Learning Objectives
Chapter 16 – Carboxylic Acids and Esters

- What are the functional groups in carboxylic acids and esters? You should be able to look at a structure and determine if the structure corresponds to a carboxylic acid or an ester.
- You should be able to name carboxylic acids and esters using the IUPAC naming system (You are not responsible for the common names of carboxylic acids…ie “formic acid”). You should also be able to convert the name of a carboxylic acid or ester to a structure.
- What is the name of the basic aromatic carboxylic acid? You should be able to name derivatives of this carboxylic acid.
- What is a dicarboxylic acid? Where are the carboxyl groups located in dicarboxylic acids? (You do not need to remember the common names of these acids).
- What are the different kinds of polyfunctional carboxylic acids? You should be able to look at a structure and determine which kind of a polyfunctional carboxylic acid it corresponds to.
- Why do carboxylic acids have higher boiling points than alkanes? (What is the cause of the higher boiling point?)
- Why are small carboxylic acids soluble in water? Why aren’t larger carboxylic acids soluble in water?
- How is a carboxylic acid synthesized?
- How is an aromatic carboxylic acid synthesized?
- You should be able to predict the product of a reaction in which an alkyl- substituted benzene ring undergoes oxidation with KMnO4.
- You should be able to predict the possible products of the oxidation of an alcohol or aldehyde.
- What kind of pH would a carboxylic acid solution have? How does that pH compare to the pH of an alcohol solution?
- You should be able to write the equation for the dissociation/ionization of a carboxylic acid. (Which hydrogens on a carboxylic acid are the “acidic” hydrogens?)
- You should be able to write the equation for the reaction of a carboxylic acid and a strong base (like NaOH or KOH). What is formed as a result of this reaction?
- What is a carboxylate ion? How is it formed? You should be able to name carboxylate ions.
- What is a carboxylate salt? How are they formed? How are they converted back into carboxylic acids? You should be able to name carboxylate salts.
- What are the sulfur analogs of esters called?
- How do the boiling points of esters compare to those of other organic compounds we have studied? Can you explain why some of the compounds have higher boiling points than others?
- How does the solubility of esters compare to those of other organic compounds we have studied? Can you explain why some of the compounds are more soluble in water than others?
- What is an esterification reaction? What does it produce? What are the reactants in an esterification reaction? What kind of catalyst does the reaction require to occur at a decent rate? What is another name for an esterification reaction? You should be able to predict the product of an esterification reaction.
- What is a hydrolysis reaction? How is it different from an esterification reaction? You should be able to predict the products of hydrolysis reactions.
- What is a saponification reaction? How is it different from a hydrolysis reaction? You should be able to predict the products of saponification reactions. What everyday household item does a saponification reaction produce?
- You should be able to describe how soap is used to remove grease.