of sp^3 carbons.

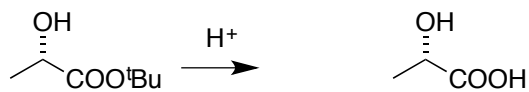
Hydrolysis Of *tert*-Butyl Esters Occurs Via A Different Mechanism

stable
without



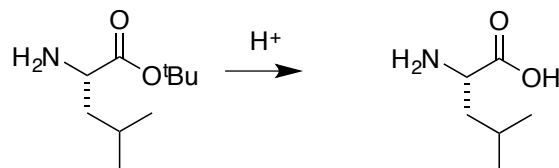
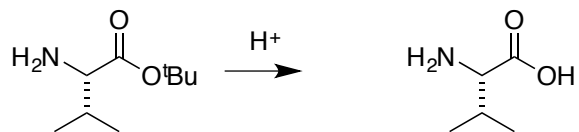


alanine



lactic acid

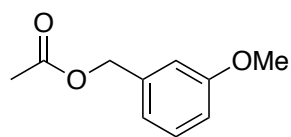
glycine



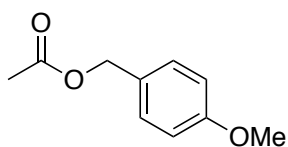
valine

leucine

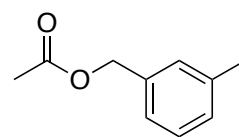
carbocation.



