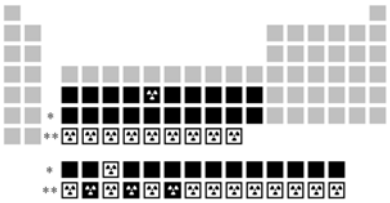

424/525 Advanced Transition Metal Chemistry

Course website: http://web.uvic.ca/~mcindoe/424/424_525.html

Instructor: Scott McIndoe

Contact details are given below; there are no defined office hours for this course, I am happy to see you when you can find me. If you are having difficulty finding me, see me after class and make an appointment.

Office: Elliott 307
Email: mcindoe@uvic.ca

Course Outline

This course is intended to provide a moderately detailed look at the chemistry of the 2nd and 3rd row transition metals as well as the lanthanides and the actinides. The main focus will be on the descriptive chemistry of these elements with reference to underlying periodic trends and differences from the rest of the periodic table and in particular, the first row transition metals. Special topics will highlight areas of current interest or technological relevance. The course is complementary to *423/523 Organometallic Chemistry*, and so a limited amount of such chemistry will be presented.

Suggested Texts

Inorganic Chemistry (Housecroft & Sharpe). Basic coverage of most topics.
Inorganic Chemistry (Atkins & Shriver). Similar coverage to the H&S text.
Advanced Inorganic Chemistry (Cotton & Wilkinson). This classic and rather massive textbook is up to the 6th edition, but the 5th edition is probably the best.
Chemistry of the Elements (Greenwood & Earnshaw). Another big, comprehensive book - probably the best companion for this course but expensive.
d- and f-Block Chemistry (Jones). Focuses exclusively on the subject matter for the course and is inexpensive. Probably the best value for money if you were to buy a textbook just for this course.

More basic texts are not very useful. There is **no compulsory** text for this course, but you should have access to a copy of one of the above texts.

Grades and Examinations

Grades will be assigned on the basis of about 50% being a pass, about 65% being a second, and about 80% being a first, but exact equivalencies will be determined when all marks are available. The total percentage mark will be made up as follows:

Midterm 1 (February 10)	**18 %**
Midterm 2 (March 10)	**18 %**
Class Presentation	**10 %**
Final	**54 %**

The midterms are not *necessarily* the same for 424 and 525 but will be held at the same time (dates are subject to change with due notice). Midterms will be 50 minutes (both will be counted under all circumstances) and final exam 3 hours. Due to Senate regulations limiting the percentage of the final grade that may be allotted to the final examination, any missed midterms will have to be made up.

Graduate (525) students have the **option** of choosing to do a term paper instead of the final exam. The term paper can be on any topic related to heavy transition metal, lanthanide or actinide chemistry subject to approval of the instructor. The paper should present a survey of the topic with appropriate background and provide a thorough discussion of current research trends in this area. The paper should be 20-25 pages double-spaced in length and include figures and appropriate literature references. All papers must be typewritten. Graduates should come and discuss possible term paper topics with me early in the term. The deadline for choosing a topic is February 3. Anyone not picking a topic by this date will be assumed to be taking the final exam instead (you can pick a topic but opt later to take the final exam instead).

Assignments

Assignments will ***not*** be graded. However, problem sets will be given out regularly and some class time will be used to go over these problems. Short model answers will be posted on the course website. Students who do not attempt these assignments will inevitably find the midterm and final exams difficult.

Class Presentations

All presentations will be held in class, and will be for five minutes plus a brief discussion time. You will be expected to choose a recent article in the popular science press (e.g. *C&EN*, *New Scientist*, *Scientific American*, *Chemistry World*) about one of the heavy metals studied in this course and explain the chemistry behind the story.

Example plan of attack:

Go to *C&EN*
Search for “cerium”
Select “Probing oxygen vacancies on ceria”

Email me (mcindoe@uvic.ca) with suggestion(s) for possible articles; include the URLs in your email. I will select one I think to be appropriate (or not already taken!). Once an article has been approved, you should go and track down the original article [in this case, it was *Science* **2005**, *309*, 752]. Follow the literature as far as you need to get a full understanding of the material covered; use textbooks to ensure you have the basics covered. Write a one page summary of the article; this will be handed in to me in the day before your talk. A second page may be used for your references if necessary. The presentation will be 5 minutes long (followed by questions) and held in mid-March, dates to be confirmed. The presentation is worth 10% of your final grade, and both the summary sheet and the presentation itself will be graded.

How will the presentation be graded? Good topic selection is key: a genuinely interesting and relevant article will make it easy for you to deliver an engaging presentation. Being able to explain what it is about the properties of the metal you have chosen that make it crucial to the particular application you are describing is important. Additionally, all of the aspects that make up a quality lecture - e.g. clarity of explanation, interest, style, delivery, ability to answer questions fluently - will be judged.

Course Materials

The course website contains pdf files of class handouts. In cases where the material was sourced from the web, the original links are provided; class versions are usually an abbreviated form. Notes presented in class are not reproduced here; if you have missed lectures, you will need to obtain these off a classmate.