**Geology 250: Mineralogy**

Winter 2004

Carleton College

MW 9:50–11:00 AM, F 9:40–10:40 AM, Mudd 66
Lab: W or Th 1:00–5:00 PM, Mudd 66

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Teaching Assistants:

- Dave Auerbach (W lab)
- Kristin Bergmann (Th lab)
- Joseph Graly (W lab)
- Bre MacInnes (Th lab)

Evaluation:

- Problem sets - 40%
- Mineral quizzes - 15%
- Mid-term quiz - 10%
- Final exam - 20%
- Research paper - 15%

Reading:


Reference:


Due dates:

- Late work penalized 20%/day.

<table>
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<th>Week</th>
<th>Topic</th>
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Minerals to Learn #4: Oxides and Sulfides (Klein: p. 351-369; 378-393)  
Due Wednesday: Problem Set #3 - Symmetry and crystal classes  
Mineral Quiz in Lab  
Due Friday: Pet mineral crystallography.  

5. Feb. 2  Optical mineralogy: anisotropic minerals, uniaxial optics.  
Nesse: p. 37-75.  
Minerals to Learn #5: Neso-, Cyclo-, and Sorosilicates (Klein: p. 491-514)  
Due Wednesday: Problem Set #4 - Refractometry  
Mineral Quiz in Lab  
Fri, Feb. 6  Mid-Term Quiz  

Nesse: p. 76-109; review 122-127.  
Mineral to Learn #6: Inosilicates (Klein: p. 514-527)  
Due Wednesday: Problem Set #5 - Anisotropic properties and uniaxial minerals  
Mineral Quiz in Lab  

Due Wednesday: Problem Set #6 - Biaxial minerals  
Mineral Quiz in Lab  
Due Friday: Pet mineral optical properties.  

Klein: p. 90-131; 134-141.  
Due Wednesday: Problem Set #7 – Halide solid-solutions.  
Due Friday: Pet mineral x-ray properties.  

9. Mar. 1  Crystal chemistry of selected silicates.  
Klein: p. 441-490.  
Due Wednesday: Problem Set #8 - Mineral formulas.  

10. Mar. 8  Catch-up  
Due Wednesday: Pet mineral paper.  

Sat., Mar. 13: Final Exam, 3:30 - 6:00 PM
Problem Sets

I assign various problem sets throughout the term ranging from relatively easy (i.e. not very time-consuming) to rather difficult and/or involved. To do an adequate job on the later, you will need to invest a considerable amount of time. Please feel free to (and do!) work with your colleagues on these problems, however, turn in your own work. Some of these problem sets are best solved using a spreadsheet; for those of you not familiar with spreadsheets, please see me so I can get you started. Again, work with your colleagues on this, but construct and turn in your own spreadsheet calculations.

Mineral Quizzes

At the beginning of every lab period (except weeks 1, 8, 9, 10), there will be a quiz on the minerals from the Dana collection. The chemical compositions of the starred (*) minerals must be learned (or memorized and then promptly forgotten after the quiz). Plan on 5 minerals per quiz. Approach these minerals like you would new friends. At first you might have problems remembering names, faces, and characteristics. But the more you spend time with that person (mineral), the easier it becomes to remember who they are and their physical properties. In fact, you should become so familiar with these individuals that you can pick out traits in their close relatives (mineral unknowns) and realize that they are just like the minerals (the friends) you already met (only different in superficial characteristics like color or texture).

Pet Mineral Project

By the end of the first week, you need to identify and posses a pet mineral to study throughout the course. During the course, you will learn about the physical properties of minerals, how and why minerals form, and various techniques for identifying minerals. As different techniques are learned, you will apply what you learned to your pet mineral, and turn these data into me for review (see syllabus for due dates). By the end of the term, you will have identified your mineral and described its physical, crystallographic, optical, and x-ray properties. The final product of your research will be a scientific paper (5 pages or less) describing your results and the techniques you used. Follow the formatting guidelines of the American Mineralogist, the official journal of the American Mineralogical Society (http://www.minsocam.org/MSA/AmMin/AmMineral.html). Use 12 point Times Roman font. Like the American Mineralogist (and most journals today), you need to save your paper and figures in PDF format and send to me electronically. We will talk about how to do this in class. Here is the grading rubric I will use on your papers:

| Points | 1. Title, name and address, appropriate headings and subheadings, proper format | 10 |
| 2. Abstract | 10 |
| 3. Body of paper | |
| a. Writing style | 10 |
| b. Spelling | 10 |
| c. Content | 30 |
| d. Figures and tables | 15 |
| 4. Acknowledgements | 5 |
| 5. References (format and completeness) | 10 |
| Total: | 100 |