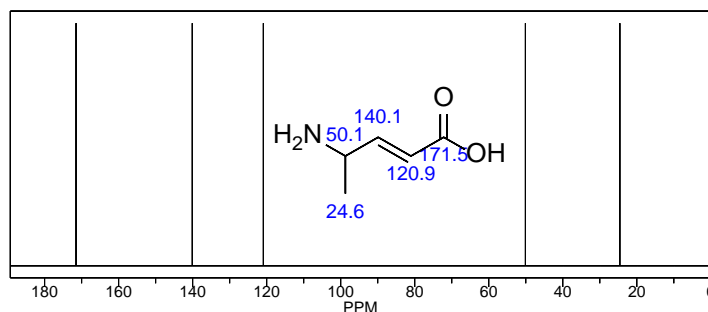
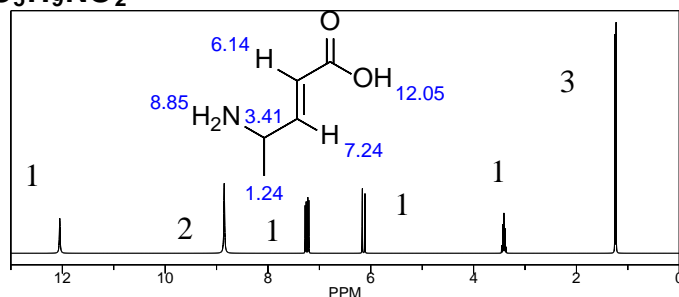
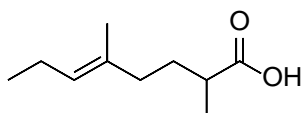
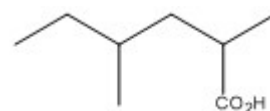


$C_5H_9NO_2$ 

## Nomenclature

*E*-2,5-dimethyloct-5-enoic acid

2,4-dimethylhexanoic acid

## Reactivity of Acid Derivatives

## Reactivity

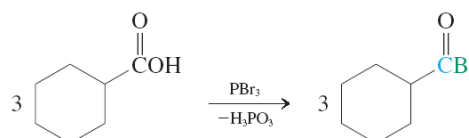
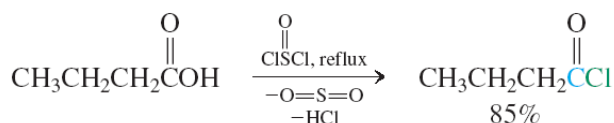
## Derivative

## Leaving Group

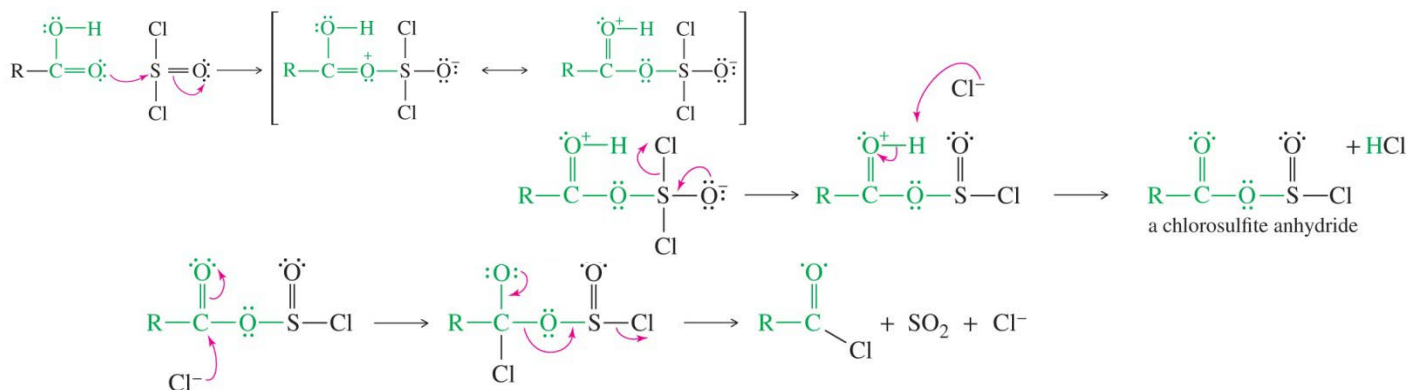
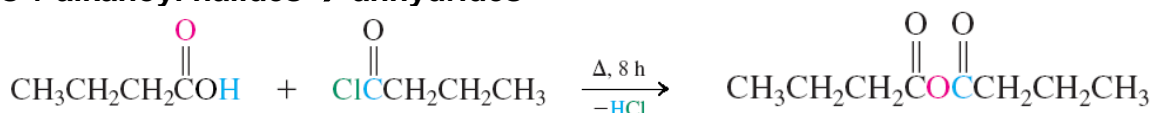
## Basicity

Reactivity	Derivative	Leaving group	Basicity
more reactive	acid chloride $R-C(=O)Cl$	$Cl^-$	less basic
	anhydride $R-C(=O)O-C(=O)R$	$-O-C(=O)R$	
	ester $R-C(=O)OR'$	$-OR'$	
	amide $R-C(=O)NH_2$	$-NH_2$	
less reactive	carboxylate $R-C(=O)O^-$	$-$	more basic

