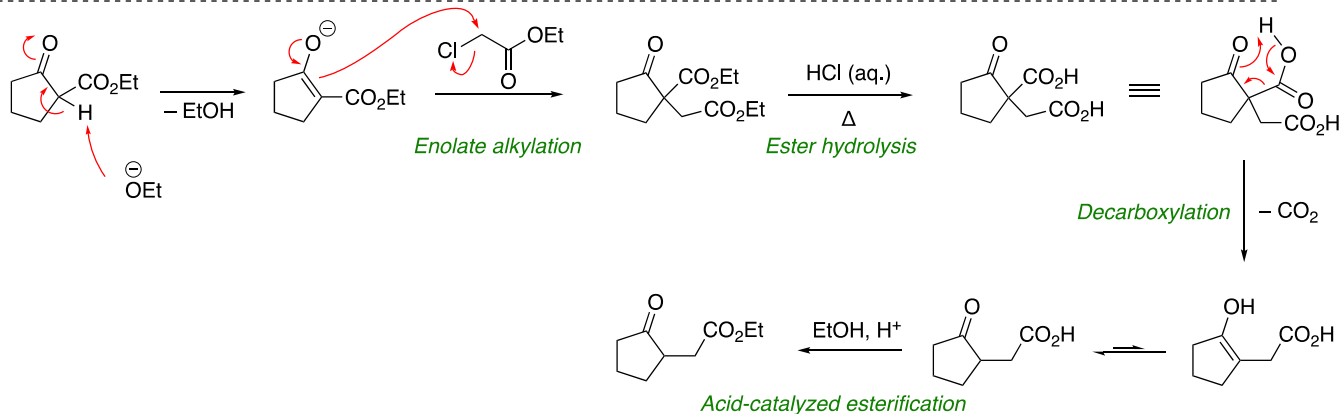
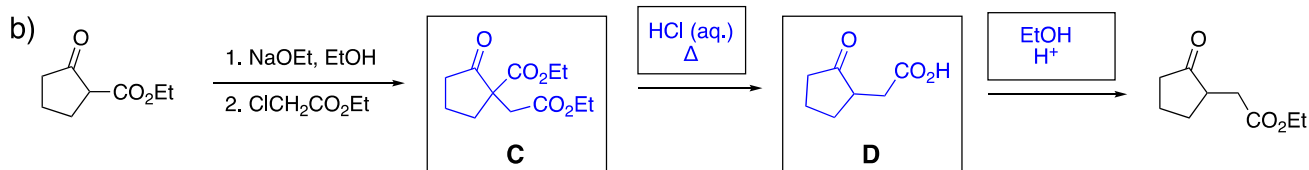
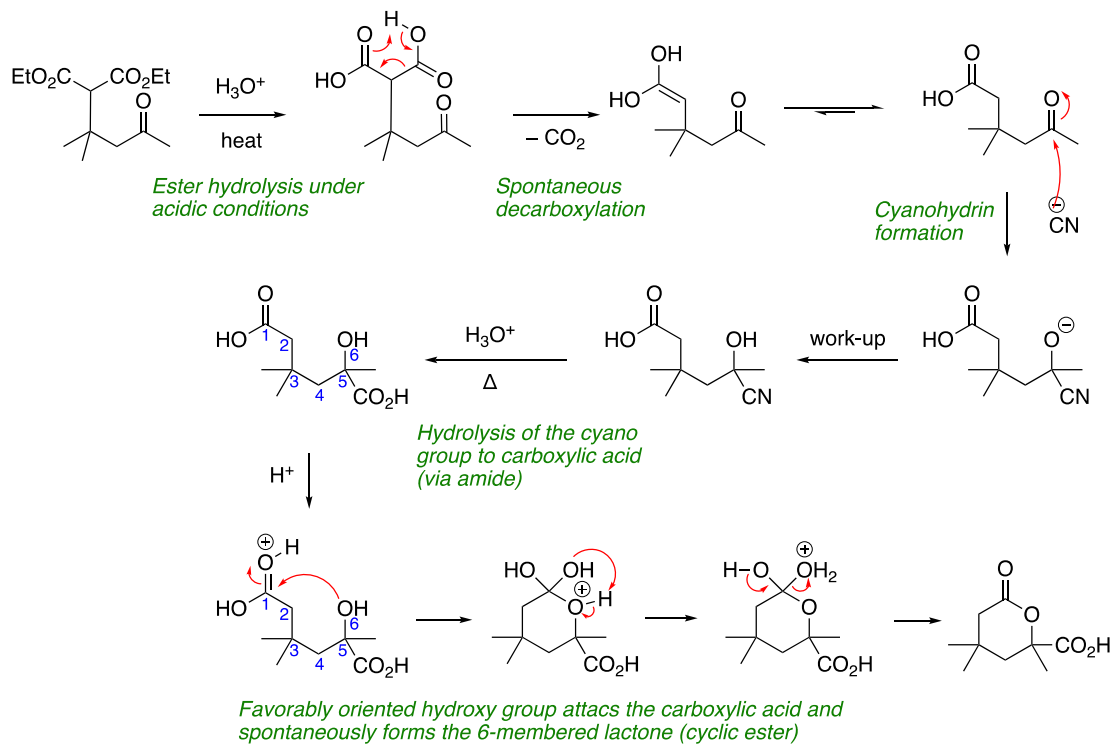
