Ester Synthesis Lab Report

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Introduction

In this lab, we experimented with the production of esters, which is accomplished by refluxing the right alcohol with a parent carboxylic acid while using an acid catalyst. In an ester, an aryl or alkyl group is joined by a carbon to oxygen double bond that is connected to a second oxygen atom. Esters' structural versatility makes them useful in the pharmaceutical business, but they are also widely recognized for carrying the scent of organic materials, making them ideal for perfume, cologne, and even artificial food flavoring.

Results

We continuously poured solution into a container until the chemical diluted and formed a layer. Once the layer had formed, we removed the bottom layer and blended it with other salts. We just kept adding it to a container while creating the top layer. We utilized $CaCl_2$ pallets that didn't absorb the liquid after removing the layers. Several of our test tubes dried out, but the result—a fragrant smell—remained. (The results are in the image).

starting weights
13.17g

...osen	volume of acetic anhydride (mL)
...cetate	2.3
...etate	1.2
...tate	1.9
...acetate	2.2
...cetate	3.1
...tate	1.5
...te	3.2

13.17g — floral
— Tangerine
14.22 — Apple (sweet fruity
13.24 — Bananas (fruit
— sweet

...ydride indicated in the above table in a large dry test tube. Add 3 drops of ...mix thoroughly. Obtain 2.0 mL of one of the alcohols in a dry small test ...

...g the acetic anhydride in cold water (to cool the reaction) and add the ... mixing between additions. Without cooling, the strongly exothermic ...s. Then place the tube in hot water at about 70°C for approximately 5 ...

...teur pipet. Mix briefly after each drop. The purpose is to hydrolyze ...e remaining after the esterification is complete.

...half-saturated sodium chloride solution (3 mL saturated NaCl plus ...Mix thoroughly and vigorously. Then ... the tube aside until upper ... break emulsions. If water alone ... used, the two layers would ...e ester, which is a water-insol... ...atile liquid. In the propyl ... layers separate cleanly wi... ...nute or two. The octyl ...emulsions which should ... ...y even after separatio... ... five minutes to separat...

Questions

1. The SN1 mechanism varies from the SN2 mechanism in several

ways. The reactions of primary (and methyl) halides are the slowest, whereas those of tertiary alkyl halides are the quickest. Because the rate law is unimolecular, it only depends on the concentration of the substrate and not the nucleophile (alkyl halide). The most straightforward explanation for the mechanism of this reaction is that it begins with the (rate-determining) loss of a leaving group to generate a carbocation, which is then capable of being attacked by a weak nucleophile at either face, resulting in the loss of stereochemistry.

Sometimes, the SN1 reaction is accompanied by carbocation rearrangements.

2.

3. Peaks are located at 2986, 1745, and 1250 nm for the sp3 CH stretch, C=O stretch, and C-O stretch, respectively. As a result, the molecule possesses a useful ester group.

4.