

Instructor: Dr. K. Walters
SC 348
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<http://www.nku.edu/~walterske>

Office Hours: I have an open office policy, so stop by whenever you have a question (I will not always be in my office but will always indicate where I can be found or when I will return). My formal office hours are as follows: MWF 10:00 – 11:30, TR 9:15 – 10:30 and 12:30 – 1:40. Feel free to make an appointment for any other time (there are scheduling links in Blackboard). I will also schedule “online” office hours on Blackboard from time to time.

Prerequisite: C or better in CHE 310 (Organic Chemistry I) or equivalent

Corequisite: CHE 320L

Student Learning Outcomes: CHE 320 fulfills the following NKU chemistry department student learning outcomes:

1. Explain the major concepts and experimental findings in the chemical sciences.
2. Utilize critical thinking skills to apply concept knowledge and adapt experimental techniques to: a) form and test hypotheses and b) solve scientific problems.
3. Compile, critically evaluate, and interpret scientific information and data.
4. Evaluate the relationships between chemistry and mathematics, physics, biology, and other disciplines and between chemistry and society.
5. Apply computer technology and other technologies in the comprehension, interpretation, and presentation of the chemical sciences.

Objectives:

1. Describe basic bonding theories and explain the properties of inorganic compounds using said theories.
2. Summarize the various spectroscopic methods utilized in determining the structure and properties of inorganic compounds and predict said properties using these methods.
3. Explain the various trends observed between periods and groups in the physical and chemical properties of transition metal coordination complexes.
4. Describe the various uses, common compounds, and representative reactions of the transition metals.
5. Demonstrate comprehension of inorganic reaction pathways through determination of reaction products based on available reagents and reaction conditions.
6. Distinguish the similarities and differences between transition metal chemistry and the chemistry of the lanthanides and actinides.
7. Explain the role of inorganic chemistry in the fields of materials science, environmental chemistry, and biochemistry.
8. Demonstrate comprehension of inorganic chemistry through the usage of primary source research articles in answering test questions and preparing summary reports

The Student:

1. ...should always come to lecture on time.
2. ...should review material from previous courses as needed to understand new topics.
3. ...should stay *ahead* of the lecture in the textbook.
4. ...should come to lecture already having read the anticipated material to be covered.
5. ...should participate in lecture at every opportunity to demonstrate comprehension.
6. ...should complete all assignments on time.
7. ...should try to have at least a little fun learning inorganic chemistry.

The Instructor:

1. ...should always be on time for lecture and be prepared to teach.
2. ...should present material in a clear, organized manner at a speed necessary to cover all topics.
3. ...should encourage the student to think about the presented material creatively.
4. ...should assign appropriate problems to help the student master the material.
5. ...should prepare fair, thorough exams that cover the presented material.
6. ...should be absolutely impartial in all matters grading.
7. ...should have lots of fun teaching inorganic chemistry.

Required Text: *Inorganic Chemistry*, by Shriver & Atkins (4th Edition), Freeman, 2006.

Course Content: The class will be broken into three sections: 1) Introduction to Inorganic Chemistry; 2) Transition Metal Coordination Chemistry; and 3) Special Topics. This will require some skipping around in the text as profiled in the course online. Note that not all topics covered in the assigned chapters will be covered in lecture, and you will be responsible for only what is covered in lecture and assigned homework problems. For section 3, additional primary source readings may be assigned. Please note that the majority of the introductory chapters will not be covered in lecture, but it will be your responsibility to understand the material since it has been covered in previous chemistry classes (as demonstrated by the take-home exam). See the “What you Should Know in Inorganic Chemistry” addendum for more details. In addition, we will cover one section of the periodic table on selected Thursdays as indicated in the course schedule. The last ten minutes of lecture will be

reserved for “element Jeopardy”, where you will be called upon to answer questions (and win bonus points!) about the elements in that portion of the table. You should use your textbook and the internet to learn about these elements before coming to lecture that day. Failure to prepare for these activities may have an adverse affect on your class participation grade.

Web Enhanced: This is a web enhanced course. Students meet at regularly scheduled class time and will need access to the internet to fulfill course requirements.

Blackboard: The NKU Blackboard website is used extensively in this course (<http://learnonline.nku.edu>). Course announcements, homework assignments (and their answers), grades, online supplementary materials, and discussion boards, are available *only* through the site, and you are responsible for all posted information. Take advantage of all the presented material (especially the discussion board), and please post questions to me on the discussion boards if possible rather than sending me email.

