



Assignment #11 - Extraction Worksheet

You cannot edit this entry after it is graded.

Description Due at 5:00 pm the day following your lab section IN TWO WEEKS, you will use this same worksheet for next week's lab as well.

I worked in a group with

The work for this assignment My notebook
is in

Grade 9 / 10

Graded on Sep 19, 2024, 1:56 PM CDT

Ilana Berlin - Sep 17, 2024, 3:05 PM CDT

EXTRACTION WORKSHEET

Purpose:

Identify what is in each layer of an immiscible solution of diethyl ether and water through process of extraction, salting-out and neutralization.

Understand how to separate organic and ionic solutes using liquid-liquid extraction to separate 3-nitrobenzoic acid from methyl 3-nitrobenzoate.

Understand how to read an IR Spectra

Describe the mixture:

Clumped white powder, large particles.

Mass of 50:50 mixture 504 mg

Mass of Ester 252 mg

Mass of carboxylic acid 252 mg.

methyl 3-nitrobenzoate:

1. 210 mg after Et₂O evaporation % recovered after Et₂O evaporation 83 %

137 mg after recrystallization from ethanol

% recovered after recrystallization 65% (based on crude mass)

2. Describe the ester:

White flaky powder that formed tiny spindles after recrystallization.

3. Melting Point: _____ 72.2°C _____

3-nitrobenzoic acid:

1. _____ 240 _____ mg after Et₂O evaporation % recovered after Et₂O evaporation _____ 95 _____ %

_____ 148 _____ mg after recrystallization from ethanol

% recovered after recrystallization _____ 62% _____ (based on crude mass)

2. Describe the acid:

White powder that formed curd like clumps after recrystallization.

3. Melting Point: _____ 89.1°C _____

Fill in the following flow chart attached below with appropriate structures as you work through the extraction, brine wash and neutralization procedures described above. Make sure to attach filled out flow chart as a pdf or picture below.

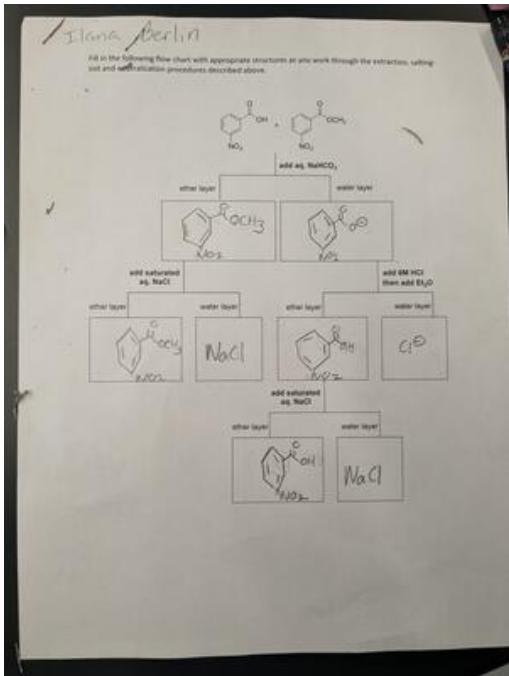
Paul Gladen
Sep 19, 2024, 1:55 PM CDT

report mp as range -1/2

Write a comment...

