
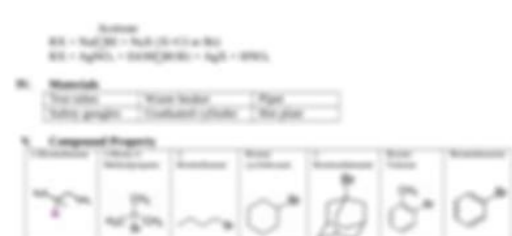


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Steam distillation lab report introduction



SIMPLE AND FRACTIONAL DISTILLATION AND VAPOR PRESSURE CONCEPTS

- SIMPLE DISTILLATION**
 Objective: To separate a mixture of two liquids with different boiling points by simple distillation. The mixture is heated in a round-bottom flask, and the vapor is condensed in a water-cooled condenser. The pure liquid is collected in a receiver flask.
- FRACTIONAL DISTILLATION**
 Objective: To separate a mixture of two liquids with different boiling points by fractional distillation. The mixture is heated in a round-bottom flask, and the vapor is condensed in a water-cooled condenser. The pure liquid is collected in a receiver flask.
- FRACTIONAL DISTILLATION**
 Objective: To separate a mixture of two liquids with different boiling points by fractional distillation. The mixture is heated in a round-bottom flask, and the vapor is condensed in a water-cooled condenser. The pure liquid is collected in a receiver flask.
- Check for understanding**
 Read the introduction to the experiment and answer the questions below.

SIMPLE DISTILLATION

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ABSTRACT

This experiment aimed to separate the alcohol and water existent within a certain amount of vodka, and to determine the amount of Ethanol in the vodka and the percentage loss of Ethanol that has occurred during the distillation process. There are several types of distillation, which would be discussed later, however, this laboratory report will focus more on the simple distillation of vodka. Simple distillation involves the principle of relative volatility and boiling points, which require the substances to have a huge difference in their boiling points to be separated. The substances that has been separated are Ethanol and water in the vodka sample. The presence of ethanol and water has been indicated through a flame test. The ethanol was present at the 1st distillate up to the 5th and last distillate, however, the flame on the 1st distillate lasted longer than the 5th which simply means that the ethanol content on the 5th distillate were decreased. The calculations for the percent Ethanol in the vodka is 11.33% and the percentage loss is 70%.

INTRODUCTION

Distillation is the process of separating two or more liquids which have large relative volatility between the two substances and a big difference between their boiling points. However, the more different the substances are in their volatility and boiling points, the easier it is to separate the components in the mixture. There two phases included in this procedure, one is the liquid phase which resulted from the condensation part, and the gas phase which is usually called the vapor that resulted from the evaporation part of the method due to the boiling of the aqueous solution. [2]

There are several types of distillation, namely, simple distillation, fractional distillation, vacuum distillation and the steam distillation. Simple distillation has the simplest set-up than the latter types of distillation. This involves separation of a volatile liquid and a non-volatile liquid that have a big difference in their boiling points. Fractional distillation is almost the same to the function of the simple distillation, however, it has an addition of a fractional distillation column, which contains a substance occupying a high surface area for a more efficient separation of the two or more liquids in a mixture. Vacuum distillation is also similar to simple distillation in terms of function, however the substance involved in the mixture tend to decompose when boiled at high temperatures, hence a vacuum is put over the liquid to prevent the decomposition of the substance in the process of separation. While, steam distillation, on the other hand, is also similar to simple distillation, however this involves substances that are slightly soluble in water, that have a tendency to decompose at higher temperatures, and that have terrible bumping when used in a vacuum distillation. Since steam lets the substance boil at a lower

temperature, steam is used instead of a direct flame from an alcohol lamp. [1]

To understand more deeply what distillation is, there is a need to know of the relationship of Raoult's Law and Dalton's Law in the process of distillation. Vapor pressure is the pressure of the substance that exerts an effort against the external pressure which is the atmospheric pressure. If there is greater vapor pressure, there is greater tendency of the pressure to escape. [4]

Raoult's Law states that: "The vapour pressure of a solution of a non-volatile solute is equal to the vapour pressure of the pure solvent at that temperature multiplied by its mole fraction." [3] This simply says that a component's vapor pressure inside the mixture contributes to the entire vapor pressure of the mixture that is in proportion to its percentage to the vapor pressure of the pure substance. [5]

Dalton's Law which states that "the total vapor pressure is the sum of the partial pressures of each individual component in the mixture" supports Raoult's law by defining what each vapor pressure consists of partial pressures of the individual components and how the sum of those vapor pressures are equal to the total vapor pressure of the entire mixture. [5]

OBJECTIVES

The objectives of this experiment are to separate the pure alcohol from water with a certain amount of vodka using simple distillation, to determine how much alcohol is in that certain amount of vodka, and to determine the percentage of ethanol lost due to the evaporation that happened during the distillation process.

