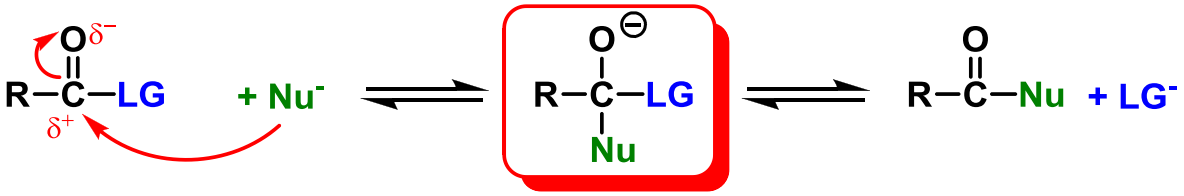
Overheads: - Outline

Recap Monday: Reactions of Carbonyl Compounds With LG's

i) LG much weaker base than Nu^- :



** tetrahedral intermediate

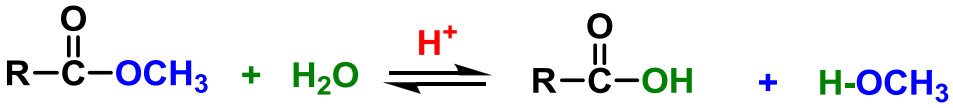
ii) LG similar, or even stronger, base than Nu^- :

Need H^+ catalysis (6 easy steps!)

+ H^+ to C=O - to help Nu- add
add Nu-
- H^+ (from neutral Nu-)
+ H^+ to LG - help LG leave
LG leaves
- H^+ (to get neutral C=O product)

H^+ is catalyst, so every time it is added, it must be removed

Seen: - ester hydrolysis

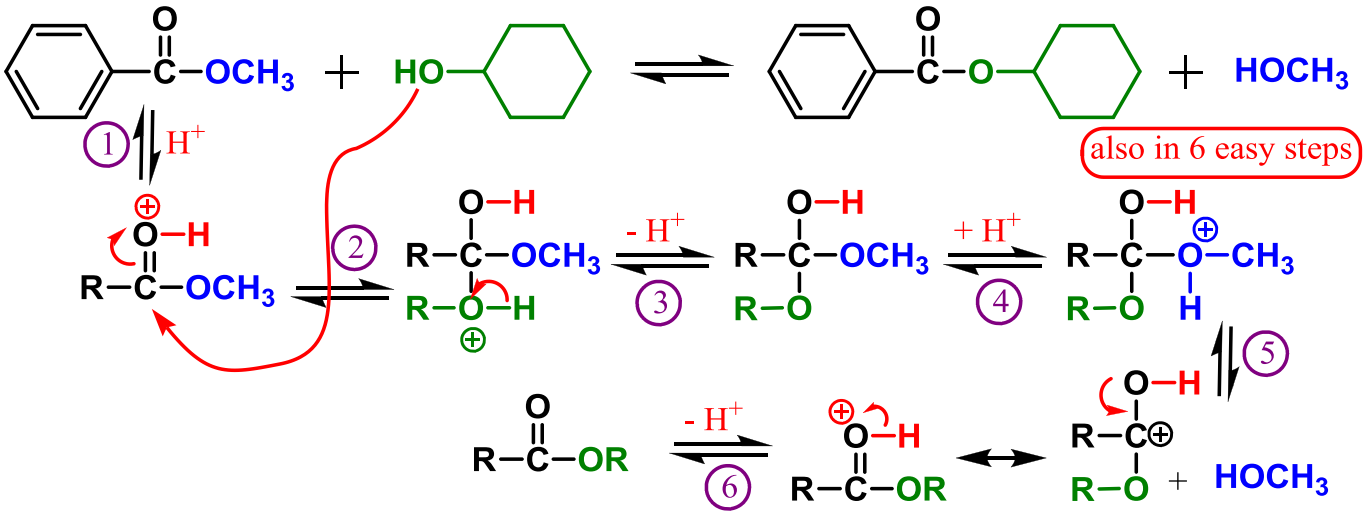


Position of Equilibrium: - controlled by LeChatellier

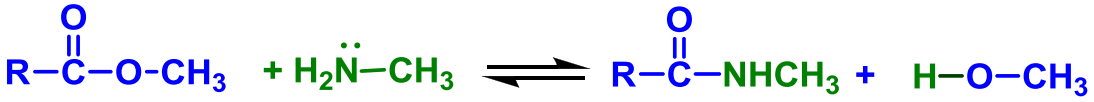
- use H_2O as solvent ⇨ products major
- use CH_3OH as solvent ⇨ reactants major

Lab 8: Synthesis of Wintergreen: same 6 easy steps in reverse!

Another example: Transesterification



Reaction with amines:



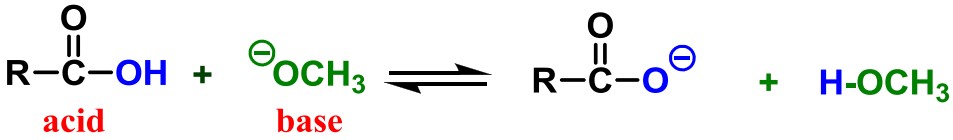
- Reaction much slower than with acyl halide ∴ may need heat

BUT: $HOCH_3$ is NOT acidic like HCl or RCO_2H, so only need one equivalent of H_2NR ⇨ BIG advantage

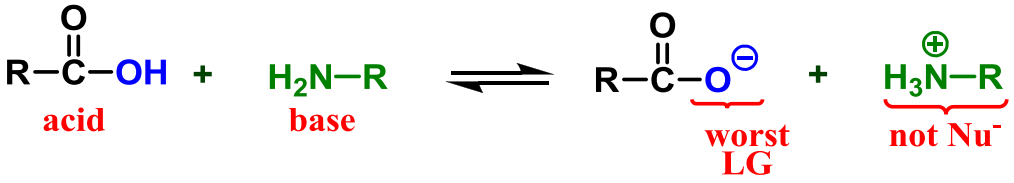
4) Reactions of Carboxylic Acids:

A) With ROH: Just saw: ⇨ reverse of ester hydrolysis in six easy steps

Base Promoted? NO!



