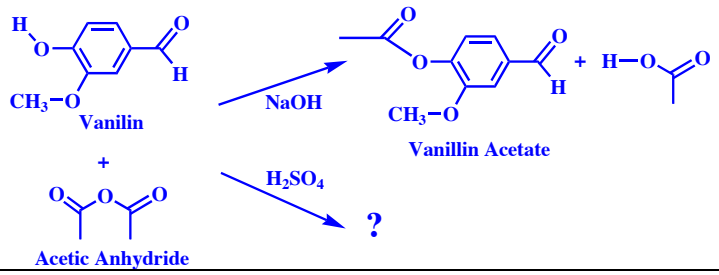
Experiment 2

Do Both Acid and Base Catalysis Work Equally Well for Acyl Substitution Reactions?	

Preparation for Preparing the Report:

Review the process we used to devise experiments for experiment 2 and our in-lab analyses of IR MS and NMR data.

The Report:

The report will focus on the QOW of Part C and will have a different structure than previous reports.

The first page and the Question of the week page formats will be the same as for the experiment 1 report using the QOW for Part C of Experiment 2.

QOW - Part C: ***What do our results reveal about what structures cause unexpected acetylation products to form and what new mechanisms are operating?***

The third page will begin with response to #1 below and continue through #'s 2 & 3.

1. **Propose structures for the Vanillin acetylation products in base and acid. Provide your warrant citing specific data from all of the compounds studied.**
   - Use the results of our in-lab analyses to propose reasonable structures for the vanillin products and, in your warrants, indicate how the earlier analyses led you to the structures. (As you may recall, one of the questions from the exam 1 packet contributed to our in-lab deliberations.)
2. **Propose a complete mechanism for the base catalyzed and acid catalyzed reactions of Vanillin with acetic anhydride. Provide your warrant based on the general mechanisms we discussed in Carbonyl Reactions-11.**
   - What do the general mechanisms in Carbonyl Reactions-11 suggest as the first steps in the two mechanisms? Provide a warrant.
   - Use the step-by-step process we developed in the Carbonyl Reactions Activities to work through from vanillin and acetic anhydride to your proposed products. Show all curved arrows and intermediate structures. This part of your report may be hand written & scanned into an electronic form.
3. **Extra Credit:** During our in-lab discussions of NMR spectra we identified positions of peaks for the methyl group and aromatic hydrogen atoms in the products from acid catalysis. We also noted that the hydrogen atom originally present on the aldehyde carbon remained on that carbon atom in the product but we did not identify the NMR peak produced by that hydrogen atom in the products. Review your copies of the NMR spectra of the acid products, identify the frequency of the NMR peak produced by the original aldehyde proton in the acid products of aldehyde containing reactants and provide your warrant for identifying the peak citing appropriate NMR spectra.

Laboratory Report Due Date:

Your lab report for Experiment 2 is due by the end of your lab period during the week of March 19-21.