

Iona College
CHM 320: Chemical Synthesis Laboratory
Spring 2006

Description

A survey of selected techniques employed in the synthesis of organic, inorganic and organometallic compounds, natural products and polymers. This course in preparative methods also includes physical and analytical methods associated with the isolation and characterization of the target compounds.

Instructor

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Required Texts

G. S. Girolami, T. B. Rauchfuss and R. J. Angelici, Synthesis and Technique in Inorganic Chemistry: A Laboratory Manual 3rd Edition: University Sciences Books, Sausalito, CA (1999).

K. Williamson, Macroscale and Microscale Organic Experiments 4th Edition, Houghton Mifflin, Boston, MA (2003).

Objectives

The object of the course is to instruct the student in selected methods employed in modern synthetic chemistry. The course is designed to foster and develop a greater awareness and skill regarding the manipulation of materials such that isolation of pure products from the various syntheses may occur at optimum yields. In addition, students will be instructed in using the physical and analytical methods required for proper characterization of the isolated products. It is expected that students learn to use laboratory time efficiently, routinely factor laboratory safety into experimental work, become more acquainted with the chemical literature and keep a laboratory notebook.

Grading Criteria

Laboratory Work: 80%

(Includes purity and characterization of the products, safety assessment, literature study and laboratory notebook.)

Exams, Quizzes: 20%

Policy on Plagiarism and Academic Dishonesty

Academic dishonesty and/or plagiarism on any assigned work will result in a grade of F on the assignment with no opportunity for make up.

Experiments

Ten to twelve experiments will be conducted including at least one from each of the following six areas:

I. Multistep Organic Synthesis:

- Diphenyl Acetylene
- Stilbene Dibromide
- Stilbenediol Diacetate

II. Inorganic Synthesis

- The 1-2-3 Superconductor $\text{YBa}_2\text{Cu}_3\text{O}_7$
- The Molecular Sieve Zeolite-X
- Vacuum Line Synthesis of GeH_4
- Microscale Synthesis of Vaska's Complex
- Preparation and Aquation of $\text{Co}(\text{NH}_3)_5\text{Cl}_2$
- Buckminsterfullerene

III. Organometallic Synthesis

- Acetylferrocene
- Organometallic Tin Derivatives
- Organoiron Chemistry
- Metal-Arene Complexes
- The Air Sensitive Sandwich Complex Nickelocen

IV. Heterocyclic Synthesis

- *cis*-1,2,3,4-tetrahydro-2,3-diphenylquinoxaline
- Metal Dithiolanes and the Use of Quaternary Ammonium Salts
- Bioinorganic Coordination Chemistry: Copper (II) tetraphenylporphyrinate

V. Natural Products Synthesis

- Camphor

VI. Polymer Synthesis (tba)