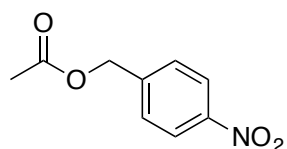
3



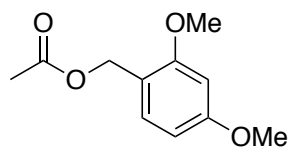
2



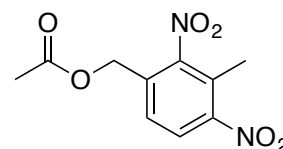
4



5



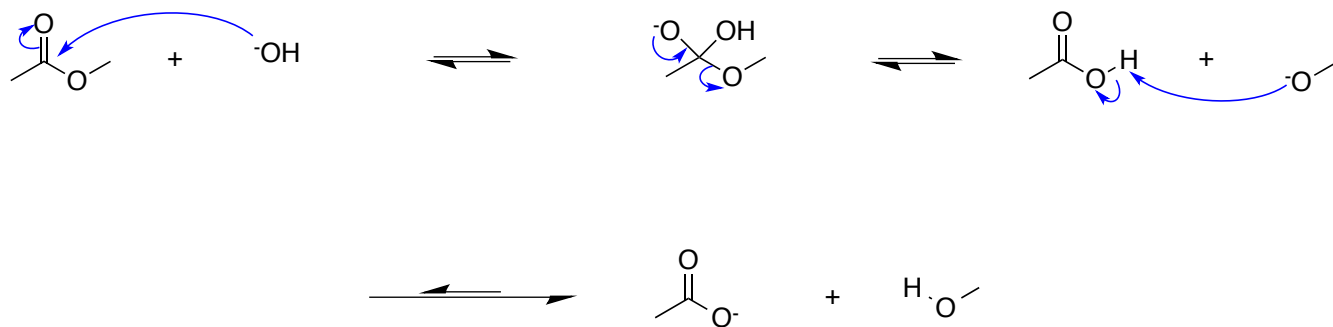
1



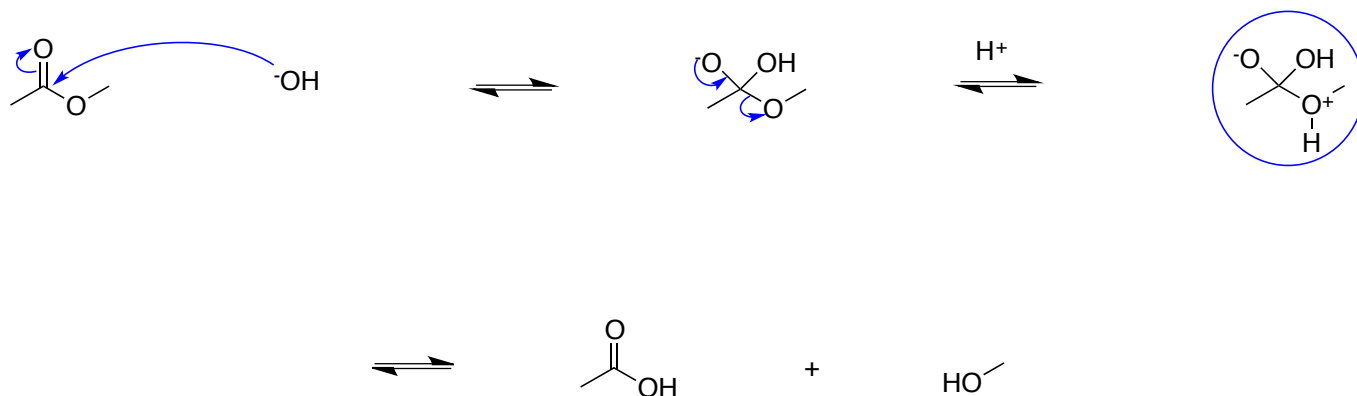
6

D. Base-mediated Hydrolysis

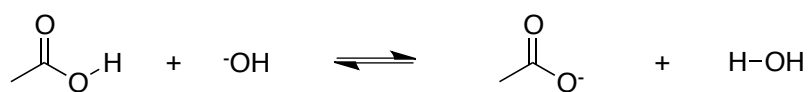
Mechanism



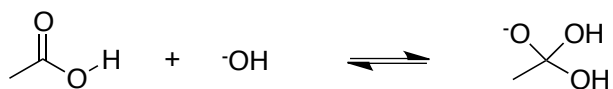
reversible
irreversible.



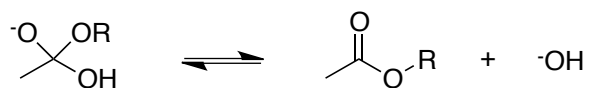
likely.

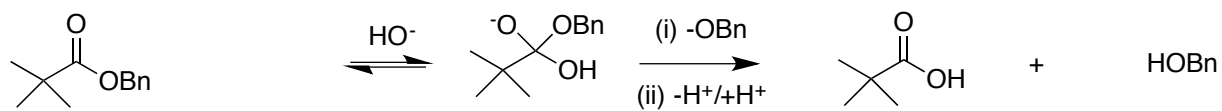
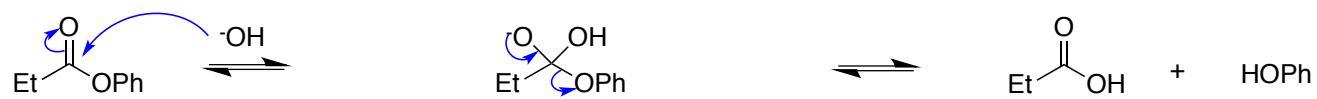


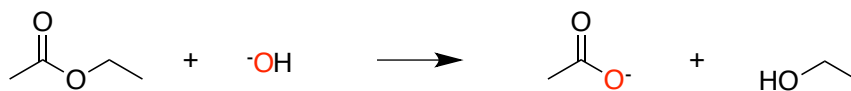
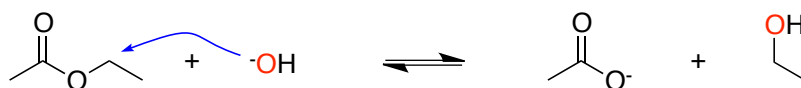
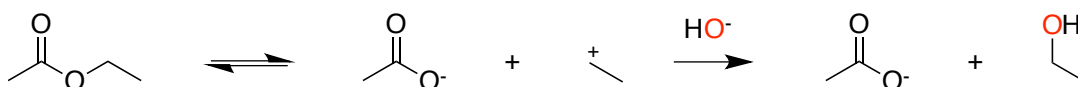
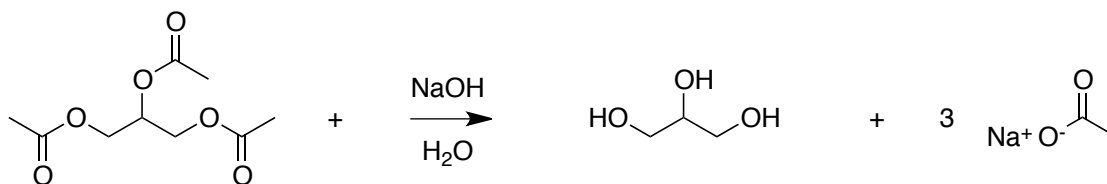
unlikely.