@

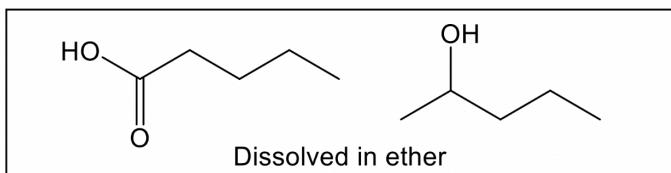
Add Comment

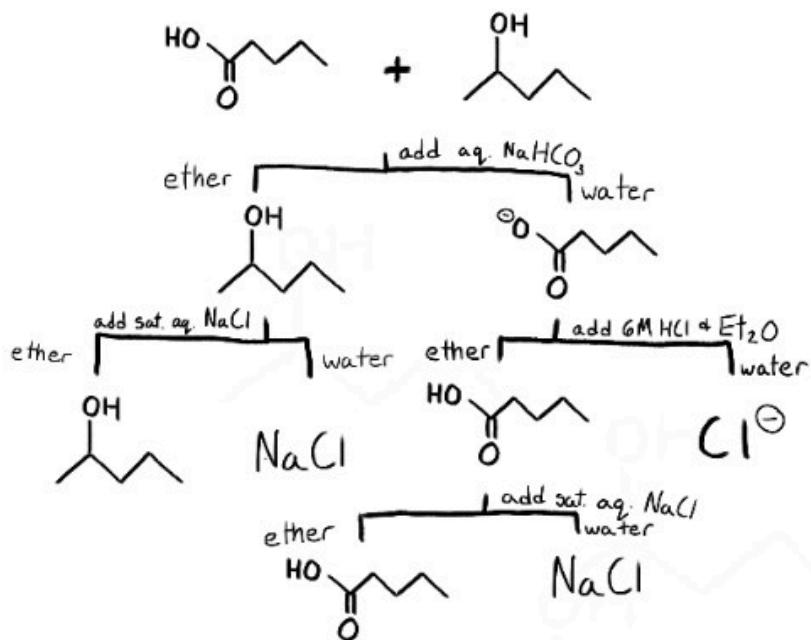


1000007392_1.jpg (189 kB)

Ilana Berlin - Sep 17, 2024, 2:55 PM CDT

Please design a extraction flow-chart to separate the following molecules from each other. Use the Flow Chart above as a guide. Upload image of your chart below.





Short Answer Questions:

1. How can you tell which layer will be on the top/bottom during an extraction?

The ether will be on top and the water will be on the bottom because ether is less dense than water.

2. For an extraction using water and dichloromethane, which solvent will be the bottom later?

In this case dichloromethane will be the bottom layer because it is more dense than water.

3. What is the purpose of washing an organic layer with saturated aqueous sodium chloride?

It helps extract the organic layer.

4. Why are carboxylates more soluble in water than the corresponding carboxylic acids?

Carboxylates are more soluble than carboxylic acid because carboxylates are more polar than carboxylic acid.

Paul Gladen

Sep 19, 2024, 1:56 PM CDT

3. removes water from ether -1/2

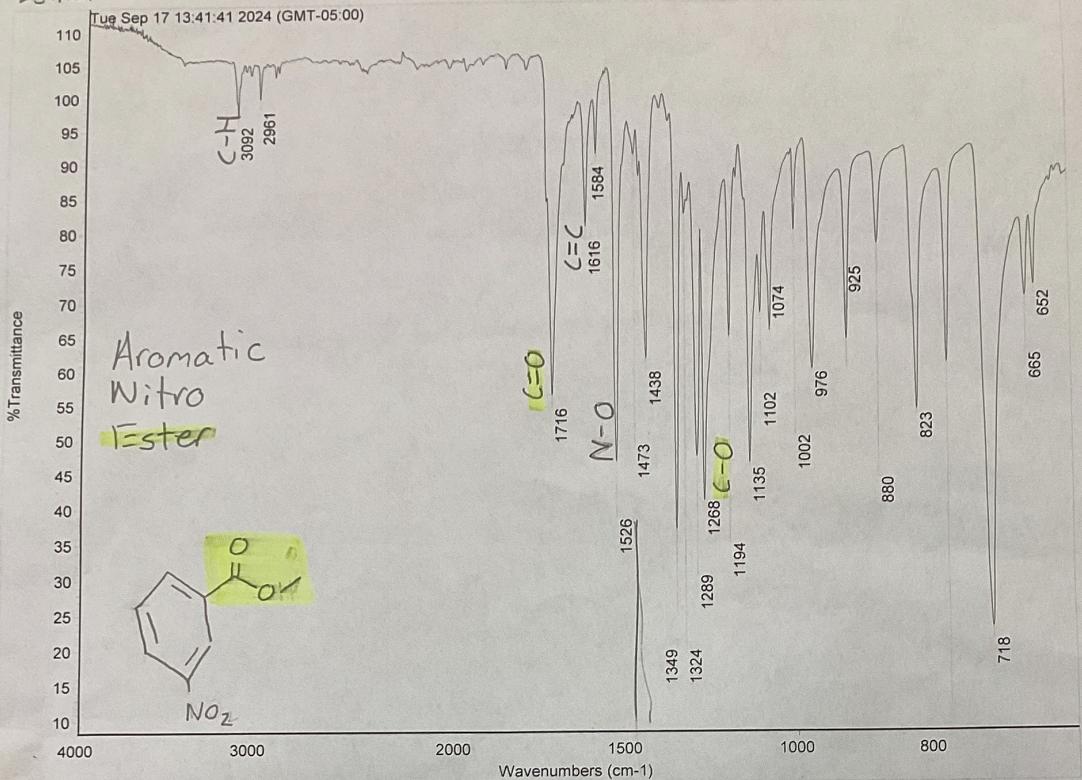
Write a comment...

