

Chem 375: Solid State Chemistry
Special Precautions for COVID-19!

Face Coverings:

- At all UW-Stevens Point campus locations, the wearing of face coverings is mandatory in all buildings, including classrooms, laboratories, studios, and other instructional spaces. Any student with a condition that impacts their use of a face covering should contact the [Disability and Assistive Technology Center](#) to discuss accommodations in classes. Please note that unless everyone is wearing a face covering, in-person classes cannot take place. This is university policy and not up to the discretion of individual instructors. Failure to adhere to this requirement could result in formal withdrawal from the course.

Other Guidance:

- Please monitor your own health each day using [this screening tool](#). If you are not feeling well or believe you have been exposed to COVID-19, do not come to class; email your instructor and contact Student Health Service (715-346-4646).
- As with any type of absence, students are expected to communicate their need to be absent and complete the course requirements as outlined in the syllabus.
- Maintain a minimum of 6 feet of physical distance from others whenever possible.
- Do not congregate in groups before or after class; stagger your arrival and departure from the classroom, lab, or meeting room.
- Wash your hands or use appropriate hand sanitizer regularly and avoid touching your face.

Please maintain these same healthy practices outside the classroom 😊

Instructor	Robin S. Tanke
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Office:	CBB447
Office Hours:	Due to COVID-19 by Appointment Only – Please e-mail for an appointment most likely via ZOOM.

Prerequisite: Chem 325 or Chem 220 Concurrent

Class Sessions:

Lecture:	T, R, F 9:00 – 9:50 AM CBB105
Lab	W 2:00 -5:00 PM CBB 420

Purpose: The purpose of this course is to introduce students to a number of materials including metals (alloys), ceramics (glasses), natural or synthetic polymers, semiconductors or composites and to discuss how the structure of a material relates to the chemical, mechanical, electrical, magnetic and optical properties of a material

Learning Outcomes: Upon completing this course, students will be able to:

After completion of this course students should be able to:

- Describe crystalline materials in detail and “defects” influence the properties of materials.
- Explain the different bonding types and which applies to the different types of materials (solids, metals, ceramic, polymers, etc.)
- Perform and describe various syntheses of solid state materials.
- Discuss and as possible use a variety of methods to characterize solid state materials such as X-ray diffraction, spectroscopy, Microscopy and Thermal Analysis
- Describe properties of solids such as:
 - *mechanical* - tension, compression, and sheer strength, brittle vs malleable vs tough, elastic vs rigid;
 - *electrical* - conductor, semiconductor, insulator; piezoelectric, pyroelectric, and ferroelectric
 - *optical* – transparent, reflective, opaque; absorption, emission, refraction
 - *thermal* – conductor, insulator; melting and glass transition temperatures;
 - *chemical* - resistance to various types of reactions, heterogeneous catalysts;
 - *magnetic* - diamagnetic, paramagnetic, ferromagnetic

Required Texts and materials:

Available from text rental: West, A. Solid State Chemistry and its Applications, Second Edition, Student Edition. Wiley 2014 and its companion website including Crystal Viewer.

To purchase:

- A bound laboratory notebook and access to a camera or scanner.
- A clean flash drive for data storage for some instruments this is the only way to save data.

Grading: There are 765 points for the class. You will be issued the following letter grades A above 720 points; B above 635 points; C above 550 points; D above 495, below 495 F. Minus and plus grades will be issued to students close to the cutoff grades.

9 Homework Assignments	9 x 10 points each	90 points
4 Exams	4 x 75 points each	300 points
Labs and Lab quiz	detailed in the Lab schedule	225 points
Final		150 points

POLICIES AND OTHER CONSIDERATIONS

UWSP Community Bill of Rights and Responsibilities

UWSP values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to succeed, a set of expectations have been developed for all students and instructors. This set of expectations is known as the Rights and Responsibilities document, and it is intended to help establish a positive living and learning environment at UWSP. For more information go to:

https://www.uwsp.edu/dos/Documents/2015_Aug_Community%20Rights%20and%20Responsibilities%20Web.pdf

The Rights and Responsibilities document also includes the policies regarding academic misconduct are found on page 11.

