Fischer esterification conclusion

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The reaction mechanism for this specific reaction was as follows: First the protonation of a carbonyl oxygen activates the carboxylic acid towards nucleophillic attack by the alcohol yielding a tetrahedral intermediate, in which there are two equivalent hydroxyl groups. One of these hydroxyl groups is eliminated after a proton shift (tautomerism) to give water and the ester. The reaction is a nucleophillic acylsubstitution carried out under acidic conditions of acetic acid and Dowex was also used for supplying protons.

The alcohol used was 1-butanol which limits the ester to a side butyl chain. After completing the esterification, it was found that 0. 734 grams of n-butyl acetate was formed with a percent yield of 61%. The product was confirmed using IR spectroscopy and boiling point confirmation. The IR spectroscopy graph showed the characteristic Ester--1735 cm-1 (C= O) strong absorption, and lacked any broad O-H peak at 3300-2500 cm-1 confirming the product as an ester.

The boiling point of the final product at 121. °C closely matched to the theoretical boiling point of n-Butyl acetate, 126 °C. Although our experiment produced a satisfactory yield of n-butyl acetate, a number of errors could have occurred in this experiment which could have limited the amount of

desired product yielded. First, if not enough acid catalyst was used, protonation of the carbonyl group on the carboxylic acid would have been difficult to obtain. Second, if the temperature was too high in heating the mixture, reflux would not occur, not allowing the solvent to boil and then recondense back into the Dean-Stark trap.