Arsenopyrite Project
Written Report Instructions

WRITTEN REPORT

Your written report should be in the same format and have the same tone as a research paper published in a scientific journal. It should be an objective report of your results and interpretation. The required components of the report were detailed in the Project Introduction handout and will not be repeated here. However a few points should be emphasized.

Experimental

This section should be concise, yet have enough detail and clarity that someone else could repeat your experiment. For example, you should include brief details on your procedures for cleaning the sample, preparing your dissolution reactions, and preparing samples for analysis. You should also include information on any standards, blanks and controls that you used.

You may have modified and improved your experimental procedure during the course of the project. If you are not using the results from a particular experiment (such as an early run that did not work as intended), you do not need to report those experimental details. You need only report the details that correspond to the results you are reporting. During the oral presentation, however, you might be asked about the parts of your experiments that didn't work and what you learned along the way.

Results

This section should summarize your best results. Graphs and tables will help you present your results in a clear and scientific manner.

Pay attention to scientific presentation of your graphs. That is, you should make careful decisions for axis markers, axis limits, the use of color, the data displayed, and so forth. If at all possible, plots that use color should be printed in color. The graphs noted below are required. You may also have others, depending on your experiments.

1. Molarity of iron vs. time (from spec measurements)

The y-axis should be the *molarity* of iron in the *reaction vessel* due to the dissolution of arsenopyrite. That is, subtract any iron that you added if your variable was iron. The x-axis might be days or hours. Data from each variation of your chosen experimental parameter should be presented in one plot.

2. Amount of iron per unit surface area vs. time (from spec measurements)

This graph should show the moles of iron that dissolved from the mineral as a function of time. Typical units on the y-axis are moles/m^2 or mmol/m^2. The x-axis might be days or hours. Data from each variation of your chosen experimental parameter should be presented in one plot.

Take care with this calculation as there are many places to go wrong. From the molarity of iron in the reaction vessel and the volume of the solution, you can

calculate the moles of iron that were in the reaction vessel. You need to add to that the number of moles of iron removed in aliquots that were taken on earlier days. Then divide by the surface area of your mineral, which will depend on the mass of arsenopyrite that you used. You may assume an average particle size of 50.00 μm.

3. Molarity of iron in dissolution vessel vs. time (from ICP-AES)
Similar to graph in #1 above, but using results from ICP-AES. This graph should be formatted in a way that facilitates comparison with the graph in #1.

4. Amount of iron per unit surface area vs. time (from ICP-AES)
Similar to graph in #2 above, but using results from ICP-AES. This graph should be formatted in a way that facilitates comparison with the graph in #2.

5. Molarity OR amount of arsenic per unit surface area vs. time (ICP-AES)
This graph is similar to the previous ones but shows arsenic.

6. Molarity OR amount of sulfur per unit surface area vs. time (from ICP)
This graph is similar to previous ones but shows sulfur.

7. Dissolution rate vs. your chosen experimental parameter
Dissolution rate has units of moles per unit area per unit time (such as $mmol/m^2 \cdot day$). This plot summarizes how your dissolution rate varied with your chosen experimental parameter (such as pH, iron concentration, or O_2 flow). The dissolution rate might not have been constant over time. That is, you might have a dissolution rate that is constant for a few days, but slows down after 5 or 6 days. If so, this plot might include two data sets, one for the early dissolution rates and another for the later rates.

Appendix
You should include one complete set of sample calculations for one of your aliquots. Use an aliquot from Day 3 or later for your sample calculation. While details of calculations are not always included in a research paper, this information will help your instructors understand your analysis.

ORAL PRESENTATIONS

You will present your results orally to your the instructors at an appointed time during the lab period. You can view these presentations as a friendly and informal discussion of your project.

Your group should prepare a *brief* presentation (5 minutes maximum) where you highlight your experimental method and anything of particular interest about the data. You do not need to provide any background or introductory material. Instead you should focus on what you did, your results, what you learned, and suggest any possible improvements.

The presentation will be followed by ~ 15 minutes of questions. The questions will, in general, be posed to specific individuals. While you may refer some details of part of a question to another group member, remember that all group members should be aware of what was done with all aspects of the project. The primary goals of the questions are to determine your understanding of the project itself and your analysis of your data.

You may refer to figures in your written report during the course of your presentation. (We will all have copies in front of us.) If you would like to use other visual aides (such as PowerPoint, overhead transparencies, or photocopies of a handout), you may, but you are not required to do so.