

CHEM 243 – Inorganic Chemistry – Fall 2017

T & R 8:10 – 9:30, Sam Mather 202

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Instructor: Vivian Ezeh (Tomsich Hall 314, ezehv@kenyon.edu, 17404275355)

Office hours: Mon & Wed, 11 am – noon, Tues & Thurs 1 – 2 pm or by appointment

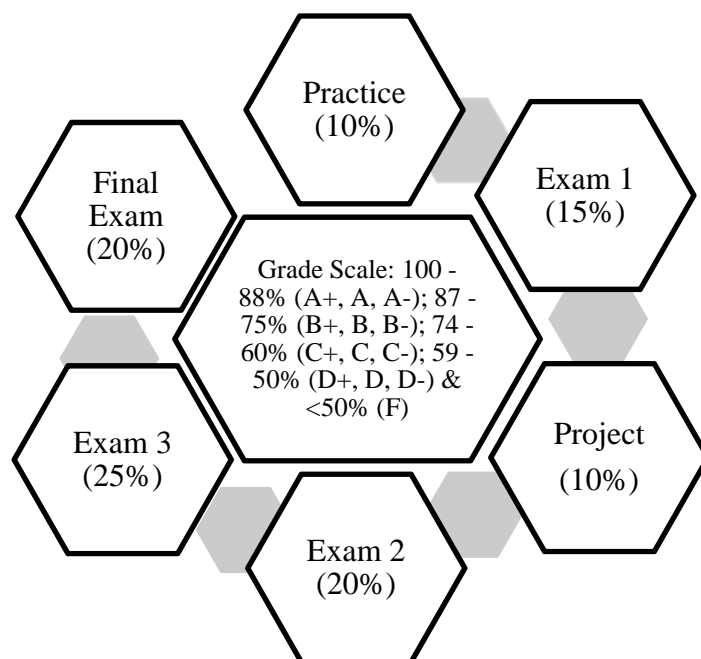
Inorganic Chemistry is considered the chemistry of the periodic table because it is a study of the chemical and physical properties of **all** the elements in the periodic table. Expect to learn about atomic structures, bonding, main group and transition metal compounds. The application of these topics will be explored in detail by reviewing current inorganic chemistry publications.

Course requirements:

Textbook: Geoff Rayner-Canham & Tina Overton “Descriptive Inorganic Chemistry” 6th ed.

Alternate Textbooks: Check the library for any of the following text: Rodgers, Descriptive Inorganic, Coordination and solid state chemistry (QD151.5 .R63 2011) & House, Descriptive Inorganic Chemistry (QD151.3 .H68 2001).

Assessment: Final grades for the class will be based upon your mastery of the materials and your demonstration of that ability on all assignments. Letter grades at the end of the semester will be assigned using the scale indicated in the following figure. The instructor reserves the right to assign whatever final grade is deemed appropriate.



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Practice: Practice makes perfect. Practice questions will be assigned after most class meeting and your answer should be written in your notebook or a separate solution notebook. Since this exercise is a formative assessment, I will check your solutions periodically and give you feedback. Grading will be based on your attempt to answer the questions.

Exams: There will be three in-class exams (**09/21, 10/26 & 11/30**). The content of each exam will be mainly topics covered prior to the exam. However, chemistry concepts are intertwined and some questions might contain questions from previous topics.

Project: There are two aspects to the class project: a weekly literature survey and two modeling activities. Each week you will complete a brief survey (Google form) on **one** just published paper (published in Inorganic Chemistry, Organometallics or Coordination Chemistry Review) on an inorganic chemistry topic that you are interested in. Links to these publications are available through the library and you can sign up for RSS or email alerts from the publication(s). We will have two modeling assignment: one with model sets (due **9/19**) and another based on 3D printing of complexes (due **12/05**). More information about the modeling activity will be given in class.

Final exam: A cumulative final exam will take place in **Dec 15th 2016** at 8:30 am. The exam can only be rescheduled with the permission of the Associate Provost, plan accordingly.