QUESTION 8

Fractional Distillation: Cyclohexane and 2-methylpentane boil at 80.7 and 62 °C, respectively. You were able to collect two fractions and obtained the following gas chromatography (GC) data below.

Calculate the percent composition of each compound in Sample A. (X% 2-methylpentane; X% cyclohexane)
 (Note: Area = h • width at 1/2 h)

Sample	Peak Height (h)	Peak Width at Half Height
Sample A	Peak 1	287 mm
	Peak 2	164 mm
Sample B	Peak 1	102 mm
	Peak 2	268 mm

- a. 54.46 b. 31.69 c. 71.29 d. 75.25 e. 41.59

Click Save and Submit to save and submit. Click Save All Answers to save all answers.

Save All Answers

Report Submission - Fractional Distillation

(22pts) Performing the Fractional Distillation

(1/1pts) Ethyl acetate literature boiling point (°C)

77

(1/1pts) Butyl acetate literature boiling point (°C)

126.1

(1/1pts) Initial volume of sample (mL)

21.5

Table view List view

Fraction	Fraction volume (mL)
Fraction 1 (85-70 °C)	0.3 <input type="checkbox"/>
Fraction 2 (70-75 °C)	1.5 <input type="checkbox"/>
Fraction 3 (75-80 °C)	4.0 <input type="checkbox"/>
Fraction 4 (80-85 °C)	2.5 <input type="checkbox"/>
Fraction 5 (85-90 °C)	1.0 <input type="checkbox"/>
Fraction 6 (90-95 °C)	0.3 <input type="checkbox"/>
Fraction 7 (95-100 °C)	0.5 <input type="checkbox"/>
Fraction 8 (100-105 °C)	0.4 <input type="checkbox"/>
Fraction 9 (105-110 °C)	0.3 <input type="checkbox"/>

