

CHEM 407 BIOINORGANIC CHEMISTRY

Spring, 2003

Tu & Th, 10:30 - 11:50 am, on days scheduled

164 Noyes Lab

0.5 Units (without paper) or 1.0 Units (with paper)
Course Registration Number 01991

Instructor: Ken Suslick, A420 CLS, 333-2794.
Office Hours by appointment.

Teaching Assistant: Jiangyun Wang, A433 CLS, 333-1532.
Office Hours: WF 10:00-11:00 am

Textbook: Lippard, S. J.; Berg, J. M. *Principles of Bioinorganic Chemistry*;
University Science Books: Mill Valley, 1994.
Primary Literature and Current Reviews to be handed out in class.

Grading Policy:

1.5 Hour Exam:	300 points possible
Term Paper:	300 points possible

For those enrolling for 1.0 Units (3 Hours), there will be a term paper required on a current topic of bioinorganic chemistry. The topic will be chosen by the student in consultation with the instructor. The term paper will comprise an abstract, detailed outline, text of paper, and referenced bibliography. Further details follow. The term paper may be turned in at any time, but will be due at class time on the last day of class, Tuesday, May 6.

The grading distribution in the past has been B's > A's >> C's.

CHEM 407 BIOINORGANIC CHEMISTRY

Ken Suslick

Course Syllabus, Spring 2003

Date	Topic	Reading Assignment*
1/21	No Lecture	
1/23	No Lecture	
1/28	No Lecture	
1/30	No Lecture	
2/4	Biochemical Overview of Metallobiomolecules	Chapters 1 & 3
2/6	Metalloporphyrin Chemistry	2 (& 4 optional review)
2/11	Heme Protein Synthetic Analogs	handout
2/13	Heme Proteins - Myoglobin & Hemoglobin	11.1
2/18	Heme Proteins - Peroxidase & Catalase	11.4
2/20	Heme Proteins - Cytochrome P450	11.2
2/25	Non-Heme Iron Proteins	11.2, 12
2/27	Methane Monooxygenase	11.2
3/4	No Lecture	
3/6	No Lecture	
3/11	B12	11.5
3/13	Electron Transport Metalloproteins	9, 13.5
3/18	Cu Enzymes	11.4
3/20	Cyt. c oxidase	handout
3/25	Spring Break	
3/27	Spring Break	
4/1	No Lecture	
4/3	Harry Gray Lecture (electron transport) at 4 pm	
4/8	No Lecture	
4/10	Mo Enzymes	11.3
4/15	Nitrogenase Models	handout
4/17	Zn Enzymes	7.1 10
4/22	Metal Transport and Storage	3.3, 6, 8.1, 8.2
4/24	No Lecture	
4/29	Term Exam, 1.5 hours	
5/1	No Lecture	
5/6	Term Papers Due	

*Lippard, S. J.; Berg, J. M. *Principles of Bioinorganic Chemistry*; University Science Books: Mill Valley, 1994.

1. The ability to communicate your knowledge in a written form is vital to your professional advancement. Writing is an inescapable part of every career. This term paper is meant to be a learning experience: how to focus on a topic, how to research it, how to organize the material, and how to write it up. Remember Michael Faraday's maxim: "Work, Finish, Publish!"

2. All work relevant to the term paper must be typed and easily readable. Proofread your paper carefully. Grammar and spelling are important, even to a scientist! The term paper abstract, outline, text, and bibliography will be graded according to the point scheme shown on the following page.

3. Term Paper Topic.

This is your choice with my advice and consent. As a starting point for thinking about topics, I will have a list with a few possible areas for your consideration. Many other topics would be at least as good. Many of my suggestions are intentionally too broad for your term paper; in many cases, you will have to focus down your scope from the original general topic.

4. Abstract.

The abstract should be on the title page and precedes the outline and text. It should be 200 words and should accurately summarize the content of your paper.