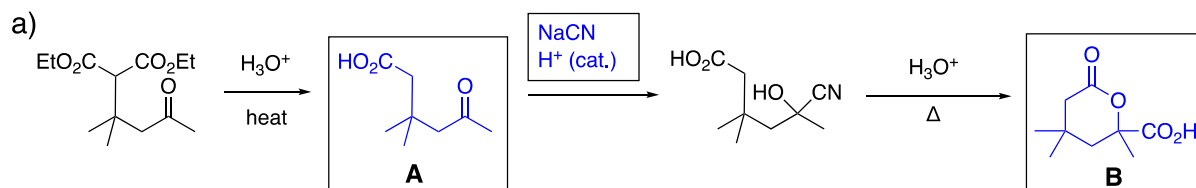
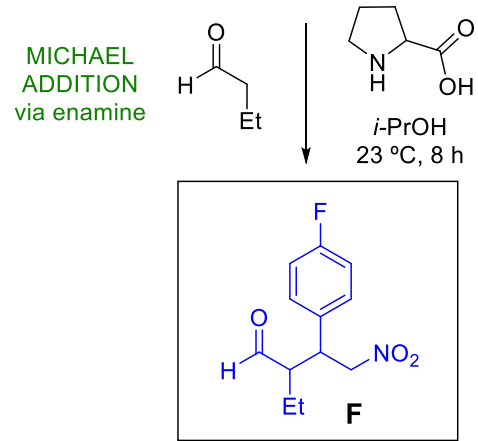
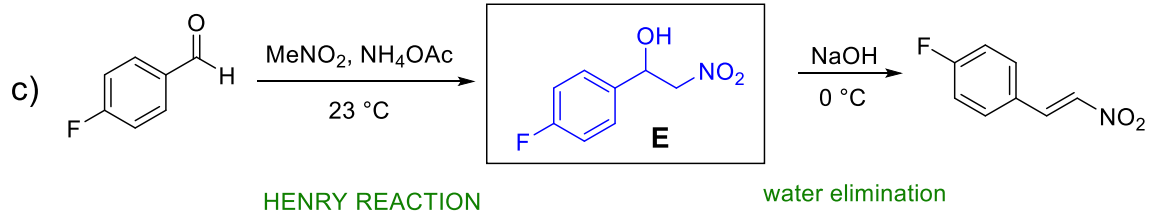


