INORGANIC CHEMISTRY & MATERIALS 265

Class Meetings TR 10:30 am Taylor G042 | Labs R 1:00 pm Taylor 1068

course topics

- properties of the nucleus, atom, and elements
- redox chemistry & batteries
- transition metal chemistry
- structure and properties of metals, alloys, and ionic solids
- inorganic materials

Blackboard is your central information center for this course. Please check it frequently throughout the semester

- announcements
- office hours and appointment sign up link
- syllabus and course map for topics for each test
- lecture notes, readings, and practice problems
- video links and screencasts
- assignment links and answers
- this year's test answers and study guides
- web resources and news items
- lab handouts including pre-lab information and report guides

Inorganic Chemistry and Materials is a one-semester course to explore the theory and scope of the chemistry of the elements with specific interest in inorganic chemistry's contributions to materials science. For chemistry concentrators, this is one of the foundational courses in general, organic, inorganic, analytical, and biological chemistry.

by the end of the semester you will have…

- built upon your previous chemical knowledge to further explore properties of the atom, periodic relationships, thermodynamics, and kinetics in the context of inorganic chemistry
- explored new theories of bonding and reactivity that impart to the transition and *f*-block elements their distinctive properties
- been introduced to a range of applications of the elements through exploration of their redox behavior and solid-state structures

alignment with college & departmental goals

You will examine in depth the foundational concepts of inorganic chemistry and learn to think like an inorganic chemist (**Disciplinary Practice**). There will be more than one way to solve a problem or design an experiment (**Intellectual Curiosity and Flexibility**). You will grow in your skills in analyzing data, graphs, and equations that illustrate chemical phenomena (**Analytic Discernment**) and will have the opportunity to design experiments, write technical summaries of your work, and present on a project to explore the social and institutional hierarchies inherent in the sourcing and use of inorganic materials (**Ethical, Informed and Engaged Citizenship** and **Communication and Expression**).

You will additionally expand your **Breath of Chemical Reasoning,** the first of Chemistry's learning outcomes, by exploring new topics central to the field of inorganic chemistry.

assignments

Throughout the semester there will be several graded short Questions-of-the-Day designed to further explore topics and provide practice. These will be graded as "mastery" or "no credit." The percent of "masteries" you earn will determine your assignment grade in the course: 90% mastery = A range, 80% mastery = B range, and so forth).

You are encouraged to collaborate on these assignments, but the work you turn in for a grade must represent your own understanding.

tests & project

There will be four tests and an individual project in this course. The tests will emphasize the material explored in class and through assignments. Class meetings will mostly seek to expand each topic, so your notes are your best outline of the course, but are not your only study resource.

Test & Project Schedule
Test I Tues Feb 13, 6:30 pm
Test II Wed Mar 6, 6:30 pm
Test III Wed Apr 17, 6:30 pm
Project Presentations, Thurs May 2
(during class & lab time)
Test IV Sun, May 12, 2:00 pm

For flexibility during the semester, the specific test dates for tests will be announced as we go throughout the term.

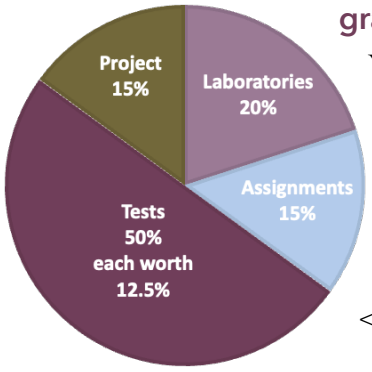
In the project, you explore issues of materials sourcing (mining) or use (development and recycling) that affect the local or global environment and thus affect different populations. You will present your findings to the class. Details will be posted on Blackboard.

textbook and class materials

- Chem LibreTexts: Inorganic; free! links posted on BlackBoard
- Supplemental chapters, videos, and articles (Blackboard)
- Lab handouts and information (Blackboard)
- Laboratory notebook (bookstore)
- Laboratory safety glasses and lab coat (lab instructor
- Gradescope

tentative class meeting schedule

Class Dates	Topic
Jan 18	Syllabus & Properties of the Nucleus
Jan 23/25	Properties of Atoms and the Elements
Jan 30/Feb 1	Redox and Electrochemistry
Feb 6/8	Electrochemistry
Feb 13/15	Transition Metals
Feb 20/22	Transition Metals
Feb 27/29	Transition Metals
Mar 5/7	Lanthanides & Actinides
SPRING BREAK	
Mar 26/28	Lanthanides & Actinides
Apr 2/4	Ionic Solid-State
Apr 9/11	Ionic Solid-State / X-Ray Diffraction
Apr 16/18	X-Ray Diffraction / Metals
Apr 23/25	Metals / Semiconductors
Apr 30/May 2	Semiconductors / Project Presentations
May 7	Last Day Activity



grading in this course

You must earn a passing grade in both the laboratory and in the tests/project in order to pass this course. Grades in this course are not curved.