Communication: You should always feel free to seek any appropriate out-of-class assistance from the instructor in your efforts to master the materials presented in this course. While you should feel free to contact your instructor, please keep the following in mind:

- Use the posted office hours of the instructor or schedule an appointment if you have many questions to answer or if the explanation is better conducted in person than via email. The instructor reserves the right to request that you come to their office if he cannot adequately respond to questions posed in emails or voicemails.
- Come to the instructor’s office with specific questions to address, which will make the interaction more productive.
- Do not make a habit to only visit the instructor’s office a few minutes before a homework deadline or exam period. In general no significant assistance will be provided within 2 hours of such a deadline.
- Emails sent to your instructor should have a specified subject in the subject line that starts with CHE 320 (e.g., CHE 320 - Question on tomorrow’s homework problem set). Emails not conforming to this structure will be considered spam mail by the instructor and likely deleted with no response. When possible, use your NKU email account to send the email, and sign all emails with your full name!
- Emails sent from your instructor will be sent to your NKU email account and will include CHE 320 in the subject line. Make sure you check your email account on a regular basis or have your messages forwarded to the account you regularly use. NKU email accounts also regularly get full with email, which will cause new messages to “bounce” and not be received. Make sure you keep this account under the size limit!
- Do not expect an instant reply to your email or voicemail messages! The instructor deals with messages in the order received, and usually can respond within 24 hours (possibly longer on the weekends).
- Refer to the “Talk and Email” section later in the syllabus for more tips on communication with your instructor (and all instructors in general).

Attendance: Attendance is not taken in this course. You are all adults, so it is up to you to make the effort to attend or not. However, it will be very difficult to be successful in this course if you do not attend all lectures, and your participation grade will be adversely affected.

Homework: Problem sets will be assigned for each chapter, and will be posted online (along with their due date). You should use these assignments as an opportunity to test your comprehension of the presented material. Make sure that you hand in a **NEAT** copy of your problem set by the due date. Late homework assignments will receive a **50% penalty** if turned in within one day of the due date, and a **zero grade past one day late**.

Seminars: All students are **required** to attend at least two seminars during the term (attending additional seminars will result in extra credit). Qualifying seminars are provided by the NKU science departments, UC chemistry department, or NKU SAACS seminars. Appropriate documentation (a form posted online) must be provided to indicate your attendance. Seminar attendance is counted as a portion of your homework grade. Should your schedule not permit you to attend seminars, arrangements can be made for additional writing assignments to cover this portion of your grade.

Studying: It has been said that students should spend 2-3 hours studying for each hour of lecture. Science courses tend to err on the high side of this estimate, so you should commit yourself to studying **9-12 hours** each week during the course. Cramming the last night or two before exams will not be sufficient to comprehend the material.

Writing: Three short papers are required during the term. Each of the papers should summarize an article pertaining to some aspect of inorganic chemistry (articles must be provided to and receive the approval of the instructor at least **one week** prior to the due date). Articles should be selected from the appropriate journal listed below for each paper. Papers should be at least **three pages** long, **typed**, and an appropriate format (12 point font, 1 1/2 line spacing, 1” margins). Remember to check your spelling and grammar! You should include a cover page listing title, your name, and the reviewed article information. Papers will be submitted electronically through Blackboard. Papers 1 and 2 will be reviewed both by myself and a peer in the class. Participation in the peer review will be credited as a homework assignment.

Paper #1: Due 2/20, Article in *Inorg. Chem.*, **2006 – 2008**.

Paper #2: Due 3/27, Article in *J. Am. Chem. Soc.*, **2006 – 2008**.

Paper #3: Due 5/1, Article in *Organometallics* or *Langmuir*, **2006 – 2008**.

Exams: There will be four exams (take-home due 1/20, 2/6, 3/6, and 4/10) along with a comprehensive final (Thursday 5/7 1:00 – 3:00) during the term. The purpose of these exams is to evaluate your ability to apply concepts, explain facts and theories,

predict the outcomes of reactions, and to test your understanding of how reactions work together to produce a desired product. A significant portion of the exam material will be derived from your assigned homework problems. Normally there are **no makeup exams**, and a missed exam will be assigned a zero grade. Note further that **these exams will be conducted outside of the normal lecture period**, as they will take longer than the lecture period to complete. Arrangements will be made leading up to each exam date to provide for additional time, although the preferred time will be in the afternoon (2 – 5PM). You will be given a **maximum of 2.5 hours** to complete any given exam.