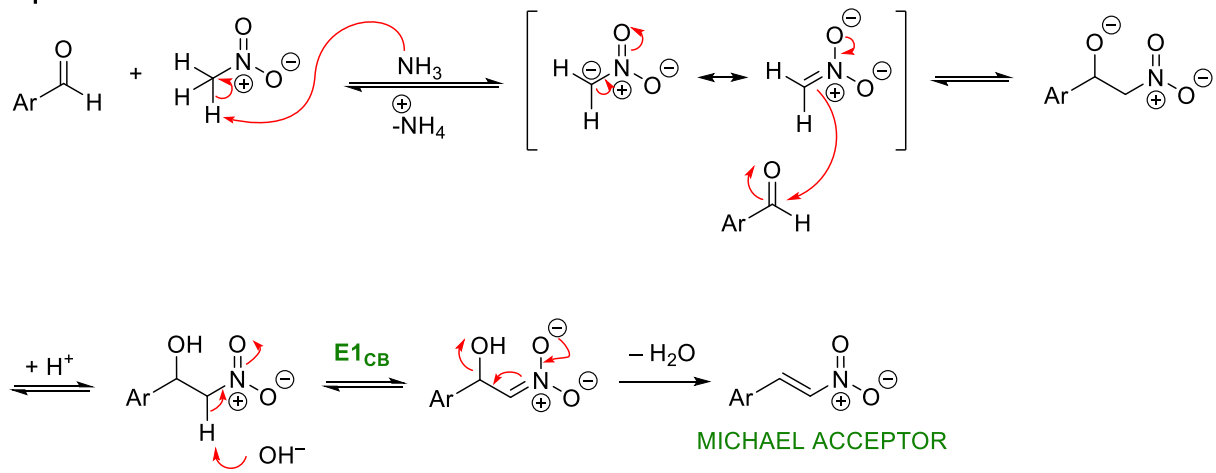
Reactivity at alpha-carbon III

1. Complete the following synthesis scheme with the missing products, reagents and relevant reaction conditions. Make sure to know the mechanism of the reactions.

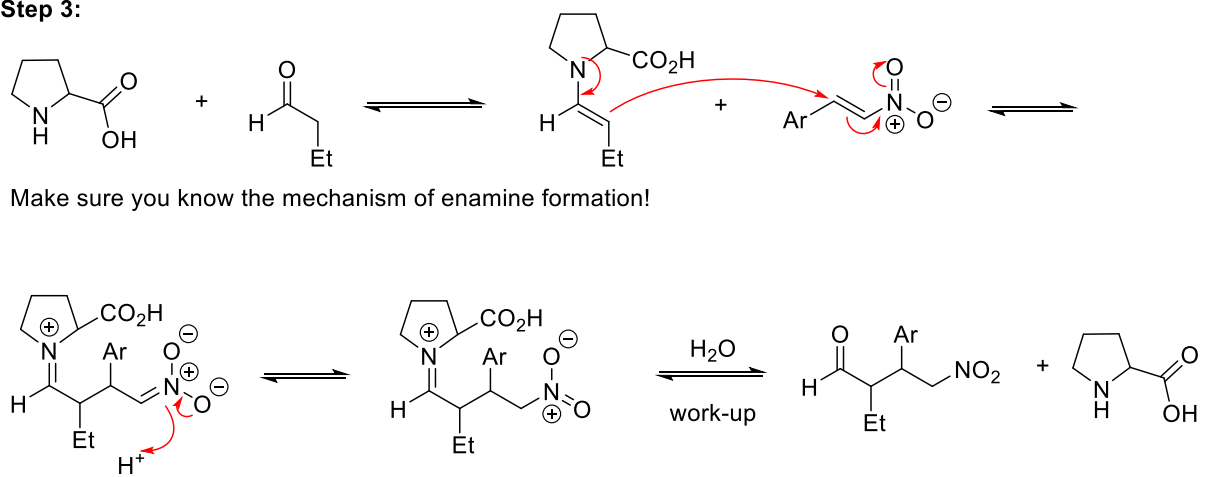




Step 1 and 2:



