

GEOL 530: GEOCHEMISTRY

Lecture: Monday and Wednesday 10:00-10:50 a.m. in CSL-422

Lab: Monday 12:00-2:40 p.m. in CSL-427

Dr. Vic Camp – Fall Semester 2012

OFFICE: GMCS-228K

OFFICE HOURS: Wednesday after class (best), **or** TTh 11:00-12:00 (I am often meeting with a number of Geol 303 students at this time, so less ideal), **or** an arranged time.

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GEOCHEMISTRY is defined as the use of chemistry to study the Earth and how it works. The field of Geochemistry is divisible into two major branches: *Low-temperature geochemistry* focuses on the chemistry of processes that operate near the surface of the Earth, whereas *High-temperature geochemistry* focuses on the chemistry of processes that operate deep within the Earth's crust, mantle and core. The primary goal of this course is to introduce you to fundamental principles of modern geochemistry, with a focus on the application of geochemistry to mantle and crustal processes. When you successfully complete the course, you should understand:

- The major themes of geochemistry and how they relate to other aspects of the geological sciences (i.e., the Big Picture!)
- How to obtain and present geochemical data
- How to manipulate geochemical data to understand various petrogenetic processes
- The cosmogenesis of elements, their relative abundance in our solar system, and processes that have differentiated them into distinct layers on Earth
- The relationship of Earth materials found in all parts of the geosphere
- The relationship of the basic chemical building blocks that make up minerals and rocks
- The integration of a variety of chemical data in understanding plate-tectonic and igneous processes.

PREREQUISITES: Undergraduate Mineralogy, Petrology, and Chemistry.

TEXT: There is no assigned text for the class, as all material for the class will be drawn from a variety of sources. There is an optional text that I will not follow, but which could be helpful as an additional resource: *Geochemistry: An introduction, by Francis Albarede (Cambridge University Press)*.

FORMAT AND POLICIES: Because this is a lecture-based class, it is important that you show up for all lectures and take good lecture notes. I will use a combination of ppt slides and board work for diagrams and lecture. I will post ppt slides periodically on the course Blackboard site, in advance of the lecture.

Laboratory Exercises will be used to supplement the lecture portion of the course. Group work on the laboratory exercises is encouraged. No lab write-ups will be assigned, but instead, all laboratory exercises will be self-graded using answer keys that I provide after the lab is completed (if appropriate, based on the exercise). It is important to note that all of the lab exams will be based on the material from the exercises and any lecture material that I give you during the first part of each lab.

Grades will be based on two *lab exams* and probably three *lecture exams*. **No make-up exams will be allowed except under extraordinary circumstances.** Your work will be weighted as follows: Class participation = 10% Exams = 90%. Your final grade will be based on a percentage of the available points:

A (90% or above), **B** (89-90%), **C** (79-70%), **D** (69-60%), **F** (59% or below).

At this point, dates for the Lecture Exams cannot be accurately determined, but I will let you know in class with plenty of notice. The Lab schedule is:

GEOCHEMISTRY LAB SCHEDULE:

August 27: Periodic Table

Sept. 3: Labor Day (no classes)

Sept. 10: Review Periodic Table / Goldschmidt Classification / Nuclides

Sept. 17: Geochemical Earth Reference Model

Sept. 24 Geochemical Earth Reference Model

Oct. 1: Rock Compositions and Plate tectonics

Oct. 8: Exam

Oct. 15: Exam Review

Oct. 22: Introduction to Geochemistry Lab

Oct. 29: XRF Lab

Nov. 5: AA Lab

Nov. 12: Veterans Day (no classes)

Nov. 19: Kilauea Iki Exercise

Nov. 26: IgPet Madinah Flow Exercise

Dec. 3: Lab Final