Honor Code:

The work you will do in this course is subject to the Student Honor Code. The Honor Code is a commitment to the highest degree of ethical integrity in academic conduct, a commitment that, individually and collectively, the students of NKU will not lie, cheat, or plagiarize to gain an academic advantage over fellow students or avoid academic requirements. You should familiarize yourself with the Honor Code at the following website:\

<http://www.nku.edu/~deanstudents/documents/StudentCodeUpdated8-07.pdf>

Cheating:

Cheating will not be tolerated in this course. In accordance with the Code of Student Rights and Responsibilities, faculty members have the right to determine actions to be taken when a student is caught cheating. In this course, students caught cheating and/or plagiarizing is grounds for immediate dismissal and an F course grade, along with a report filed with the Dean of Students.

Calculators:

Programmable and graphing calculators are not permitted during exams. A basic scientific calculator (e.g., TI 34II, TI 30X) should be brought to class **every day**, as they may be needed during lecture examples and may be necessary for taking exams. Under no circumstances may calculators be shared during exams, and the lack of an operable calculator will not excuse you from completing the problems! You should also **practice** with this calculator before you use it in an exam!

Electronic Devices:

Cell phones, pagers, and watch alarms **should be turned off and put away during lecture**. If you anticipate an emergency call (e.g., child sick), please leave your phone on vibrate but put away (in your pocket, not on the desk) and sit in the back of the room. Should you receive a call, please quietly leave the lecture room to answer it. Should your device audibly ring during class, you will be asked to leave with no further discussion and receive an unexcused absence for the day. **Use of a cell phone or pager during an in-class quiz or exam will be considered cheating**, and appropriate actions will be taken by the instructor. You are welcome to use computers during lecture for note-taking purposes, but should the instructor notice other computer usage not relevant to the lecture (e.g., email, web surfing) your computer privileges will be removed for the remainder of the course.

Assessment:

Assessment of topics learned in this course will be achieved through the completion of homework assignments, literature summary papers, class participation, and critical thinking problems on exams. Course grades are assigned based on the following scheme:

Class Participation (50 pts)	= 50 points
Homework (125 pts)	= 125 points
Papers (25 pts each)	= 75 points
4 Exams (150 pts. each)	= 600 points
Final Exam (150 pts.)	= 150 points
Total possible points	= 1000 points

Point TotalGrade

890 – 1000	A
780 – 889	B
670 – 779	C
560 – 669	D
0 – 559	F

Talk and Email:

- Be mannerly. Before asking "What are your office hours?", check your syllabus. If hours aren't listed or won't work, ask your professor when he or she can meet with you. A reasonable professor will understand that office hours cannot accommodate every student's schedule.
- When you arrive at the professor's office, knock on the door, even if it's open, and greet your professor by name.
- If you're coming in to talk because you're having difficulty in a course, there are a few familiar sentences to avoid: "Will this affect my grade?" Whatever "this" is, it will play a part in your grade. How much or how little depends upon the rest of your work. "Can I still get a A/B/C/D/Pass?" This question will usually lead a professor to think that your grade-point average, not learning, is your priority. "I'm an A student." Grade inflation is widespread, and some of those As may not be the most accurate evaluations of your work. Even if they are, your professor won't grade you on the basis of your reputation.
- If you want to talk to a professor in some other way (about a question that you didn't get to ask in class or an idea that you want to discuss) just do the best you can. Your professor will very likely meet your genuine interest with kindness and encouragement.
- If you are having difficulty in a course, let your professor know that you realize it, and ask what you can do to improve.

- Ending the conversation can be tricky. Some professors will wrap things up for you, while others will be happy to just keep talking. In other words, a signal that you're "dismissed" may not be coming. So don't hesitate to take the initiative in bringing the conversation to an end, especially if you have other obligations.
- In emails, choose an appropriate greeting. "Hi/Hello Professor [Blank]" is always appropriate. Substitute "Dear" and you've ended up writing a letter; leave out "Hi" and your tone is too brusque.
- Avoid rote email apologies for missing class. Most professors are tired of hearing those standard apologies and acts of contrition.
- Ask politely. "Could you e-mail me the page numbers for the next reading? Thanks!" is a lot better than "I need the assignment."
- Proofread what you've written. You want your e-mail to show you in the best possible light.
- When you get a reply, say thanks. Just hit Reply and say "Thanks," or a little bit more if that's appropriate. The old subject line (which will now have a "Re:" in front) will make the context clear.