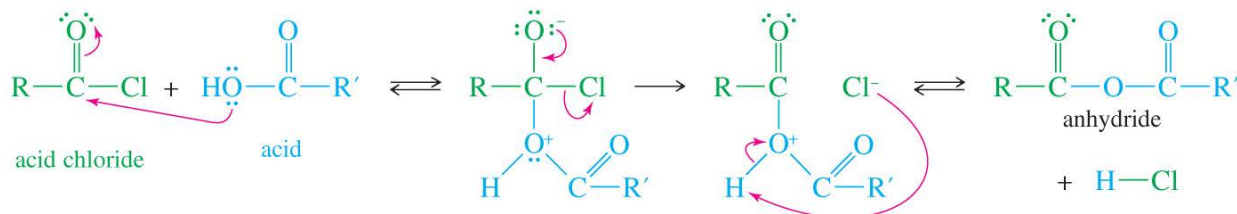
## Carboxylic Acid Derivatives

 $SOCl_2/PBr_3 \rightarrow$  Acyl halides

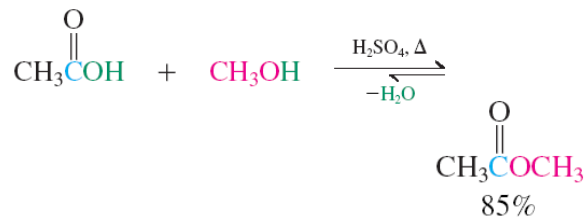
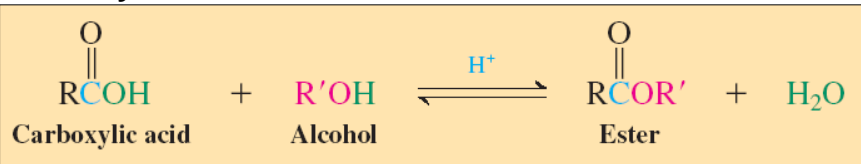
## Mechanism

Acids + alkanoyl halides  $\rightarrow$  anhydrides

## Mechanism



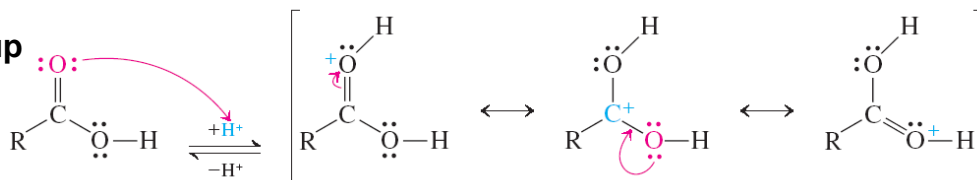
## Carboxylic Acids + alcohols → esters



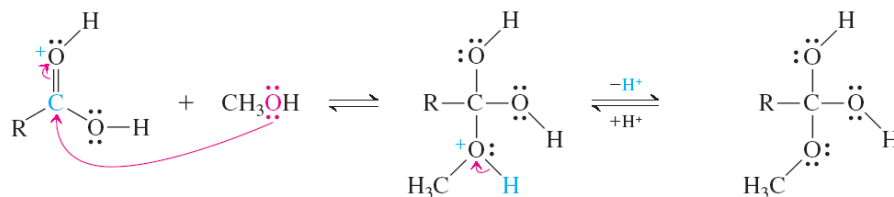
Esterifications most often use the alcohol as solvent.

## Acid-catalyzed addition-elimination

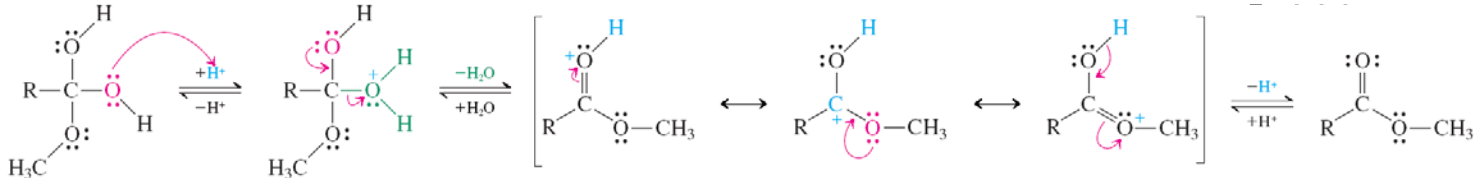
### Step 1. Protonation of carboxy group



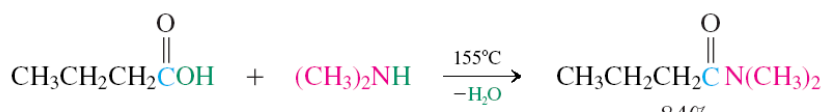
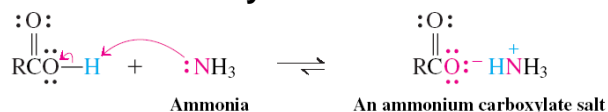
### Step 2. Attack by methanol



### Step 3. Elimination of Water

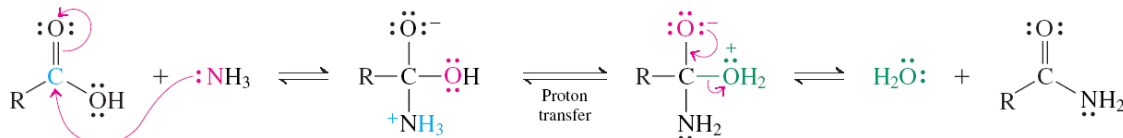


## Amines + carboxylic acids → amides



Reaction is reversible but with heat, creates amide.

## Mechanism



## Predict Products

