Experiment II
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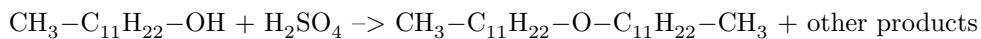
1   Goal

To demonstrate synthesis of an ether from an alcohol.

2   Hypothesis

Given $4\,\mathrm{mL}$ $(0.018\,\mathrm{mol})$ dodecanol, it should be possible to synthesize $6.3\,\mathrm{g}$ $(0.018\,\mathrm{mol})$ didocecyl ether.

3   Reaction

$CH_3-C_{11}H_{22}-OH + H_2SO_4\ ->\ CH_3-C_{11}H_{22}-O-C_{11}H_{22}-CH_3$ + other products

4   Materials

4.1   Reactants

1. $40\,\mathrm{mL}$ dodecanol

2. 10 drops H_2SO_4

3. aqueous NaOH

4. water

4.2   Other materials

1. scintillation vial

2. boiling stone

3. microwave oven

4. ice

5. pH paper

6. $CaCl_2$

5 Procedure

1. Place 4 mL dodecanol into scintillation vial.

2. Add 10 drops concentrate H_2SO_4 to vial.

3. Add boiling stone to vial.

4. Heat vial in microwave 15 seconds at a time for 10 minutes.

5. Add mixture to 4 mL tap water.

6. Add mixture to container with 4 mL ice.

7. Treat with aqueous NaOH until basic to pH paper.

8. Boil mixture to remove excess water.

6 Results

Theoretical yield: 6.3 g
Actual yield: 2.9 g
Percent yield: 46%
Percent purity: no GC taken

7 Analysis

Because no GC was taken, it is not possible to accurately estimate the percent purity of the product. However, it is estimated that the product is reasonably pure, because the IR does not indicate presence of water or alcohol (no peak near 3300 in the final product).

The IR for the final product does have a peak near 1200, which is expected for an ether.