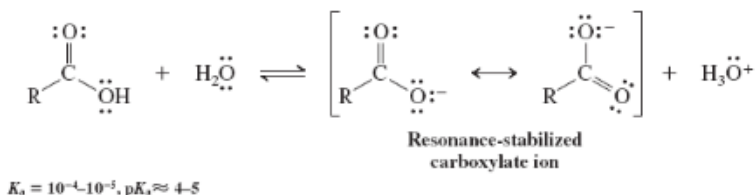
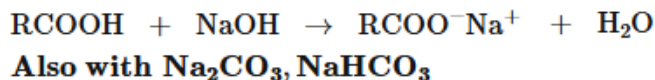


New Reactions

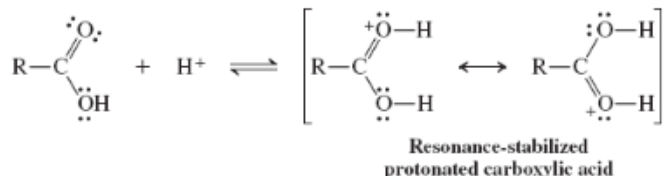
1. Acidity of Carboxylic Acids ([Section 19-4](#))



Salt formation

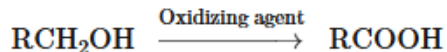


2. Basicity of Carboxylic Acids ([Section 19-4](#))

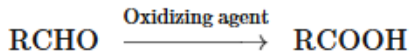


Preparation of Carboxylic Acids

3. Oxidation of Primary Alcohols and Aldehydes ([Section 19-6](#))

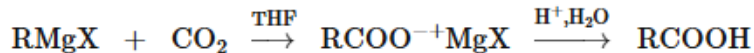


Oxidizing agents: aqueous CrO_3 , KMnO_4 , HNO_3

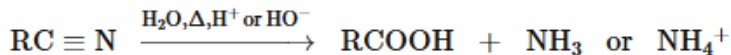


Oxidizing agents: aqueous CrO_3 , KMnO_4 , Ag^+ , H_2O_2 , HNO_3

4. Carbonation of Organometallic Reagents ([Section 19-6](#))



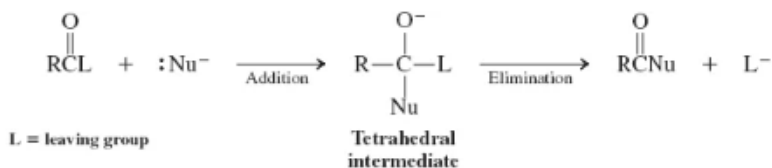
5. Hydrolysis of Nitriles ([Section 19-6](#))



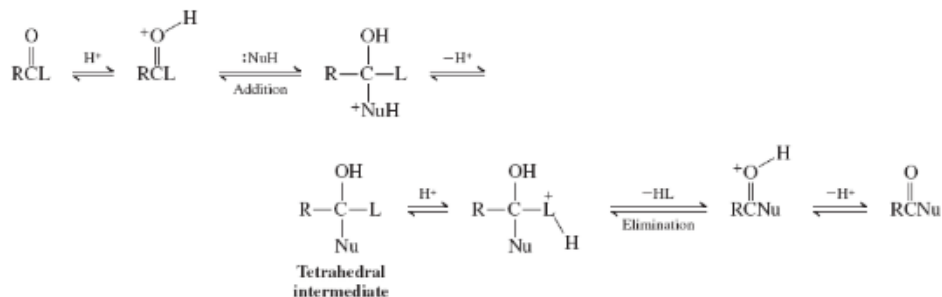
Reactions of Carboxylic Acids

6. Nucleophilic Attack at the Carbonyl Group ([Section 19-7](#))

Base-catalyzed addition–elimination

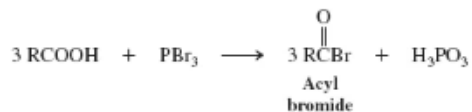
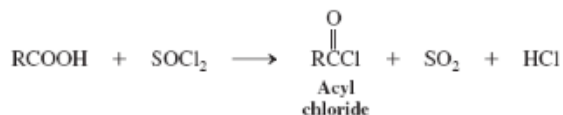


Acid-catalyzed addition–elimination

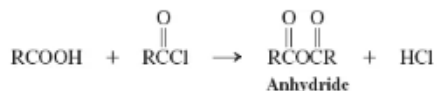


Derivatives of Carboxylic Acids

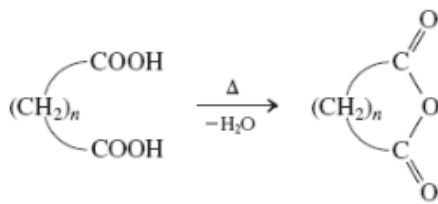
7. Acyl Halides ([Section 19-8](#))



8. Carboxylic Anhydrides ([Section 19-8](#))



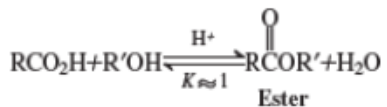
Cyclic anhydrides



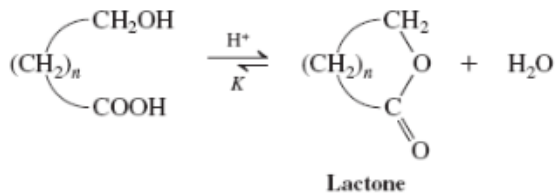
Best for five- or six-membered rings

9. Esters ([Section 19-9](#))

Acid-catalyzed esterification

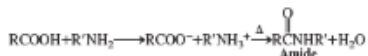


Cyclic esters (lactones)

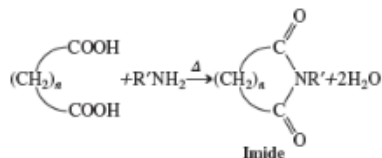


$K > 1$ for five- and six-membered rings

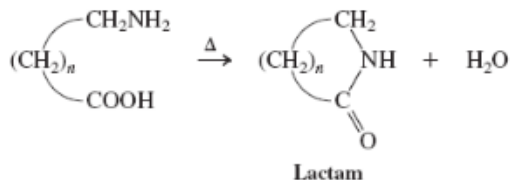
10. Carboxylic Amides ([Section 19-10](#))



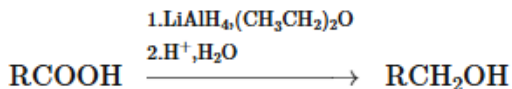
Imides



Cyclic amides (lactams)



11. Reduction with Lithium Aluminum Hydride ([Section 19-11](#))



12. Bromination: Hell-Volhard-Zelinsky Reaction ([Section 19-12](#))