Mathematics (Mols, equivs, etc.) is correct. Then attach a ring support to one of the stands. After 20 min, remove the separation funnel and ring and mount a regular clip for laboratory support. Define the two stands for each other in Capá. 4 pts: procedural details are written according to the examples provided with the correct format, including the name of the product and the reaction diagram. Open the tap and drain the organic layer in your glass. Connect the heating mantle into the temperature controller, but still do not connect it. Thus, the steam distillation technique allows us to extract it from the orange peel at a temperature that does not compromise its structure. Now get a glass of clock with 3 dried orange peels of your instructor. Now, carefully open the faucet in the separation funnel to slowly add water to the bottle. Now, close the tap and return the contents of the aqueous layer glass to the separation funnel, add 20 ml of it is dietary and repeat the extraction. Pour it is dietary in the separation funnel with the distillate. Record the temperature in the thermometer in your notebook. Some errors are present in the calculation of the RXN table. Now getting magnetic sulfate on a weighing boat and harvesting a small spot of his in the organic layer glass. The liquid in the bottle will become less cloudy as the most oil is collected. Connect the second pipe of rubber piping to another door, which is the output and place the end of the piping on the drain. First, you will need to mount the steam distillation apparatus. 3 pts: Small errors in the format or chlists exist, but all the necessary components are present, including diagram, quantities and stoichiometry. Now get the condenser and carefully squeeze the second stand. We swallow the glass and let it sit for about 20 min. Steam distillation (A ° C) mass of orange peel (g) Empty Mass Mass (C) Bottle Mass + Essential Oils (C) Essential Oil Mass (g) Percent Essential Mass Recovered Click here to download Table 1 Bring your dried shells, funnel, spell and 500 ML Bottom Bottle to the instructor's seat and place the barks in the blender. Once you have collected enough distillate, turn off the heat. Using the funnel, transfer the mixed barks to the round balloon. 5 pts: The author reaffirmed the purpose of the laboratory. Take the connection gasket and secure it at the end of the condenser. Allow the aqueous and organic layers separate completely. Be sure to do this inside the hood and away from your face. Lara Al Hariri and Ahmed Basabrain at the University of Massachusetts Amherst, MA, US steam distillation in this experiment, you will perform a steam distillation to extract an essential oil from An orange peel. The reaction tables are complete and correct. Then attach a rubber pipe piece at the entrance of the condenser, which is the farthest door of the distillation head. Then set your hot plate to 40 ° C and place a large berry containing 400 ml of water in it. Attach the other end to the tap of the tap water in the cap. MEÇA 200 ml of deionized water using its graduated cylinder and transfer it to the round bottom balloon using a funnel. 3 -2 EN: Some data spectra, tables, chlists or equations are missing or roughly incorrect. This experiment should be performed in a capA'. Explanations for 4 pts: The objective and conclusions of the laboratory may or may not be correct, but the author of the report makes gross errors in the analysis of the data to reach any of these conclusions. Secure the bottle for the stand above the heating mantle. Insert the separation funnel on the Claisen adapter and add approximately 100 ml of deionized water to the Procedure is © Original or Autántico, and a diagram of De The installation is included. The procedure is not clear or imitates the text. Remove the funnel and add a stirring bar to the bottle. Efinders final conclusions may be missing, unclear or no detail. Place the separation funnel on the holder. Put the Erlenmeyer bottle in the hot water bath and let the organic solvent evaporate in the hood. Locate the Claisen adapter and apply a thin layer of grease to joint. Label the two bits of 250 ml as à € à € à € Orgine Layer Entry every month. The RXN table is incorrect. NOTE: Be sure to slowly connect the water or piping may appear and cause a flood. Then turn off the water for the condenser and carefully increase the entire configuration. Add about 4 ml of deionized water for the barks. Put the cone inside the CÁNico funnel. Your goal is to add water at the same rate as The distillation, about 20 drops / min. Check the unit configured by your instructor. Open the tap and drain the aqueous layer in the suitable cup, and then drain the organic layer in the organic layer glass € Nica, adding it to the organic layer from the first extraction. Then attach a 250 ml bottle round to the connecting board using a plastic clip. now And the steam distillation apparatus is fully assembled, start the procedure. Before starting the experiment, first make sure that the separation funnel is rinsed and cleaned. Remove the stopper and slowly open the tap to drain the aqueous layer in the glass. The results determine the dough of the extract of the orange peel subtracting the mass of the empty bottle of the jar of the bottle with oil. Processing does not have or presents incorrect details such as Mols, Equiv, Conc, etc. doubles your filter paper in half and half again. note: You should see the immiscible liquids form two layers in the funnel. INTRODUCTION AND TABELASEXPORIMAL TABELASEXPERIMAL And reaction tablesclulation and data analysis despite an empty bottle of 125 ml erlenmeyer and record the dough in your notebook. The two liquids should be immiscible and are generally an aqueous solution and a non-solid not solvable water. Replace the aqueous layer cup with the organic layer cup. Grease the thermometer adapter and insert it into the distillation head. The data explained contain little thought and depth. Once the liquids are set in layers, they can be drained from the funnel one at a time. Hold the cork in place and shake the separation funnel vigorously for about 1 min. After you finish mixing the contents, vent the funnel again, close the tap and place the funnel in the ring connected to the holder. Then transfer the distillate to the separation funnel. Occasionally, vent the funnel, making it head down and opening, then closing the tap. Normally, the method of steam distillation recovers about 0.9% 4% of the mass of a peel orange as essential oil. Place the stirring board at one of the stands and set the heating mantle on top of it. Orange oil consists mainly (+) lmonene, which has a boiling point of 176 ° C. in the next part of the experiment, the liquid-liquid extracting will be used to extract the essential oil water into an organic solvent. Lightly grease the condenser and the side gasket of the distillation head before connecting them. Allow the distillation to proceed and collect about 50 ml distillate. Lightly graze the lower joint of the distillation head and insert it into the outer arm of the claisen adapter. The top layer is the dietary. Wash all cups using detergent and wash them with acetone and deionized water. 1 EN: Two or more required components are missing. Once the bubbles begin to form in the mixture and the liquid are dripping into the collection balloon, adjust the to increase or decrease the distillation for about 20 drops / min. Carefully asset the solution drain and make sure you close the tap before the next layer is drained. Let cool completely before removing the heating mantle and disassembling the glasses. Empty the separation funnel from any remaining water and pour the orange pulp by the drain. 0-1 EN: The introduction does not connect the principles of laboratory with chemical theory. The data are used à € à €

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