

# CHEMISTRY 104B – ADVANCED INORGANIC CHEMISTRY II (3 UNITS)

## COURSE OVERVIEW

### Summary

Chemistry 104B is the second course in the introductory undergraduate inorganic chemistry sequence. While Chem 104A covers the fundamentals of inorganic chemistry, Chem 104B focuses on inorganic compounds, and characterization of their structure and reactivity. Chem 104B is also known as the undergraduate “organometallic chemistry” class. 104B uses some concepts introduced in 104A; namely, group theory.

### Prerequisites

- Chemistry 104A or 103

### Topics Covered

- Importance of Transition Metal Chemistry; History; Ligands
- Electron Counting; Coordination Numbers, Isomerism
- Crystal Field Theory; Magnetism
- Ligand Field / Molecular Orbital Theory
- Spectroscopic trends in inorganic compounds
- Reactivity, Mechanisms and Kinetics
- Organometallic Chemistry
- Catalysis
- Actinides and Lanthanides

## WORKLOAD

### Course Work

- 10 Problem Sets
- 2 Midterms
- Final Exam

### Time Commitment

3 hours of lecture, 1 hour of optional discussion per week. Problem sets can be long and can take 4-6 hours.

## CHOOSING THE COURSE

### When to take

The class is predominantly juniors and seniors with some sophomores, as this is an upper-division required course for the chemistry major. 104B is a fairly small class. It's a good idea to take this either concurrently or after taking Chem 12A/B (Organic I/II), since some of the organometallic material will overlap slightly.

Note that this class is only offered in the spring (meant to be taken in sequence after Chem 104A, which is only offered in the fall).

### What next?

- Chem 108: Inorganic Synthesis and Reactions. This is the undergrad inorganic lab class, which directly builds off of Chem 104B. Note that this class is only offered in the fall; some students take it immediately after 104B.
- Chem C150: Introduction to Materials Chemistry
- Chem 201: Graduate level Fundamentals of Inorganic Chemistry, and then further graduate level courses

## ADDITIONAL COMMENTS/TIPS

Though there are a few recommended textbooks for this course (Miessler & Tarr, and Housecroft & Sharpe), there is no textbook that the lectures closely follow. In addition, lecture material may not directly correlate to what is covered on the problem sets – the problem sets and lectures together determine what appears on exams. Often, it's necessary and encouraged to look at outside sources (other textbooks, or Internet searching, or office hours) to take a more active role in learning the material.

This course is required for the Chemistry major, but is optional for Chemical Biology and Chemical Engineering majors.

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