5. Term Paper Outline.

The outline must be in proper format detailed down generally to the fourth level (that is: I. A. 1. a.). Remember, in an outline, subdivisions must come in at least two parts and seldom should exceed four. I strongly encourage you to submit the outline for suggestions (without grading or prejudice) long before the term paper itself is due. Please use key phrases and not complete sentences. The outline should be at least 1 double-spaced typed page. Preparing this detailed outline will make writing the term paper *much* easier; do it first, not last!

6. Term Paper Text.

The length of the text should be at least eight (and no more than sixteen) pages of double-spaced typed text (1 inch margins, 10 point Times Roman font), not counting figures. One page should be introductory in nature. The text should be divided into sections, using major subheadings for divisions (e.g., Introduction, Work Prior to 1995, Recent Work on ..., Conclusions). Graphs and figures will also greatly improve the clarity of your presentation; *use them*. Important figures can be Xeroxed or better, scanned, from the literature, then cut and pasted into your paper with caption; the source must be cited in the caption. I encourage you to make use of enlarging via scanned images, etc.

The term paper text **must** be preceded by an abstract, then an outline, and followed by the appended endnote citations.

7. Term Paper Citations.

The endnote citations should contain at least 20 references with full citation, including authors, article or chapter title, journal or book name, *inclusive* pages. The bibliography may be submitted for suggestions (without grading or prejudice) long before the term paper itself. Do not rely too heavily on one source. References should be mostly current (since 1995) and from the better journals. References should be cited in the text of the paper as superscripts and listed as endnotes. The standard ACS format should be used:

Books: Smith, A. B. *Textbook of Organometallics*; Academic Press: New York, 1993; pp 123-145.

Journals: Doe, J. S.; Smith, J. "New Metalloproteins" *J. Am. Chem. Soc.* **2002**, *90*, 234-241.

CHEM 407 SPECIAL TOPICS IN INORGANIC CHEMISTRY

Term Paper Evaluation for _____

Term papers will be graded with the following point breakdowns. Specific comments have been made on the term paper where appropriate.

TOPIC, TITLE, ABSTRACT, AND OUTLINE

Choice and Focus of Specific Topic	0 too broad/narrow	3	7 appropriate	10	
Abstract	0 poor	5	10	15 excellent	
Title Choice	0 poor	2	5 excellent		
Outline, Organization and Flow	0 disjointed	5	10 well organized		
Outline, Content	0 poor	5	10 excellent		
Outline, Format	0 poor	5	10 excellent		
Abbreviations (defined, etc.)	0 poor	2	5 excellent		

TEXT AND STYLE

Term Paper Text, Length	0 too brief/long	10	15 excellent		
Term Paper Text, Style & Grammar	0 poor	10	20	25	30 excellent
Introduction, Content & Scope	0 poor	5	10	15 excellent	
Term Paper Body, Content	0 poor	15	30	40	50 60 excellent
Conclusions, Content & Style	0 poor	5	10 excellent		
Equations, Figures, and Tables	0 poor/insufficient	10	20	25	30 excellent

BIBLIOGRAPHY

References, Quantity of acceptable	0 insufficient	10	20	25	30 excellent
References, Quality	0 weak choices	10	20	25	30 excellent
References & Citations, Format	0 poor	5	10	15 excellent	

TOTAL POINTS AWARDED : _____ **of 300 possible points.**

A Partial List of Possible General Term Paper Topics**Spring, 2003**

These will need a better focus for your paper. Please consult with me before getting too far into your paper!

Ni Proteins

Aconitase

Blood Substitutes

Metallopharmaceuticals

Heavy Metal Toxicities

High Oxidation States of Fe

Inorganic Carcinogens

Long-Distance Electron Transfer

Magnetic Resonance Imaging Contrast Agents

Other Metalloproteins, nearly any specific system with a recent x-ray Structure

Synthetic Analogs to the Photosynthetic Reaction Center

Photosystem II

Non-Zn/Cu Superoxide Dismutase

Zn Fingers