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 2007

TA Office Hours Change

Wednesday morning
10:30 - 11:30
is gone.

Wednesday afternoon
3:30 - 4:30
is new.
(Ashley every week.)

Experiment 1 Post-Game Show

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

A quick note on the accuracy of glassware.

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 $CaCO_3$.
SiO_2 is left behind in the beaker.

Physical properties

Characteristics of a material that do not involve changing the identity 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 involve changing the identity 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:

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 will refuse to drip through.

Part 2: "Tiny Bubbles...!"

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

$$CaCO_3(s) + HCl(aq) \longrightarrow CaCl_2(aq) + H_2O(l) + CO_2(g)$$

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."

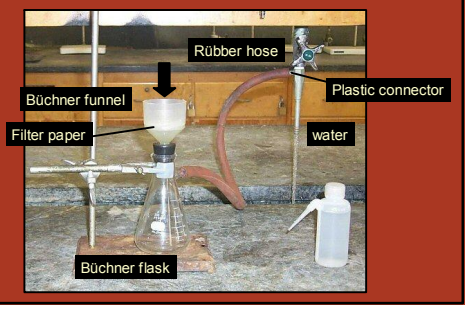
Please DO NOT put hot items on the white lab bench surface!

Part 3: Recovering the $CaCO_3$

Suction filtering is the trickiest part of the whole experiment.

Did he say "Byookner?"

No, I said "Büchner."



Almost finished

Biggest source of error - wet $CaCO_3$

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 masses of recovered NaCl, $CaCO_3$, and SiO_2.

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, 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 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 3

Directly analogous to our experiment with NaCl, $CaCO_3$, and SiO_2.

How would you separate NaCl and $CaCO_3$ from SiO_2?

Post-Lab problem 5

Calculate how many moles of Na_2SO_4 and how many moles of $MgSO_4$

Add 'em up to get total moles of SO_4

Calculate total grams of SO_4

Quiz time

Quizzes make up 30% of your course grade.

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