Tentative Schedule

Week – Dates	Topic/event	Reading (DIC6)
1 – 8/24	Intro, atomic structure & electronic configuration	1.1–1.4
2 – 8/29 & 8/31	Periodic table, element, isotope & classification. Bonding, CB, Lewis, Shapes	2.1-2.4, 3.1-3.5
3 – 9/05 & 9/07	Symmetry elements & points groups, network solids	3.12, 3.10
4 – 9/12 & 9/14	Brief MO intro, LCAO, band theory, metallic bonding & crystal packing	3.6-3.8, 4.1-4.3
5 – 9/19 & 9/21	Alloys & ionic bonding (T) and Exam 1 (R)	4.5, 5.1, 5.3
6 – 9/26 & 9/28	Acid & Base	7.1–7.3, 7.4
7 – 10/03	Acid & Base	7.5-7.6
B: 10/05	Fall Break	
8 – 10/10 & 10/12	Redox	8.1-8.4, 8.6-8.7
9 – 10/17 & 10/19	Redox	8.6-8.9
10 – 10/24 & 10/26	Exam 2 (T) and TM	19.1-19.2
11 – 10/31 & 11/02	CC, ligands, structures, naming, bonding theories	19.3-19.6
12 – 11/07 & 11/09	CFT, CFSE, hs/ls	19.6-19.7
13 – 11/14 & 11/16	Magnetism and visible spectroscopy	19.8-19.9
14 – 11/28 & 11/30	CC (T) and Exam 3 (R)	19.8-19.9
15 – 12/05 & 12/07	Organometallic Chem, Class summary/ review	23.1-23.3, 23.6
16 – 12/15	Cumulative exam @ 8:30 am	

Also study: Study the following sections after the dates indicated in in bracket. Periodic trends, 2.5-2.7 (**8/29**); Intermolecular forces and electronegativity scales, 3.11 (**8/31**); Bonding continuum, 3.14 (**9/5**); MO of heteronuclear diatomic molecules, 3.9 (**9/12**); Nanometal particles, 4.6 (**9/14**).

Important class policies:

Attendance: Attendance at all class meeting is expected. Excessive and unexplained absences will result in dismissal from the course. If you must miss class for excused absence such as family or medical emergency or a scheduled sporting event, inform the Dean of academic advising and me as soon as possible. To be considered for extension on academic work, a notice from the Dean will be required.

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Safety: I will provide and we will use gloves when there is a demo performed in class.

Academic accommodation: Students who anticipate they may need accommodation in this course because of the impact of a learning, physical or psychological disability are encouraged to contact Erin Salva (salvae@kenyon.edu, 740-427-5453), Director of Student Accessibility and Support Services. Early contact will help avoid unnecessary inconvenience and delays.

Academic Honesty: All work turned in for credit must adhere to the principles of academic integrity (see Academic Honesty and Questions of Plagiarism in the Course Catalog). Copying colleague's texts, not citing source materials are examples of incidences that could potentially violate academic integrity. Potential violations will be forwarded to the Academic Infractions Board for adjudication, as is required by University policy. If the ethical implication of any situation is not clear, do ask me for clarification.

Bias/Discrimination/Harassment: Kenyon College seeks to provide an environment that is free of bias, discrimination and harassment. If you have experienced sexual harassment/misconduct/assault, interpersonal violence or stalking we encourage you to report it. If you report the incident to a faculty member, they must notify Kenyon's Title IX coordinator of any information about the incident you provide. Kenyon College's title IX and VAWA policy is available at: <http://www.kenyon.edu/directories/offices-services/title-ix/policy/>

Aug 24th	Meet and greet, quantum number, atomic orbital shapes & electronic configuration
Aug 29 th	Periodic table, stability of elements, classification of element, isotopes
Aug 31 st	All types of bonding, covalent bonds, Lewis structures (ask students to draw, 10 examples) and shapes. Lewis, VBT, VSEPR, network covalent compounds: diamond, graphite, silica etc. intermolecular forces
Sept 1 th & 14 th	Bonding: covalent (MO), ionic and metallic. Shapes of metallic compds
Sept 19 th & 21 st	Literature review 1, exam review 1 and exam 1
Sept 26 th & 28 th	
Oct 3 rd	
Oct 10 th & 12 th	
Oct 17 th & 19 th	
Oct 24 th & 26 th	
Oct 31 st & 2 nd	
Nov 7 th & 9 th	
Nov 14 th & 16 th	
Nov 28 th & Nov 30 th	
Dec 5 th & 7 th	

Demos

- 1) Elephant toothpaste – first class to illustrate role of electrons in chemistry
- 2) Reaction of Al & Br, Zn & I to illustrate bonding triangle
- 3) **Alloys, network solids, band gap, gallium**
- 4) **Reaction of P₂O₅, CO₂, NaO, MgO with water. Acid-base of oxides**
- 5) **Reaction of NaCl, MgCl₂, FeCl₃, FeCl₂, ZnCl₂, with water and indicator. Aqua acids**
- 6) **Electrolysis of water with Bromothymol blue**
- 7) **Color of Aqua acid of TM complex, KMnO₄, heat gun & CoCl₄**

Check homework on Thurs? Send lit survey reminders on Sunday and due on Mon. modeling activity: assemble the models or print the models, take pictures, make a presentation: bonding type, fun fact, atoms, etc. Modeling activity (buckyball, quartz, diamond, crystal packing-double sided sticky tape & NaCl - need to buy), due 9/19 & 12/05.

Email alert from ACS require membership

All types of bonding (8/31), strong and weak, look for good reference.

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