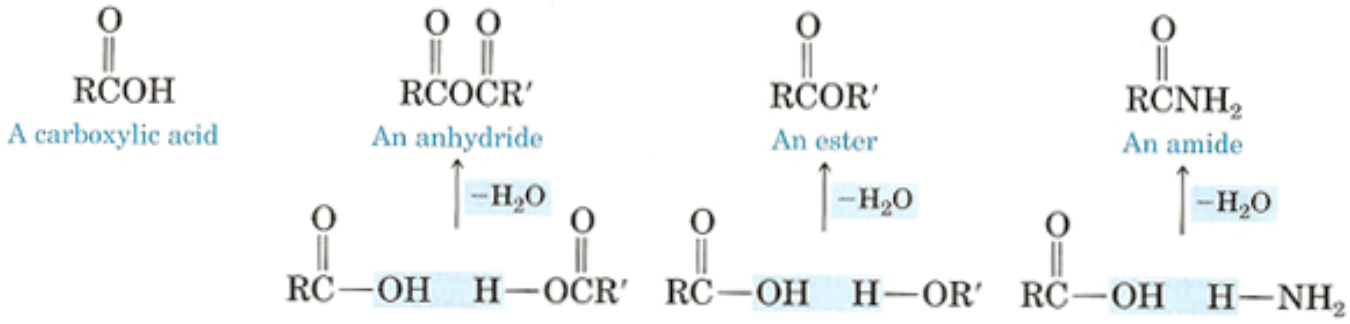
Organic Chemistry 212
Prof J. Walker
Notes: *Chapter Eleven – Carboxylic Anhydrides, Esters and Amides*

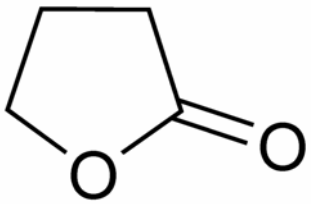
Study this important chart:



Your text states that anhydrides are unstable. Why is this?

Draw the structure of acetic anhydride:

Cyclic esters are called lactones. What is the name of this lactone?



What is an amide? How is an amide different from an amine? Draw acetamide below:

There is an article about beta-lactam antibiotics. We will discuss this article in class. Here are some questions to answer about this article:

1. When was penicillin discovered?

2. Where was the mold found that led to a method of commercial production of penicillin?

3. What structural feature is common to all penicillins?

4. What is the key factor that gives the antibacterial activity to the penicillins?

5. What happened over time to the effectiveness of penicillin?

6. How are the cephalosporins different from the penicillins?

Review Fischer Esterification.

There is an article about Aspirin. Answer the following questions about this article:

1. Why did Hippocrates recommend chewing the bark of the willow tree? When was this?

2. Draw the structure of Salicin the active ingredient of willow bark?

3. How was salicylic acid an improvement over salicin? What is the major problem with salicylic acid?

4. Draw the structure of acetylsalicylic acid:

5. Why is acetylsalicylic acid an improvement over salicylic acid?

6. What is the structure of ibuprofen? Indicate the stereocenter. Which form is active?

7. What was discovered in 1960 about the mechanism of action for aspirin?

Hydrolysis

Write the reaction for the hydrolysis of acetic anhydride:

How is hydrolysis of an ester in base different from hydrolysis of an ester in acid? Give examples:

Write the reaction between an anhydride and an alcohol:

Write the reaction between an anhydride and an amine:

Write a reaction between an ester and ammonia:

Draw the structure of Phenobarbital:

What is a phosphoryl group?

Polymers

List some important polymers and describe their structure:

Nylon

Polyester

Polycarbonate