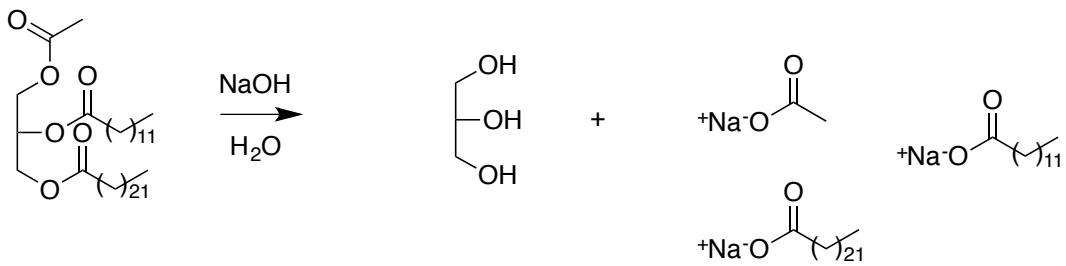
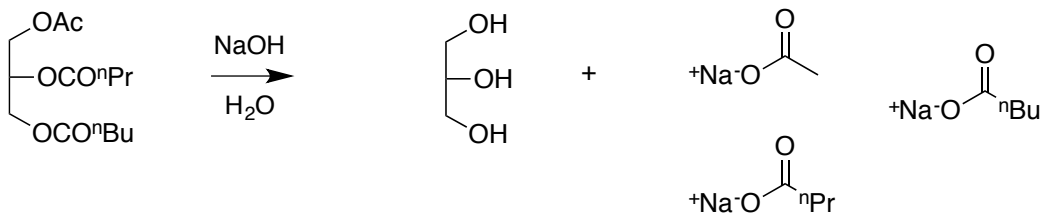


unlikely.

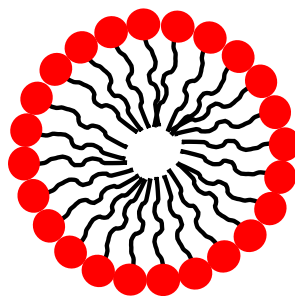




¹⁸O*would not**would not**can**soaps*



are: Particles that aggregate in the solution with the hydrophilic "head" regions in contact with surrounding solvent and the hydrophobic single-tail regions are in the micelle center.