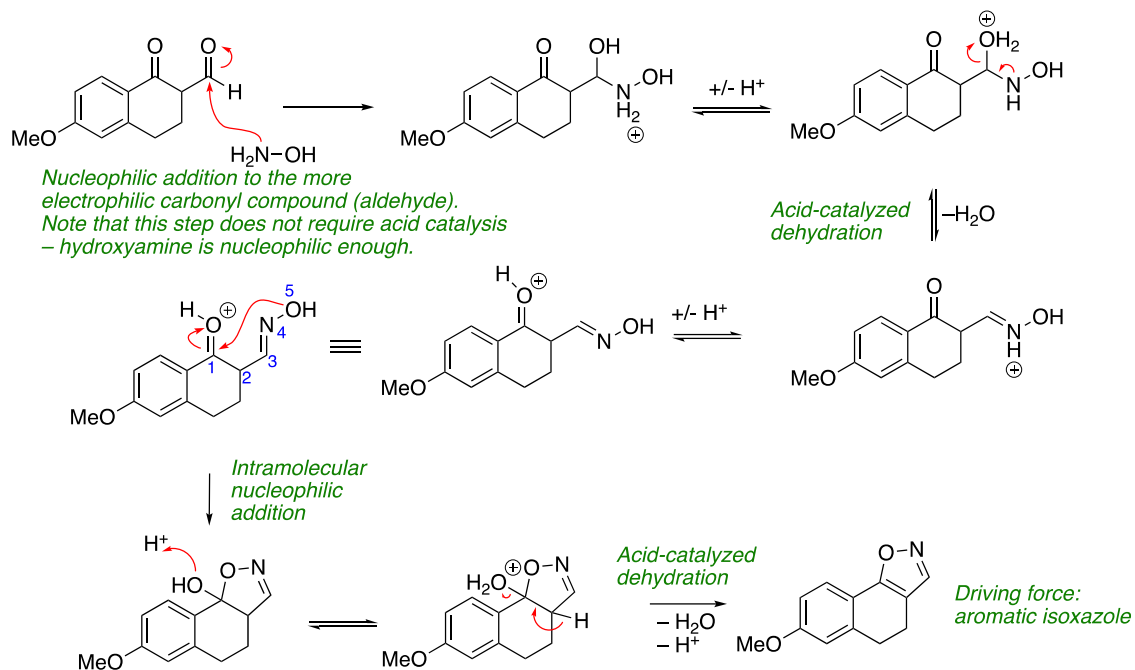
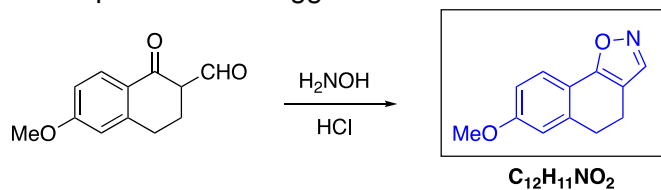
Step 3:

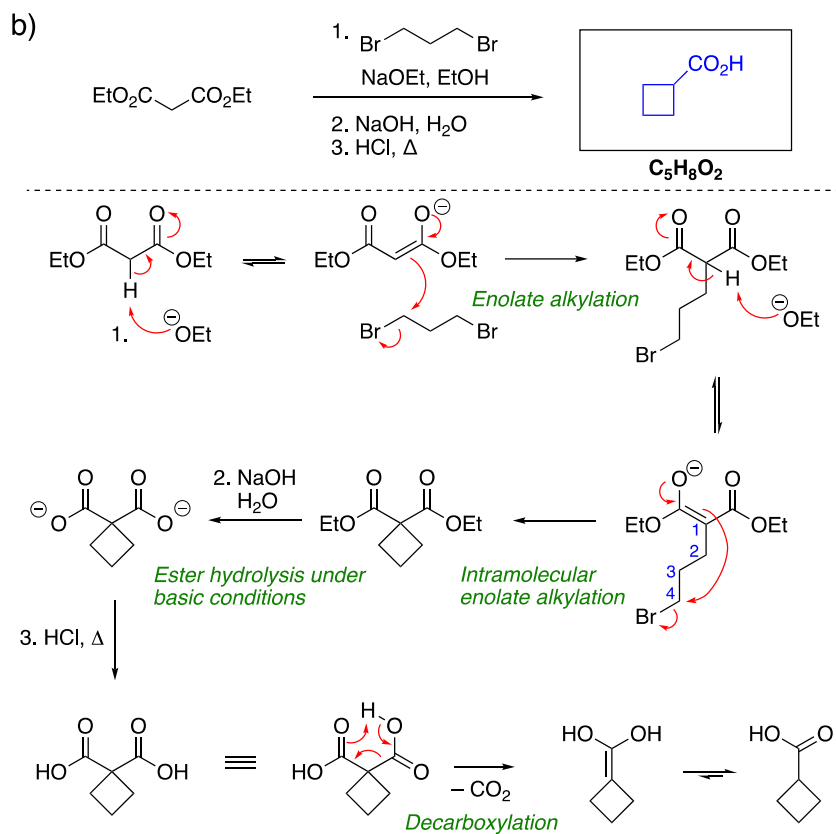


Make sure you know the mechanism of enamine formation!