@

Annotated IR Spectra

Ilana Berlin - Sep 17, 2024, 2:01 PM CDT

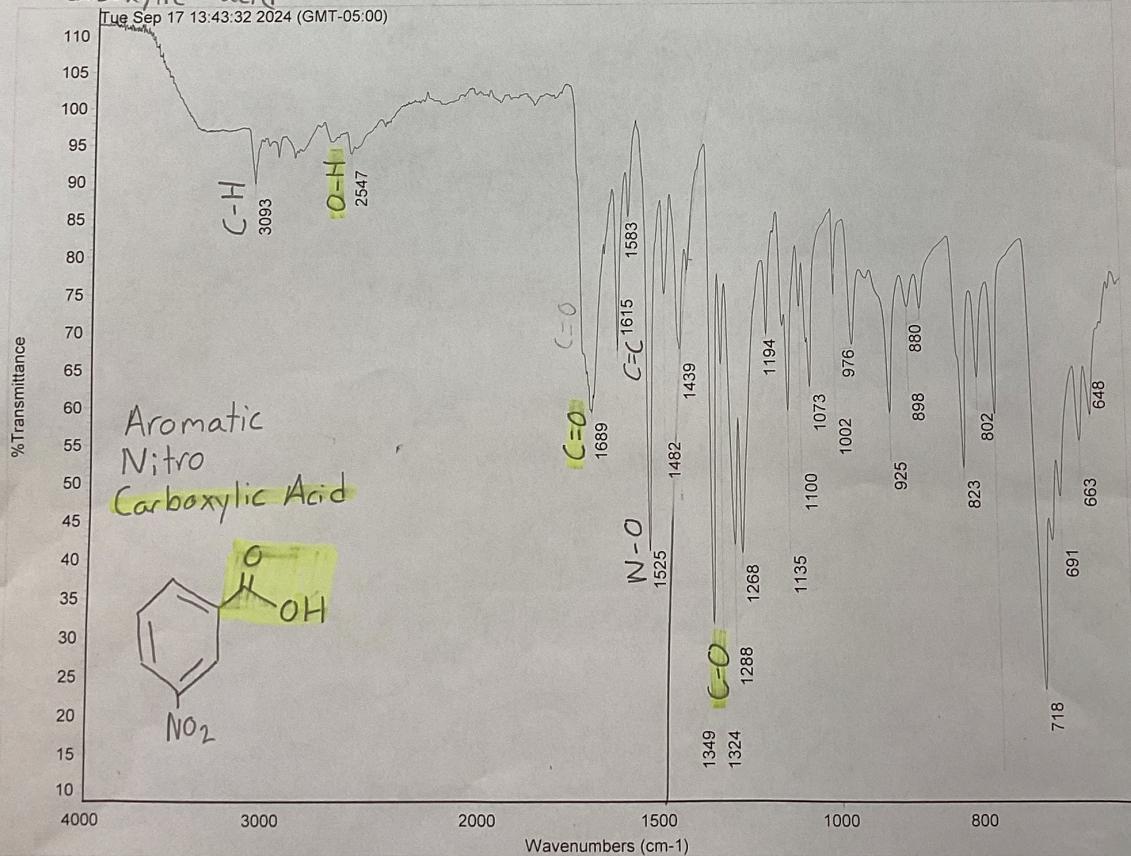
Esther



Diagnostic

Fingerprint

Carboxylic acid



Diagnostic

Fingerprint

Attach the annotated (labeled) FTIR spectra for the 2 solids recovered from the extraction experiment. Provide evidence for the identification of the solid from "ether layer 1" as methyl 3-nitrobenzoate and for the identification of the solid from "ether layer 2" as 3-nitrobenzoic acid.