Other Notes:

- All items on this syllabus are subject to change by the instructor. Check the NKU Blackboard website regularly for updates.
- Students are responsible for reading and understanding all items on the syllabus. Any items not understood must be brought to the attention of the instructor within the first two weeks of class.
- Faculty members reserve the right to dismiss or to have removed a disruptive student from their classrooms.
- No smelly, messy, or loud food is allowed in class. Violators will be asked to leave.
- Students with disabilities who require accommodations (academic adjustments, auxiliary aids or services) for this course must register with the Disability Services Office. Please contact the Disability Service Office immediately in the University Center, Suite 320 or call 859-572-6373 for more information. Verification of your disability is required in the Disability Services Office for you to receive reasonable academic accommodations. Visit the Disability Services website at www.nku.edu/~disability/.
- As stated in your catalog, a grade of incomplete is given only at the student's request and where there is reasonable possibility that a passing grade will result from completion of the work.

Course Outline

- I. Introduction to Inorganic Chemistry
 - a. Chapter 2, Molecular structure and bonding (partial)
 - b. Chapter 3, The structures of simple solids (partial)
 - c. Chapter 6, Physical techniques in inorganic chemistry
 - d. Chapter 7, Molecular symmetry
- II. Transition Metal Coordination Chemistry
 - a. Chapter 8, An introduction to coordination compounds
 - b. Chapter 18, The *d*-block metals
 - c. Chapter 19, *d*-Metal complexes: electronic structure and spectra
 - d. Chapter 20, Coordination chemistry: reactions of complexes
 - e. Chapter 21, *d*-Metal organometallic chemistry
 - f. Chapter 25, Catalysis (partial)
 - g. Chapter 22, The *f*-block metals
- III. Special Topics
 - a. Chapter 23, Solid-state and materials chemistry (partial)
 - b. Chapter 24, Nanomaterials, nanoscience, and nanotechnology (partial)
 - c. Chapter 26, Biological inorganic chemistry
 - d. Supramolecular chemistry (not in textbook, material provided)

CHE 320-001 (Walters) Spring 2009

MONTH (WEEK #)	MON	TUES Lecture 1:40 – 2:55	WED	THUR Lecture 1:40 – 2:55	FRI
January (1)	12 Classes Begin	13 1/2	14	15 Hydrogen 2	16
(2)	19 No Classes	20 Exam 1 Due 3	21 SAACS Seminar	22 Group 1 3	23
(3)	26	27 3/6	28	29 Group 2 6	30
February (4)	2 Last Day to "X"	3 6	4 SAACS Seminar	5 Review	6 Exam 2
(5)	9	10 7	11	12 TM 1 st Row 7	13 Paper 1 Topic Due
(6)	16	17 8	18	19 TM 2 nd Row 8/18	20 Paper 1 Due
(7)	23	24 18	25	26 TM 3 rd Row 18/19	27
March (8)	2	3 19	4 SAACS Seminar	5 Review	6 Exam 3
(9)	9 No Classes	10 No Classes	11 No Classes	12 No Classes	13 No Classes
(10)	16	17 19	18	19 Group 13 19/20	20 Paper 2 Topic Due
(11)	23	24 ACS-No Class	25	26 Group 14 20	27 Paper 2 Due
April (12)	30 Last Day to "W"	31 20/21	1 SAACS Seminar	2 Group 15 21	3
(13)	6	7 21	8	9 Review	10 Exam 4
(14)	13	14 22/23	15	16 Group 16 23/24	17
(15)	20	21 24/26	22	23 Group 17 26	24 Paper 3 Topic Due
May (16)	27	28 26/Sp Top	29	30 Group 18 Sp Top	1 Paper 3 Due Classes End
(17)	4	5	6	7 Final Exam 1:00 – 3:00	8

- Notes:**
- This schedule is subject to change by the instructor. Please check Blackboard regularly for updates.
 - Numbers indicate chapter content to be covered each class period.
 - All SAACS seminars will be from 12:00 – 12:50 in SC 402.

CHE 320-001: Inorganic Chemistry – Spring 2009

Student's Acceptance of Course Policies

Please fill out and sign the following form and **return it no later than January 23, 2009** to the instructor. Use **a blue or black pen (no pencil)**.

I, _____, have read the entire syllabus describing the course policies for CHE 320-001, Inorganic Chemistry, taught by Professor Keith Walters. I fully understand these policies and I agree to comply with them during the entire spring 2009 semester.

Signature: _____ Date: _____