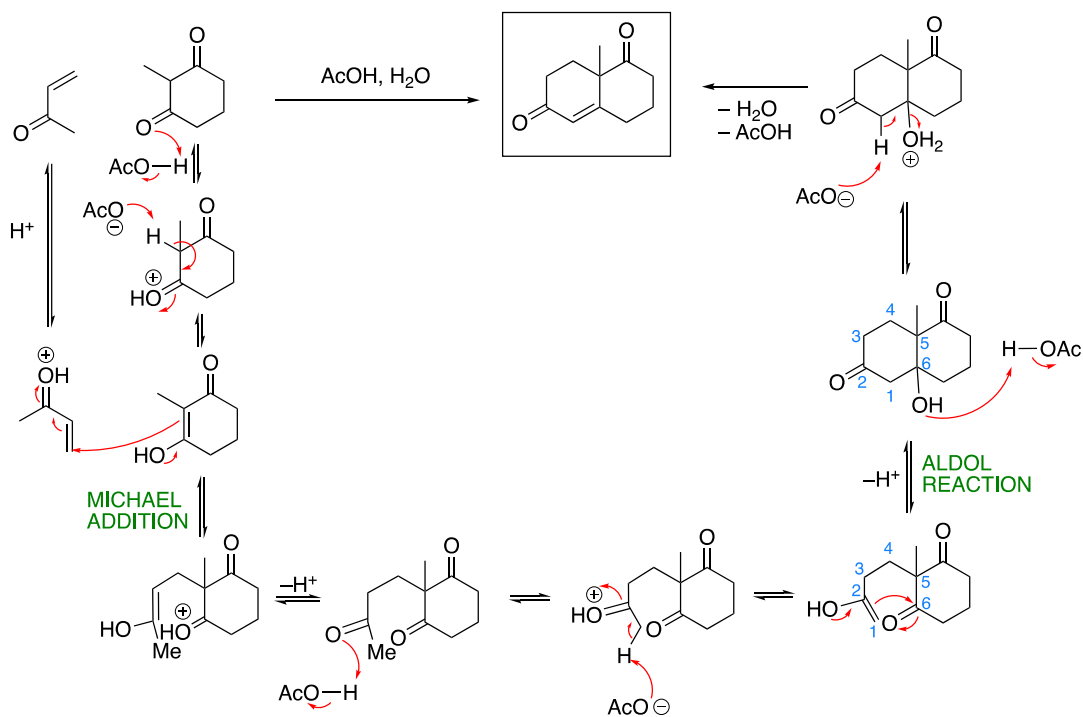
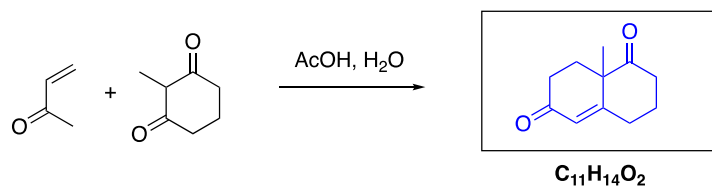
2. Provide the product and suggest the mechanism for the following reactions.

a)

