

The University of Western Ontario

Synchrotron & Materials II

Course Information Chemistry 9784S: Synchrotron & Materials II

Dates: Tuesdays 9:30 -12:00 for six weeks. Room 3402 MSA
Class begins the week of January 6, 2025.

Instructor

Professor Tsun-Kong (T.K.) Sham

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Course Description X-ray spectroscopy and imaging using synchrotron radiation and applications

Topics include:

- Review of synchrotron radiation and X-ray properties of elements
- X-ray Absorption Near Edge Structure (XANES) Spectroscopy
- Extended X-rays Absorption Fine Structure (EXAFS) Spectroscopy
- Inelastic X-ray Scattering (IXS), X-ray Emission Spectroscopy (XES) off resonance and on resonance (RIXS and RXES)
- X-ray Excited Optical Luminescence (XEOL)
- Applications of X-ray micro beam for imaging and micro-spectroscopic analysis

Course Materials

No textbook, lecture notes and supplemental materials will be either posted on OWL or distributed in class Several reference books are suggested below:

J. Stöhr, NEXAFS Spectroscopy (Springer, 1992)

Jeroen A. Van Bokhoven and Carlo Lamberti (ed), X-Ray Absorption and X-Ray Emission Spectroscopy: Theory and Applications 2016, |Online |DOI:10.1002/9781118844243

John Evans, X-ray Absorption Spectroscopy for the Chemical and Materials Sciences (Wiley, 2018)

T.K. Sham (ed) Chemical Applications of Synchrotron Radiation (World Scientific, 2002)

Frank de Groot and Akio Kotani, Core Level Spectroscopy of Solids (Taylor & Francis CRC press, 2008)

Grant Bunker, Introduction to XAFS (Cambridge University press, 2012)

Method of Evaluation

Assignments: two to three with equal weight (60 %). Written essay or CLS beamtime proposal with an oral presentation (written: 20 %; oral: 20%)

Students must pass both with at least 60% each to pass the course.

Course Attendance and Missed Tests/Exams

Appeals related to information missed due to course absences will not be considered for the basis of a grade appeal. If you are unable to meet a course requirement due to illness or other

serious circumstances, you must provide valid medical or other supporting documentation to your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. The weight of missed course material will be transferred to the final examination in cases where medical accommodation has been granted. It is the policy of the Department of Chemistry that when a student takes a test or examination, they have deemed themselves fit to do so. Claims of distress or medical issues after the fact will not be considered for the basis of a grade appeal.

Statement of Academic Offences:

Scholastic offences are taken seriously, and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

Additionally, “All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism.” All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the Senate Agenda March 15, 2024, ITEM 8.3 107

Statement on Gender-Based and Sexual Violence

Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who is going through or has gone through these traumatic events. If you are experiencing or have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including emergency contacts at the following website:

https://www.uwo.ca/health/student_support/survivor_support/get-help.html

To connect with a case manager or set up an appointment, please contact support@uwo.ca.”

Statement on Generative Artificial Intelligence (AI)

Use of generative artificial intelligence (AI) tools/software/apps is acceptable in this course except for essay writing. For more information please refer to information on the SGPS website at: https://grad.uwo.ca/about_us/policies_procedures_regulations/ai.html.