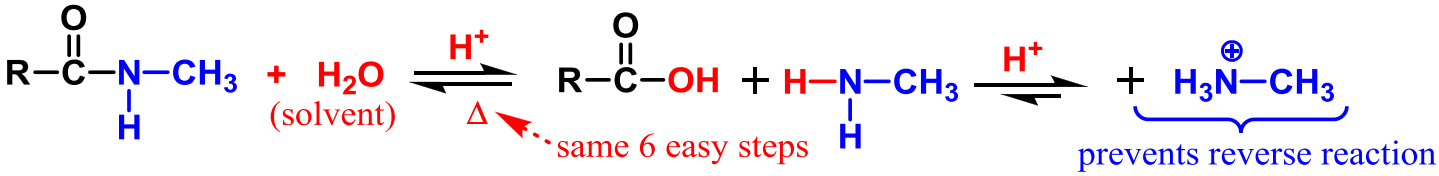
B) With Amines: similar problem



⇨ because RCO_2H is acid, can't do acyl substitution with base.

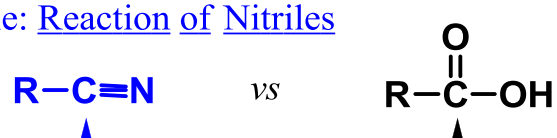
5) Reactions of Amides: - least reactive!

⇨ can only be hydrolyzed if heated with H^+ or OH^- and excess H_2O



One more example: Reaction of Nitriles

recall:



vs

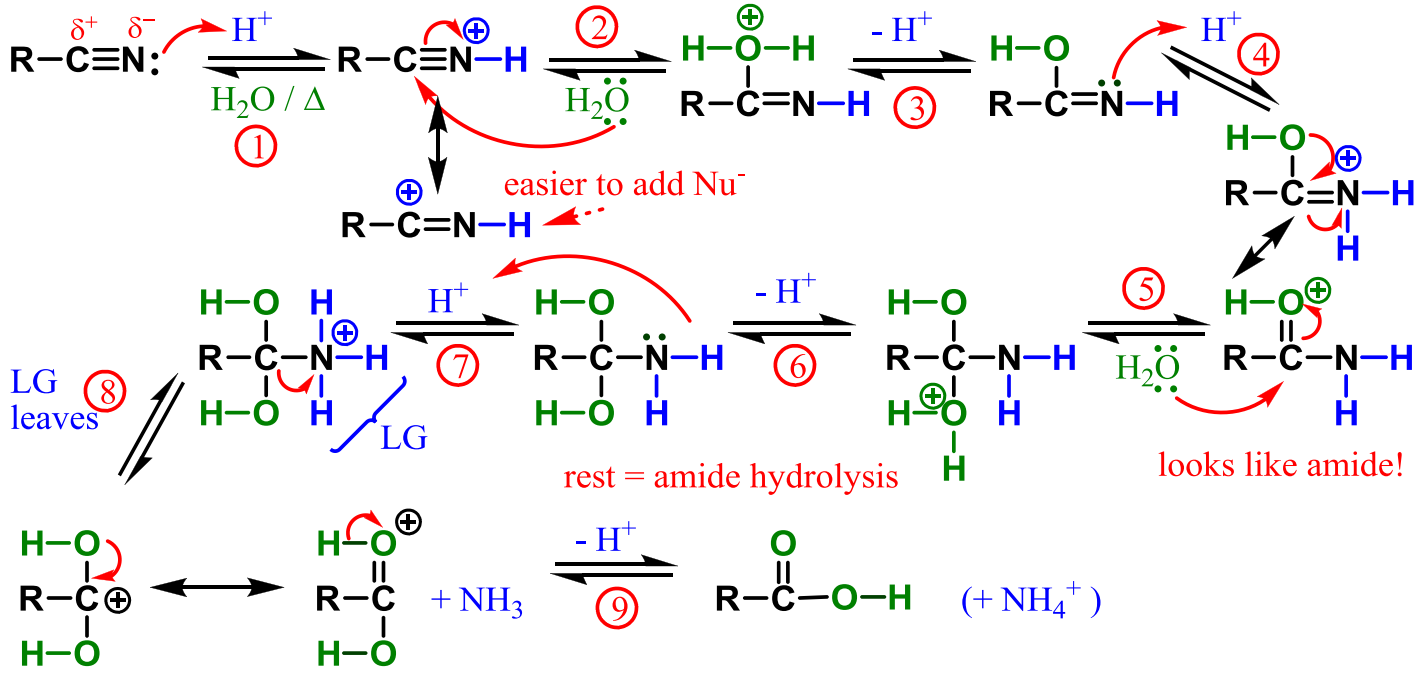
3 x C-N

3 x C-O

= nitrile hydrolysis

$H^+ / H_2O / \Delta$

Similar (but longer) mechanism (need to change 3 bonds!):



⟹ 9 easy steps!! (+ H_2O twice / -NH_3 / + H^+ , - H^+ , + H^+ , - H^+ , + H^+ , - H^+)