

CHEMISTRY 425/625: CRYSTALLOGRAPHY
Fall, 2017
INSTRUCTOR: JON ZUBIETA

Text: X-Ray Crystallography, by Gregory S. Girolami, University Science Books, Mill Valley, CA. (2015). ISBN: 978-1-891389-77-1

Please check SU Blackboard for announcements.

Website: <http://chemistry.syr.edu/che625>
Username: student; password jaz625

Class Hours and Location: MWF, 9:35AM- 10:00AM. CST1-109

At the heart of crystallography lies an object – the **crystal**. Crystallography is concerned with the laws governing the crystalline state of solid materials, with the arrangement of atoms in crystals, and with their physical and chemical properties, their synthesis and their growth.

Crystals play a role in many subjects, among them mineralogy, inorganic, organic and physical chemistry, physics, metallurgy, materials science, geology, geophysics, biology and medicine. This pervasiveness is perhaps better understood when it is realized how widespread crystals are: virtually all naturally occurring solids, i.e. minerals, are crystalline, including the raw materials for chemistry, e.g. the ores. A mountain crag normally is made up of crystals of different kinds while an iceberg is made up of many small ice crystals. Virtually all solid inorganic chemicals are crystalline, and many solid organic compounds are made up of crystals, among them benzene, naphthalene, polysaccharides, proteins, vitamins, rubber and nylon. Metals and alloys, ceramics and building materials are all made up of crystals. The inorganic part of teeth and bones is crystalline. Hardening of the arteries and arthritis in humans and animals can be traced to crystal formation. Even many viruses are crystalline.

The topics to be covered will include the following. Approximate class dates and the schedule of examinations are also listed:

Topic	Approximate Dates
• Point and Space Symmetry	Aug. 28, 30; Sept.1, 6
• Crystallographic Space Groups	Sept. 8, 11, 13, 15, 18, 20, 22
First Hour Examination	Sept. 25
• The Use of International Tables for X-Ray Crystallography	Sept. 27, 29; Oct 2, 4, 6
• Diffraction of X-Rays by Crystals	Oct. 9, 11, 13, 16

- Powder and Single Crystals Techniques Oct. 18, 20
- Second Hour Examination Oct. 23**
- Electron Density Calculations Oct. 25, 27, 30
- Fourier Synthesis Nov. 1, 3, 6, 8, 10
- Patterson Methods Nov. 13, 15
- Third Hour Examination Nov. 17**
- Direct Methods Nov. 27, 29; Dec. 1, 4
- Selected Topics Dec. 6, 8
- Final Examination TBA**

Academic Honesty: Complete academic honesty is expected of all students. Any incidence of academic dishonesty, as defined by the SU Academic Integrity Policy (see <http://academicintegrity.syr.edu>), will result in both course sanctions and formal notification of the College of Arts & Sciences. In this course, students are allowed and encouraged to work and study together, but all assignments turned in must be the work of the individual student and may not be copied from another student's work, the text, or any other source, except for short quotations with proper attribution.

Disability Accommodation: Students with any sort of disability who may need special accommodations should see me right away. In order to obtain authorized accommodations, students should be registered with the Office of Disability Services (ODS), 804 University Avenue, Room 309, 315-443-4498 and have an updated accommodation letter. Accommodations and related support services such as exam administration are not provided retroactively and must be requested in advance.