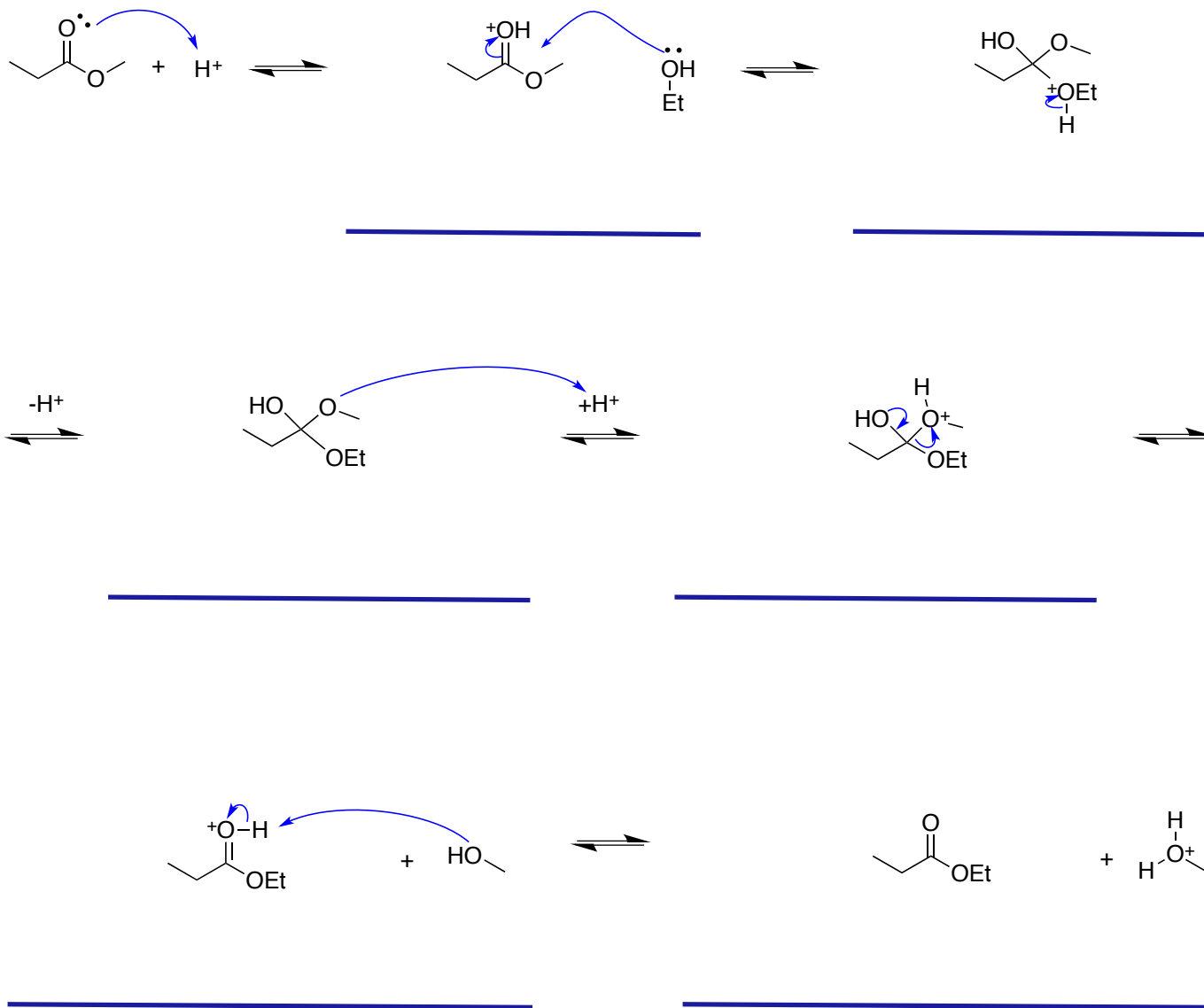


cartoon of a micelle

E. Transesterification Reactions

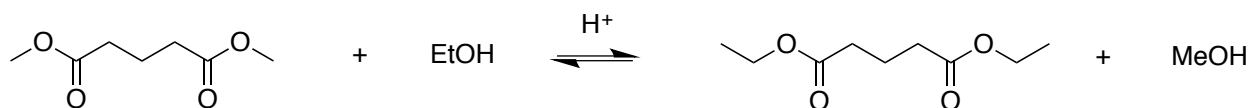
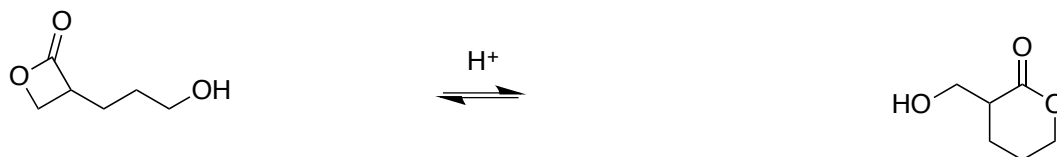
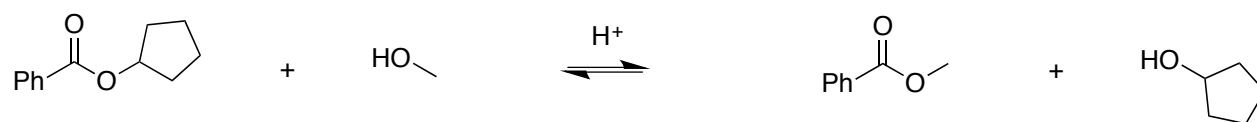
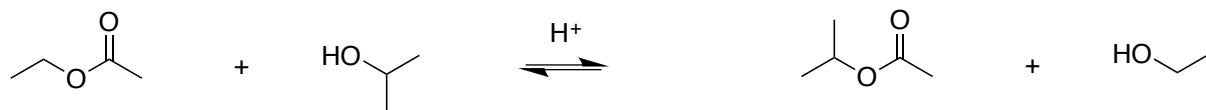
Mechanism Under Acidic Conditions

