CHEM 110L, Lecture 6 Worksheet
Ionones ^{1}H NMR
Biodiesel Synthesis & ^{1}H NMR Analysis

Describe each ^{1}H NMR term in your own words. Give a few examples, if any, from *alpha*- and/or *beta*-ionone. Share your findings with a neighbor.

1. Homotopic protons

2. Heterotopic protons

3. Enantiotopic protons

4. Diastereotopic protons

Alpha-Ionone Splitting Patterns

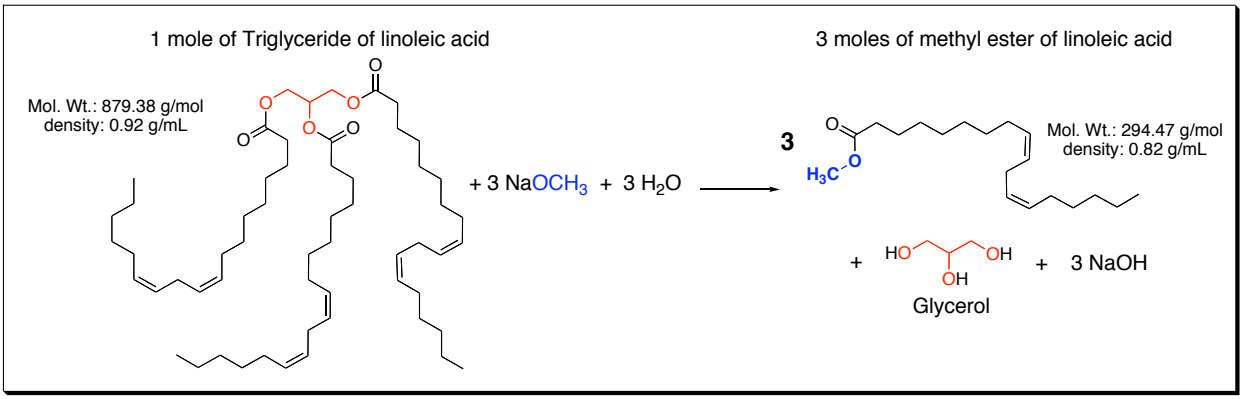
(a) What does is mean when a signal appears as a **singlet (s)**? Identify (chemical shift, ppm) and assign each **singlet** to a letter to the best of your ability.

(b) What does is mean when a signal appears as a **doublet (d)**? Identify and assign each **doublet**.

(c) What does is mean when a signal appears as a **doublet of doublets (dd)**? Identify the **dd** in the spectrum (ppm) and assign it to the structure.

(d) What does is mean when a signal appears as a **triplet of triplets (tt)**? Identify (ppm) and assign the two **tt**'s.

Exp 4 - Synthesis of Biodiesel



Scheme 1. Synthesis of biodiesel from corn oil *via* "transesterification."

What **vegetable oil** will you bring to lab this week?

Draw the structure of its major **triglyceride** component.

Draw **diagrams / comic strip** of what you'll be doing in **Part A**. What are the **safety concerns** and how will you **prevent chemical exposure** accidents?

Draw the **reaction** and **mechanism** for **Part A**.

Draw **diagrams / comic strip** of what you'll be doing in **Parts B & C**. Highlight the **safety concerns** and **preventative measures**.

Draw the **reaction** and **mechanism** for the first cycle of **Part B** (one *trans*-esterification reaction, which takes place via nucleophilic acyl substitution).

What ^{1}**H NMR peaks** should stand out in the **spectrum of your biodiesel** product?

Part D – Summarize waste disposal and clean-up procedures as well as safety notes for Exp 4.

Clean-up	**Safety**