

CHEM 462

Inorganic Chemistry: Organometallics and Catalysis

Fall 2017 ✧ TuTh 9:35 a.m. - 10:50 p.m. ✧ 2121 Chemistry

INSTRUCTOR: Prof. Marcetta Darensbourg, Rm. 408. Phone # 845-5417 or 5-2981
Email: marcetta@mail.chem.tamu.edu,
Website: <http://www.chem.tamu.edu/rgroup/marcetta/>
Office hours: Th 11-12; M 11-12. Or any afternoon

WEBPAGE: <http://www.chem.tamu.edu/rgroup/marcetta/chem462>
<http://ecampus.tamu.edu/>

TEXTS:

- ♦ **SHRIVER & OTHERS, CHAPTER 22.** *INORGANIC CHEMISTRY*, 6th Edition, W.H. Freeman and Company (ISBN-10: 1429218207; ISBN-13: 9781429218207);
- ♦ **ROBERT H. CRABTREE,** *THE ORGANOMETALLIC CHEMISTRY OF TRANSITION METALS*, Wiley (ISBN: 9781118138076);
- ♦ **SPESSARD AND MIESSLER,** *ORGANOMETALLIC CHEMISTRY*, 3rd Edition, Oxford University Press (ISBN: 9780199342679);
- ♦ **MIESSLER, FISCHER & TARR, CHAPTERS 13, 14, 15.** *INORGANIC CHEMISTRY*, 6th Edition

Various websites such as VIPeR (see below)

Organometallics Hypertext: <http://www.ilpi.com/organomet/>

REVIEWS: AS REQUESTED, SUNDAYS AT 5-6 P.M. RM. 405

OTHER REFERENCES:

- ♦ *Organometallics Hypertext:* <http://www.ilpi.com/organomet/>
- ♦ WebElements: <http://www.webelements.com/>
- ♦ VIPeR: *Virtual Inorganic Pedagogical Electronic Resource. Organometallic Chemistry by George Stanley (an Aggie at LSU Chemistry)* www.ionicviper.org/five-slides-about/chapter-4-stanley-organometallics
- ♦ Wikipedia
- ♦ Cambridge Crystal Data Base

COURSE GRADING:

SCHEDULE

MID-TERM EXAM	25%	TUESDAY OCTOBER 24TH
FINAL EXAM	35%	FRIDAY DEC. 8TH
PROJECTS	20%	
PARTICIPATION	20%	

PREREQUISITE(S): Undergrad level Organic Chemistry and Chem 362

CELL PHONES, TABLETS AND OTHER ELECTRONIC DEVICES: Use of cell phones, tablets, and computers in class is strictly limited to course-related activities (e.g., taking notes, looking up data). Students violating this policy will be required to deposit phones outside/with me. If you have an emergency, please be courteous and step outside, so as not to disrupt the class.

DESCRIPTION: CHEMISTRY 462 ORGANOMETALLICS AND HOMOGENEOUS CATALYSIS: A “structure and bonding” approach to transition metal organometallic molecules and reactions will briefly review classical T.M. complexes and contrast to the ligand/metal arrangements that support transition metal – carbon bonds. An overview of the molecules that are the foundation of this division of inorganic chemistry will include electron counting and a molecular orbital approach to ligand /metal orbital overlap, bond stability, and reactivity. Discussions of reaction types and features that define their mechanisms will lead into the role of T.M. organometallic chemistry in homogeneous catalysis.

COURSE OBJECTIVES: At the end of the course success will be judged by the student’s ability to:

- Predict the formulation of transition metal organometallic complexes, their electronic structure, and their geometry. Predict properties based on structure and reactive centers.
- Understand the governing features of the major classes of reactions and reaction mechanisms in organometallic chemistry.
- Account for the ability of such complexes to be catalysts in the mediation of C-C and C-H bond making and other organic transformations.
- Read and dissect assigned papers in the current literature of this field.
- Generate proposals based on outstanding questions raised in the current literature

ADA STATEMENT: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.

AGGIE HONOR CODE: “An Aggie does not lie, cheat, or steal or tolerate those who do.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information please visit: www.tamu.edu/aggiehonor/

CLASS SYLLABUS AND EXPECTATIONS:

August 29 – Sept 12th. Section 1. *Begins with Fundamentals of (Inorganic) Chemistry from TAMU Chem. 362 or equivalent; Defining Ligand/T.M. bonds. Electron Counting.*

A short “review” will assure you have the following information securely in your mind and at your disposal. Structures and Bonding in TM Organometallics: The major classes of ligands: Carbonyls, Metallocenes, Hydrides.

Sept 19th – Oct. 19th. Section 2. *Organometallics Reactions and Mechanisms*
October 24th Midterm exam

Oct 26th – Dec. 5th. Section 3. *Catalysis.*

Various short assignments.