90–100% A– to A+
80–89% B– to B+
70–79% C– to C+
60–69% D– to D+
< 60% F

course (oops) tokens

You will have twelve tokens throughout the semester that you can apply to assignments or tests. These can be used to correct one problem on each test for up to half of the point missed or submit an overdue/missed assignment/"no-credit" assignment for full "mastery."

Academic Honesty

The rules concerning the Academic Honor Code are described in Article 3, section 2 and 3, of the Honor Court Constitution. These rules apply to all examinations and assignments including and laboratory pre-lab assignments, notebooks, and reports; in other words, all work submitted for a grade. During tests, unless explicitly stated, only a standard scientific/graphing calculator will be allowed. No other electronic devices will be permitted including notebook computers, tablets, mobile phones, smartwatches, or other data-saving/text-messaging electronic devices.

getting help in this course/meet with me

- Individual Appointments can be made through Calendy; if the posted times conflict for you, please email me for an alternate time
- Feel free to email your questions, but please allow up to 24 hours for a reply.
- At any time, if my office door is open, please come in!

course policies

Class attendance

If you must be absent from a class meeting because of a short-term illness or other pressing reason, please follow up to find out what you missed with classmates and with me.

Late assignments

All assignments will be accepted on Gradescope for up to 12 hours after they are due. If you miss or can't complete an assignment on time, remember that you can use an oops token! No questions asked; you need not ask for an extension.

Test rescheduling

Knowing that there will be conflicts for orchestra, choir, sports, and work-study with any scheduled evening tests, I am happy to make accommodations for alternate times, generally within 24-hours of the scheduled test time.

Students with Disabilities

I welcome arrangements to make reasonable accommodations for students with properly documented disabilities. If you are eligible to receive an accommodation and would like to make a formal request for this course, please discuss it with me during the first two weeks of class. Let me know how I can be helpful to your success!

about your professor

I have taught at Hamilton since 1989 and along with this course, I regularly teach Principles of Chemistry 120 and Science, Technology, and Society 348; along with, on occasion, Research Methods 371W and half-credit seminar courses.

My research area studies the incorporation of rare earth (*f*-series) elements into sol-gel silica and other materials such as MOFs to study their fluorescence properties.

In my free time, I enjoy reading to reach my annual reading goal of 50 book–audiobooks count, too, right?

Contact Information
Taylor Science Center 1060
kbrewer@hamilton.edu

All course announcements as well as office hours and appointment times with Zoom links, if needed, will be posted on Blackboard

laboratory program

Attendance and completion of the laboratories for this course are required and you must earn a passing grade in the lab in order to pass the course. The experiments have been chosen to allow you to explore a few topics in depth, rather than an associated experiment for every topic covered in the class.

Date	Experiment
Jan 18	No Lab Meeting
Jan 25	Intro to Lab/Bengal Lights Demo
Feb 1	Galvanic Cells
Feb 8	Redox Demos
Feb 15	tfac Complex isomers
Feb 22	Schiff Base Complexes
Feb 29	Rhodium Rainbow
March 7	Fluorescent Compounds
	SPRING BREAK
Mar 28	Metal Demos and Radioactivity
Apr 4	Thermochromism
Apr 11	Unit Cell Modeling
Apr 18	Silver Nanoparticles
Apr 25	Materials Demos
May 2	Project Presentations

resources for success

Overwhelmed, Anxious, or Depressed?

There are many resources available on campus to support you, please ask whenever I can help point you to any that you need to succeed and be well.

- Counseling Center (315-859-4340) offers individual and group therapy, peer counselors, psychiatric treatment, and a 24-hour hotline
- Sarah Solomon, Associate Dean of Students for Student Support, ssolomon@hamilton.edu, Associate Dean of Students for Student Support, and Adam Van Wynsberghe, Associate Dean of Students for Academics, avanwyns@hamilton.edu. Both can be contacted by phone at 315-859-4600
- Your faculty advisor, RA, and Area Director

If at any time you feel suicidal or in danger of harming yourself or others, please reach out for support! The Hamilton community cares and is available to help. Campus Safety is available 24/7 for urgent concerns at 315-859-4000.

Inorganic Study Resources

Throughout the semester, I will post on Blackboard video and print supplements to further explain our topics and to further your interest. General sites you might also explore include

- American Chemical Society, *What is Inorganic Chemistry?*
- COMPOUND iNTEREST infographics
- Periodic Table & Element Infographics from the the Royal Society of Chemistry
- Inorganic Chemistry Latest Research and News from NatureResearch

lab safety & general policies

You are expected to know and abide by all the lab safety rules of the Chemistry Department. You are never permitted to work in the lab without consent and supervision; you must never work alone in the lab. Any dangerous spill or situation must be called to the attention of the instructor or teaching assistant immediately. Safety glasses, lab coat, and face mask must be worn at all times.

For further details about the lab program, see the lab syllabus and experiment handouts and report guides posted on Blackboard.