CH204 Experiment 2

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Spring 2006

Separation and Recovery of the Components of a Mixture

Before we begin...

- **Office Hours: TA's alternate staffing the cubicle**
- **If you e-mail me PLEASE include your section number!**
- **If you know you will miss a lab, let me know as early as possible – and ALWAYS send an e-mail!**

Experiment 1 Post-Game Show

We learned pipette, burette, deionized water, intensive properties, interpolation, experimental error.

A note on the accuracy of lab glassware

Question your results!

What about the error in the density we determined in Part 2?

Back to Jamaica, mon!

This Week – Real Chemistry!

- Acids!
- Bases!
- Hot plates and vacuum lines!
- Little magnetic stir bars spinning around in tiny circles!

Let's all burn holes in our clothes!

A Somewhat More Rational Overview of Experiment 2

- Separating the components of a mixture: salt, sand, chalk dust
- Physical vs chemical properties
- Hot plate / stir plate
- Disposable pipettes (Pasteur pipettes)
- Suction filtering / vacuum filtration
- Q-test

Unknown Summary Sheets

Some of the experiments we do will require you to identify a chemical unknown in some way :

- Determine the identity the unknown or
- Determine its concentration or
- Determine its composition

In addition to your normal lab report, you will turn in an Unknown Summary Sheet for these experiments.

Unknown Summary Sheets can be found on the small wooden shelves next to the stockroom or can be downloaded from the class web site at

http://courses.cm.utexas.edu/banderson/ch204/uss.html

Part 1: Removal of NaCl

Removal is E-Z – just add water and stir.

Make sure you turn the STIR knob, not the HEAT knob.

Don't use excessive amounts of water to dissolve and transfer your sample.

Separating the salt

After the salt is dissolved, you pour the liquid through a funnel lined with filter paper to separate the dissolved salt from the chalk and sand.

Not all of the liquid will pour through the funnel – the final few mL will refuse to drip through. This residual liquid will be carried into the next step of the experiment.

"Quantitative transfer"

Pour the salt solution into your large evaporating dish and use disposable pipettes to carefully rinse the beaker.

Be careful with that heat setting.

While the water is evaporating, start on Part 2.

"Tiny Bubbles…!"

Add HCl dropwise into the stirring mixture of sand and chalk to dissolve the chalk:

$CaCO_{3(s)} + HCl_{(aq)} \rightarrow CaCl_{2(aq)} + H_2O_{(l)} + CO_{2(g)}$

Add HCl until your sample stops bubbling, even if it takes more than 15 mL. If your sample stops bubbling early, stop adding HCl. Make sure the bubbles have completely stopped before you stop adding acid.

"I can't decant."

Don't worry about a few grains of sand.

"Remove the beaker from the hot plate and let it cool to room temperature."

But please DO NOT put hot items on the white lab bench surface!

Add K_2CO_3 slowly.

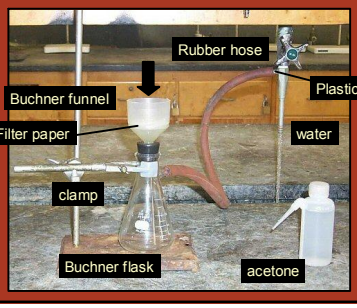
Recovering the $CaCO_3$

This is the trickiest part of the whole experiment.

Each step of the procedure is fraught with peril.

Did he say "Byookner?"

No, I said "Buchner."



Did he say "fraught with peril?"

Yes, I did.

- **Wet the filter paper first with deion water**
- **Pour your sample into the funnel slowly**
- **Keep your sample on the filter paper**
- **Wet filter paper tears easily**
- **Drip acetone onto your sample using disposable pipettes to help dry it**

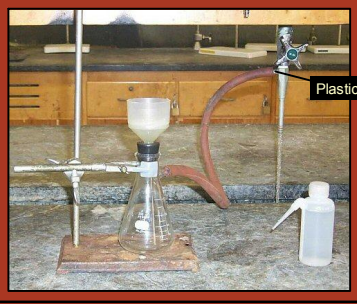
More peril still

The $CaCO_3$ will resist drying. Dry it as well as you can in the Buchner funnel before transferring it to your small evaporating dish.

Remove the plastic connector from the water faucet before you turn off the water.

What plastic connector?

This plastic connector.



Almost finished

Dry the sand in the beaker.

Calculate the mass of each component of the mixture.

Enter your starting mass and the mass of each component into the spreadsheet.

Type with your fingerd, not wity your thmubs.

Do you feel lucky?

You have the option of reporting your own data or the average results of everyone who had the same unknown as you.

You can Q-Test outlying data points, but you cannot arbitrarily keep or reject data based on hunches, intuition, or having "a really bad feeling about this one."

How's that Q-test work again?

I'm glad you asked.

To the Doc Cam!

Quiz time!

Quizzes make up 30% of your course grade.

Each individual quiz is only about 3%, and you can drop the lowest score.