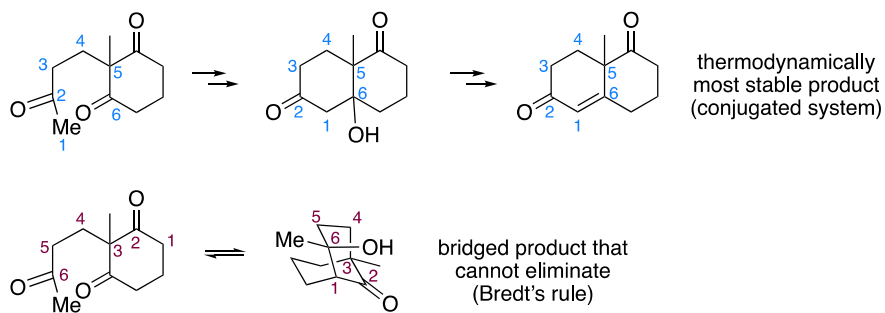




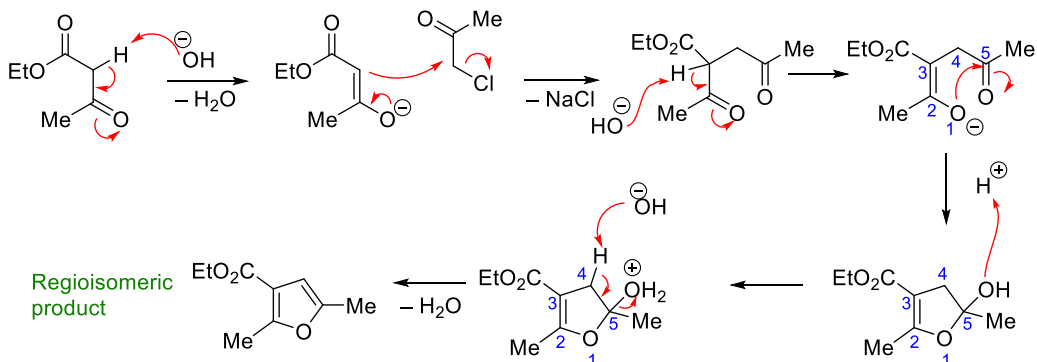
c)



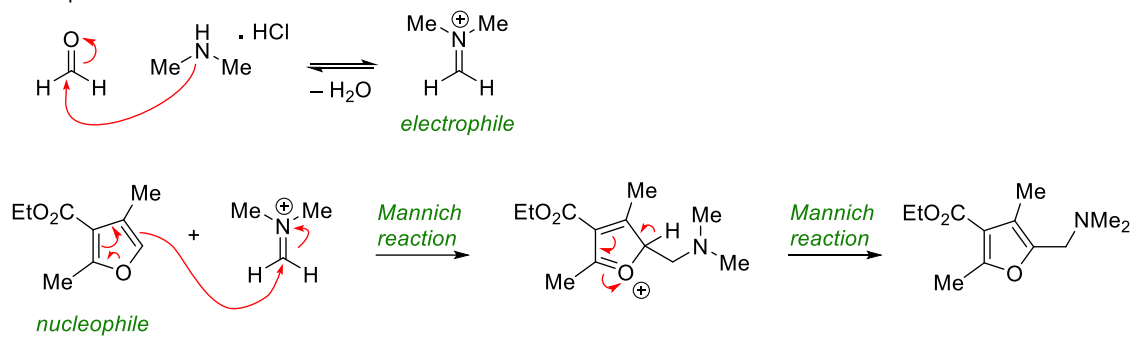
Note:



1st step: alternative



2nd step:

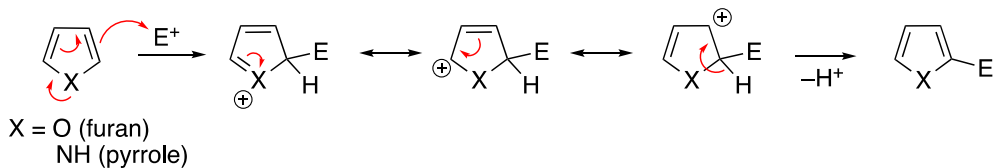


- α -Substitution is favoured over β -substitution – more resonance forms for intermediate, so the charge is less localized
- Some β -substitution is usually observed (depends on the other substituents)

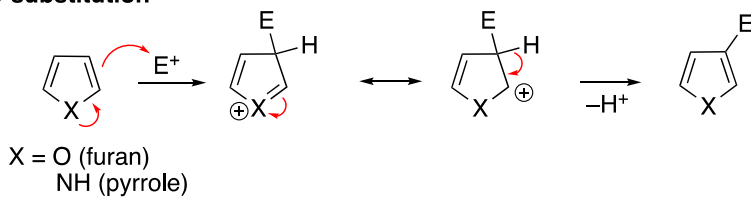
Regioselectivity:

See more in Clayden, 2nd Edition, Chapter 29, p. 733

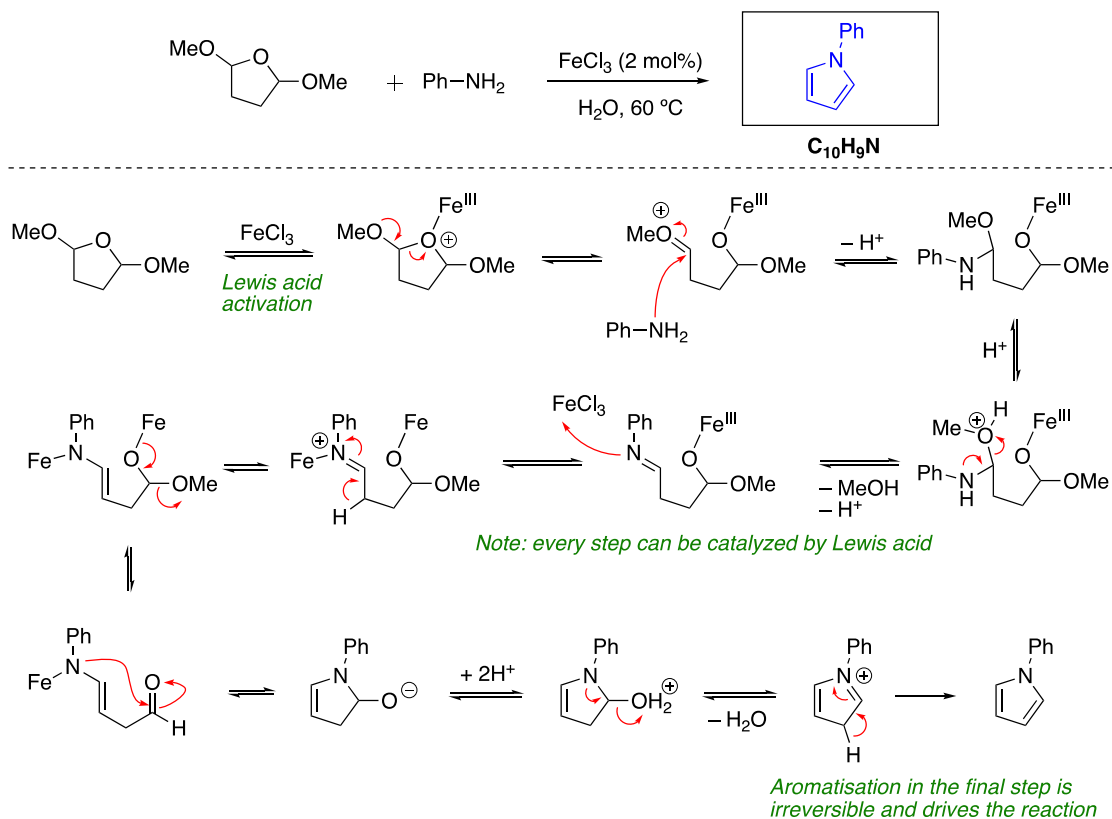
α -substitution



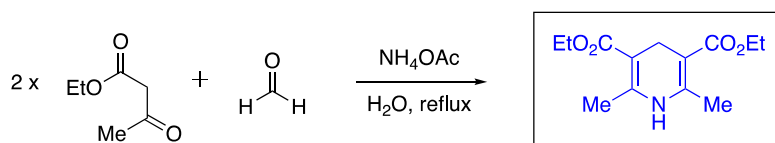
β -substitution



5. Provide the product and a mechanism accounting for its formation. (Hint: FeCl_3 acts as a Lewis Acid)

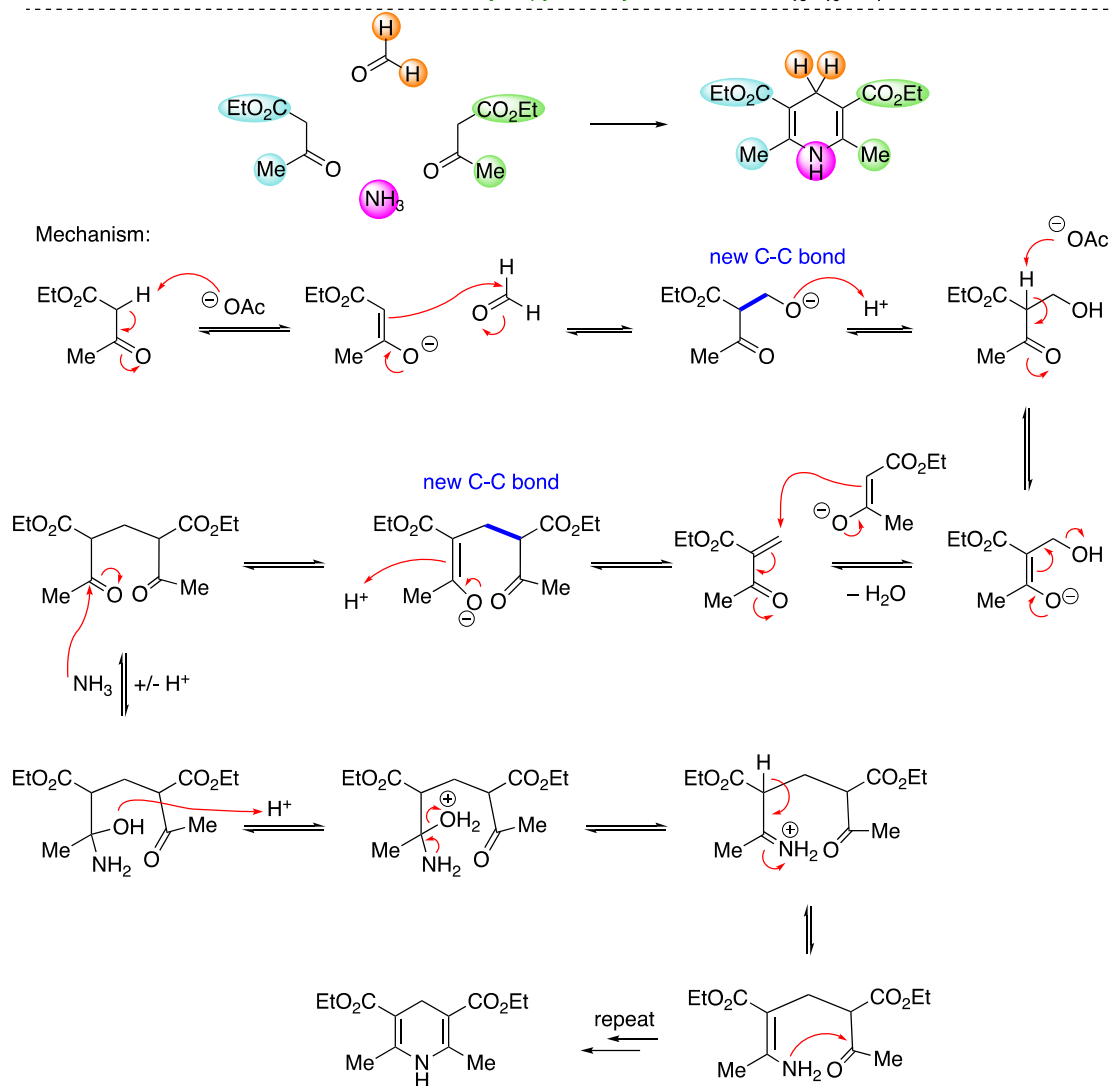


6. Dihydropyridine can be synthesised using a multi-component organic reaction between an aldehyde such as formaldehyde, 2 equivalents of a β -keto ester (e.g. ethyl acetoacetate) and a nitrogen donor such as ammonium acetate. Provide the product and include the mechanism.



Hantzsch dihydropyridine synthesis

$C_{13}H_{19}NO_4$



7. Complete the following synthesis scheme with the missing intermediates / products, reagents and relevant reaction conditions. Mechanisms are not required.

