Reagents, Compositions, Weight Loss
C:\a-StudioClassroom\ex1.doc; July 1, 2005

During this semester you will be doing experiments as you try to make synthetic minerals. The experiments may or may not work. The basic approach involves several steps:

- calculate the amount of reagents to mix up
- mix them and form them into pellets
- bake them in an oven
- analyze the results

When we do our synthesis experiments, we will X-ray reagents, mixtures, products, etc., to determine what they are and what they are turning into. For now, to get you thinking about reactions, reagents and moles, etc., we will do some preliminary experiments using reagents available in the lab.

For these experiments, you will consider the following reagents:

- aluminum hydroxide
- silicic acid
- magnesium oxide
- calcium carbonate

A. Experiments at 110°

For each reagent:

1. Determine its formula
2. Calculate the mole % of each element in the reagent
3. Calculate the weight % of each element in the reagent
4. Calculate the mole % of each oxide in the reagent
5. Calculate the weight % of each oxide in the reagent

We are going to heat the reagents to 110° and leave them there for an hour. We will weigh them before and after heating and see what happens.

6. Before we do this, predict what you think will happen to each reagent. Write down your prediction for each. *No cheating; do it now.*

Now let's really see what happens when you heat the reagent. For each of the four reagents:

7. Weigh a crucible, add about 1 gram of reagent, weigh it again to determine the sample weight.
8. Put crucible with sample in the oven. Wait an hour, remove and weigh. Then store in the 110° oven, taking extreme care to label your samples so they don't get mixed up.
9. Calculate percentage weight loss or gain and explain why there was a change, if there was one.
10. Put the results of your experiments in the table on the black board in the front of the classroom.

B. Experiments at 1200°

Now we will heat the same crucibles and reagents to 1200°, leave them overnight, and determine weight loss or gain.

11. Before we do this, predict what you think will happen to each reagent. Write down your prediction for each. *No cheating; do it now.*

12. Now repeat steps 7 - 10 and see what really happens when you heat the reagents to 1200°. (The only difference is that we will leave them in the oven until our next class, this time.)

C. Your report

Write a lab report that summarizes your result. In the report, you should: include all measurements, describe what happened step-by-step as you did your experiments, and answer the questions asked above. Additionally, look at the results obtained by the different groups in the class. How consistent are they? Explain any disagreements? Are there any experimental results that just seem out-to-lunch? Explain them or give hypothetical explanations for the discrepancies.

The TA will give you further details regarding report format, etc. When the report is completed, put it in your lab portfolio and hand it in.