

**Dr. Anderson's
Favorite Uses for Diet Coke**

1. Density Experiments
2. Diet Coke + Mentos → Sticky Fun!
<http://www.eepybird.com/>

CH204 Experiment 2
Dr. Brian Anderson
Spring 2008

**Separation and Recovery
of the Components
of a Mixture**

Experiment 1 Post-Game Show

pipette and burette
intensive and extensive properties
interpolation
determining random experimental error

What about gross error and systematic error?

Experiment 1 Post-Game Show continued...

Another question:
Isn't there some error in the
density we determined in Part 2?

We going to Jamaica, mon!

Experiment 2 Overview

Separate a mixture of salt, sand, and
chalk dust based on differences in
their physical and chemical
properties.

Add water to dissolve NaCl.
Add acid to dissolve CaCO₃.
SiO₂ is left behind in the beaker.

Physical properties

Characteristics of a material that do not
involve changing the chemical formula
of the compound. Examples include:

Boiling point	Physical state
Melting point	Particle size
Solubility	Color
Density	Shape

When a compound changes state (solid,
liquid, gas, aqueous), it is still the same
compound, so that's a physical change,
not a chemical change.



Chemical properties

Characteristics of a material that **DO** require changing the chemical formula of the compound. This means reactivity with another chemical. Examples:

- Flammability
- Oxidizability (rust/tarnish/corrosion)
- Oxidation/reduction in general
- A host of other chemical reactions

The products of a chemical process are different molecules than the reactants.



In this lab

Dissolve NaCl in water and recover NaCl by evaporating water. Is this process physical or chemical?

React CaCO_3 with HCl to form CaCl_2 , then convert CaCl_2 to CaCO_3 by adding K_2CO_3 . Physical or chemical?

SiO_2 - insoluble in water, and unreactive to HCl. Physical or chemical?



Part 1: Removal of NaCl

Steps 3-5, transferring the dissolved NaCl:

When you are rinsing the beaker with your squirt bottle, don't use excessive amounts of water because you will have to evaporate it all away later.

Separating the salt

Step 4: pour the dissolved NaCl through a funnel lined with filter paper.

Not all of the liquid will pour through the funnel - the final mL or so will refuse to drip through.

Part 2:

“Tiny Bubbles...!”



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



Tiny bubbles from the bottom of the beaker = chemical reaction

“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.”

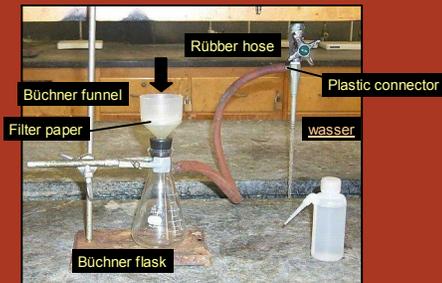
Please DO NOT put hot items on the white lab bench surface!

Part 3: Recovering the CaCO_3

Suction filtering is the trickiest part of the whole experiment.

Did he say "Byookner?"

Nein, Ich sprach "Büchner."



Almost finished

Biggest source of error - wet CaCO_3
Dry it as best you can in the Büchner funnel, then transfer it to an evaporating dish and dry it on the hot plate.

Evaporate NaCl slowly in the large evaporating dish. Turn down the heat when the water level gets low.

Dry the SiO_2 in the beaker.

And when you're done...

Enter your name into the spreadsheet.

Enter your starting mass and the final masses of the recovered NaCl, CaCO₃, and SiO₂.

Do you feel lucky?

For each component, 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, Tarot deck readings, or having "a really bad feeling about this one."

How's that Q-test work again?

Let's go see.

Remember, the Q-test is only used for discarding outliers in replicate analyses. (That means repeat measurements of the same thing.)



Unknown Summary Sheets

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

- ❖ Determine the identity of 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>



Lab write-up

Don't forget to show a sample calculation for % recovery and for % of each component

If you Q-test an outlying data point, show the calculation regardless of whether the point stays or goes.



Post-lab problem 2

Directly analogous to our experiment with NaCl, CaCO₃, and SiO₂.

How would you separate and recover SiO₂ from NaCl and CaCO₃? Which of the separation and recovery techniques are physical and which are chemical?



**Preliminary Write-up for
Experiment 3**

When you copy the reaction tables on
pages 21 and 22

Make them big!

You will be writing your
observations in those tiny
boxes.



Final exam time

Quizzes make up 30% of your course
grade.

Nine quizzes, drop the lowest one.

Each individual quiz you keep is
worth about 3.75% of your final
grade.