Americans with Disabilities Act

The Americans with Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities.

If you have a disability and require classroom and/or exam accommodations, please register with the Disability and Assistive Technologies Center and then contact me at the beginning of the course. I am happy to help in any way I can. For more information, please visit the DATC, located on the 6th floor of the Learning Resource Center (the Library). You can also find more information here: <https://www.uwsp.edu/datc/Pages/contact.aspx>

Attendance

If you are able, please attend class. If you are ill, need to quarantine or are uncomfortable, class lectures will be recorded and posted on CANVAS. Should I become ill, need to quarantine, or feel uncomfortable, lectures will be asynchronous. If the need to miss lab arises, please contact me as soon as possible. We will work together on how to proceed depending on how long you will have to be out and your individual circumstances.

All handouts will be posted on CANVAS. All homework assignments, Lab notebook scans and photos of data, Lab reports, Written Assignments and Exams will be upload to Canvas.

Tentative Schedule

Week	Topic	Evaluation (CANVAS)
1 (9/2)	Chapter 1: Symmetry elements, Crystal systems, Bravais Lattices and Miller Indices.	Information about you! Due 9AM Friday 9/4
2 (9/8)	Chapter 1: Unit cell densities and bond lengths, common crystal forms for metals and ionic compounds	Homework 1 due 9/11
3 (9/15)	Chapter 2: Crystal Defects, Non stoichiometry and Solid Solutions	Homework 2 due 9AM Friday 9/18

4 (9/22)	Chapter 3: Bonding in Solids	Exam 1 Friday 10/2 Chapters 1-2
5 (9/29)	Chapter 4: Synthesis and processing of inorganic solids.	Homework 3 due 9AM Friday
6 (10/6)	Chapter 4: Synthesis and processing of inorganic solids.	Homework 4 due Friday
7 (10/13)	Chapter 5: X-ray Diffraction	Exam 2 Chapters 3-4 10/16
8(10/20)	Chapter 6: Microscopy and Spectroscopy Techniques	Homework 5 due Friday
9 (10/27)	Chapter 6: Thermal Techniques Supplement: Organic Polymers	Homework 6 due Friday
10 (11/3)	Organic Polymers and Chapter 7: Phase Diagrams	Exam 3 Chapters 5 and 6
11 (11/10)	Chapter 8: Electrical properties	Homework 7 due Friday
12 (11/17)	Chapter 8: Electrical properties	Exam 4 Organic polymers and Chapter 7.
13 (11/24)	Chapter 9: Magnetic Properties (Thanksgiving – no class R or F)	Get ready for the online end to the semester!
14 (12/1)	Chapter 10: Optical Properties	Friday Homework 8 due
15(12/8)	Chapter 10 Optical Properties	Homework 9 due Friday
12/17	Final due 4:45PM Thursday 12/17/2020	Final Cumulative exam with a focus on Chapters 7-9

Robin Tanke Fall Semester 2020

	Monday	Tuesday	Wednesday	Thursday	Friday
08:00	SAFER		325 Lab 01L2 420/426		
09:00	At	375 Lec 01 CBB 105	325 Lab 01L2 420/426	375 Lec 01 CBB 105	375 Lec 01 CBB 105
10:00	Home		325 Lab 01L2 420/426		
11:00		325 Lab 02L1 420		Research	
12:00		325 Lab 02L1 420		Research	
13:00	SAFER	325 Lab 02L1 420		Research	
14:00	at		375 Lab 01L1 420	325 Lab 02L2 420/426	Virtual Meeting
15:00	Home		375 Lab 01L1 420	325 Lab 02L1 420/426	Virtual Meeting
16:00			375 Lab 01L1 420	325 Lab 02L1 420/426	