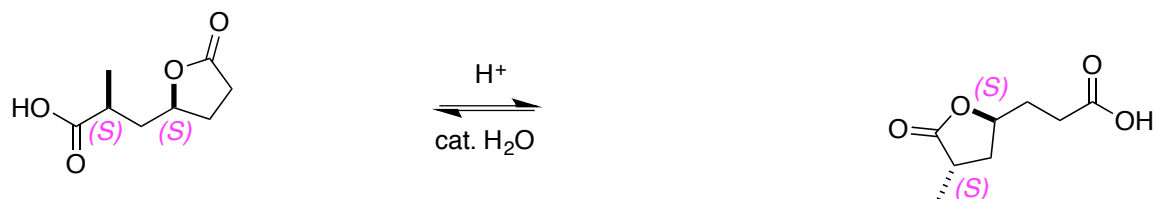
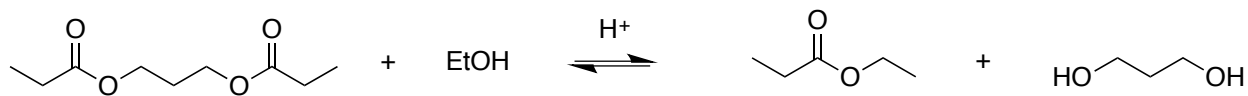
another ester.



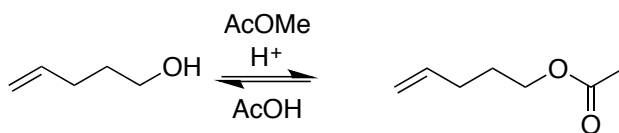
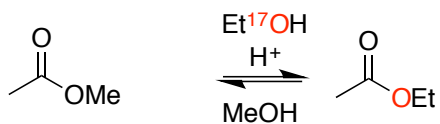
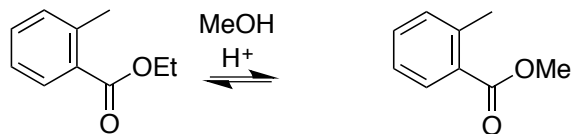
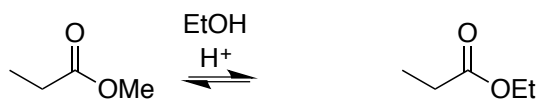
Examples Of Transesterifications

alkoxide



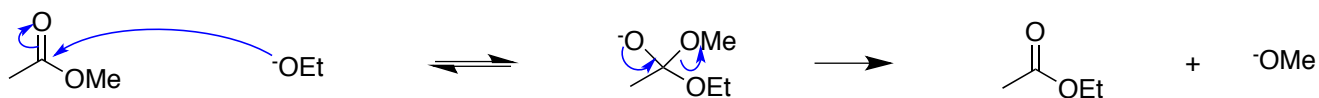
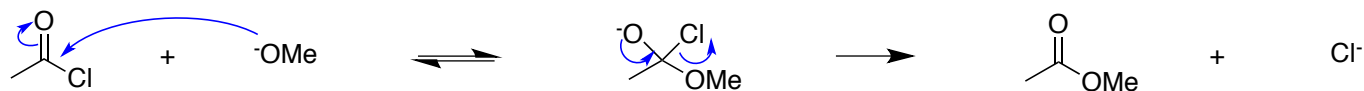


check by assigning (R)- or (S)-configurations



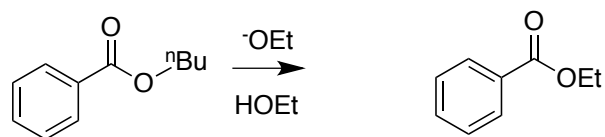
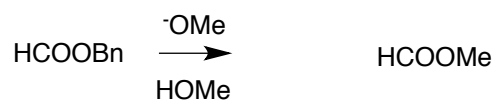
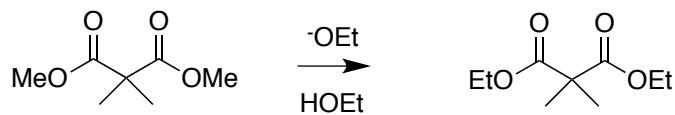
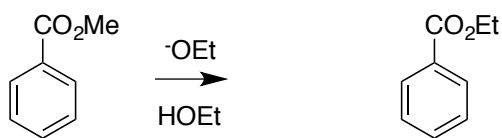
Mechanism Under Basic Conditions

alkoxides.



show arrows

Examples Of Base-Mediated Transesterifications



*more
sp³-
would not*

F. Ester Hydrolyses In Biochemistry In The Central Nervous System

esterases.

acetylcholinesterase.

*acetylcholine receptors
choline.*

*ACHE
paralysis.*

nerve gases.

In The Digestive System

long chain alkyl groups

triglyceride

catalysts.

neutral

nucleophiles

electrophiles.

metabolism of triglycerides

transesterifications.

lipases.