

## Actinide Chemistry: RDCH 710

### **Time and Location**

RDCH 710: Monday, Wednesday 1000-1130, 1st floor conference room HRC  
Fall 2016

### **Grading**

**Homework (20%):** assigned at the end of each topic.

**Exam (60 %):** oral presentations (~20 min, based on topics covered during courses

**Participation (20 %)**

### **Textbook**

The Chemistry of the Actinide and Transactinide Element, Editors, Morss, L.R., Edelstein, N.M., and Fuger, J., 3rd edition, Springer, Dordrecht, Netherlands, 2006

note: The website [springerlink.com](http://springerlink.com) is used for links to book chapters and articles on the actinides. It operates when the page is searched from UNLV.

The goal of the course is to provide students with an understanding of the actinide elements for support in graduate education and research.

The cumulative outcomes for the course are:

- Understand the role of oxidation-reduction reactions in actinides
- Evaluation and utilizing actinide speciation and complexation
- Understanding the impact of f-orbitals on actinide chemistry
- Ability to interpret spectroscopy of the actinides
- Ability to discuss in detail the chemistry of various actinide elements
- Explain how to use actinide nuclear properties in experiments
- Ability to work with radioelement in solution and in the solid-state
- Ability to perform liquid-liquid extraction and synthesis of Uranium compounds

The chemical properties of actinide elements are described and related to their electronic characteristics. Using nuclear properties in understanding actinide chemistry is provided. Presentations are given on exploiting the chemical behavior of the actinides in separation, the nuclear fuel cycle, environmental behavior, and materials.

The course begins with a basic introduction to the actinide elements then progresses to lectures on each individual actinide element. Lectures cover: discovery, separation chemistry, solid-state compounds, analytical chemistry and spectroscopic properties of the individual actinides. RDCH 710 covers the introduction of the actinide elements to the chemistry of neptunium.

## UNLV Policies

**Academic Misconduct** — Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at: <https://www.unlv.edu/studentconduct/student-conduct>.

**Copyright** — The University requires all members of the University Community to familiarize themselves **with** and to follow copyright and fair use requirements. **You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws.** Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

**Disability Resource Center (DRC)** — The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

**Religious Holidays Policy** — Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit:

<http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

**Transparency in Learning and Teaching** — The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:

<https://www.unlv.edu/provost/teachingandlearning>

<https://www.unlv.edu/provost/transparency>

**Incomplete Grades** — The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student’s control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving “I” grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

**Tutoring and Coaching** — The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895- 3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

**UNLV Writing Center** — One-on- one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student’s Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

**Rebelmail** — By policy, faculty and staff should e-mail students’ Rebelmail accounts only. Rebelmail is UNLV’s official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students’ e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

**Library Resources** — Students may consult with a librarian on research needs. For this class, the subject librarian is [https://www.library.unlv.edu/contact/librarians\\_by\\_subject](https://www.library.unlv.edu/contact/librarians_by_subject). UNLV Libraries provides resources to support students’ access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>.

**Final Examinations** — The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.

### RDCH 710 Actinide Chemistry Course Schedule

Wk	Date	Instructor	Lecture#	Topic
1	August 29	FP		Introduction
	August 31	FP	1	General overview
2	September 5			NO CLASS
	September 7	FP	2	Actinium
3	September 12	FP	3	Thorium-1
	September 14	FP	4	Thorium-2
4	September 19	FP		Correction homework 1-4
	September 21	FP	5	Proactinium
5	September 26	FP	6	Uranium-1
	September 28	FP	6	Uranium-2
6	October 3	FP	6	Uranium-3
	October 5	FP	6	Uranium-4
7	October 10	FP		Correction homework 5-6
	October 12	FP	7	Neptunium-1
8	October 17	FP	7	Neptunium-2
	October 19	FP	7	Neptunium-3
9	October 24	FP		Correction homework 7
	October 26	FP	8	Plutonium-1
10	October 31	FP	8	Plutonium-2
	November 2	FP	8	Plutonium-3
11	November 7	FP	8	Plutonium-4
	November 9	FP	8	Plutonium-5
12	November 14	FP	8	Plutonium-6
	November 16	FP		Correction Homework 8
13	November 21	FP	9	Presentation UREX process
	November 23			NO CLASS
14	November 28	FP	9	Presentation UREX process
	November 30	FP	10	Presentation PUREX process
15	December 5	FP		Correction and Homework 9-10
	December 7	FP		Open Discussion / question
16	December 12	FP		Final