



UNIVERSITY OF CALGARY  
FACULTY OF SCIENCE  
DEPARTMENT OF CHEMISTRY  
COURSE SYLLABUS  
WINTER 2016

1. **Course:** Chemistry 533, Advanced Inorganic Chemistry II: Main Group Elements

Lecture Sections:

L01: MWF, 10:00-10:50, SA 121 Instructor: Thomas Baumgartner, SB 229A, 403-220-3039,  
thomas.baumgartner@ucalgary.ca, Office Hours: by appointment

T01: M, 13:00-13:50, SA 121 Instructor: Thomas Baumgartner, SB 229A, 403-220-3039,  
thomas.baumgartner@ucalgary.ca, Office Hours: by appointment

**TEXTBOOKS:** *"Organometallics"*, 3<sup>rd</sup> Edition, by C. Elschenbroich, Wiley-VCH and *"Inorganic Chemistry: Principles of Structure and Reactivity"*, James E. Huheey, Dorling Kindersley Pvt Ltd (**recommended, not required**)

**TOPICS COVERED AND SUGGESTED READING:**

**Organoelement Compounds**

**Organometallic chemistry of Alkali Metals** (Li, Na, K; structure, bonding, reactivity, applications)

**Organometallic chemistry of Alkali Earth Metals** (Be, Mg; structure, bonding, reactivity, applications)

**Organometallic Compounds of Group 13** (B, Al, Ga, In, Tl; structure, bonding, reactivity, applications)

Boranes & carboranes, heteroboranes, BN compounds, BC compounds & heterocycles, B subhalogenides

Organoaluminum compounds, Lewis Base adducts of  $AlR_3$  compounds, subvalent organo-Al compounds.

Organogallium, -indium, and -thallium compounds

**Organometallic Compounds of Group 14** (Si, Ge, Sn, Pb; structure, bonding, reactivity, applications)

Organosilicon compounds: silicides, (organo)silanes, chlorosilanes, silicones, silylenes, molecules with  $Si=E$  and  $Si \equiv E$   $\pi$ -bonds, hypervalent Si compounds

Organogermanium, -tin, and -lead compounds

**Chemistry of the Group 15 Elements** (mostly N, P; structure, bonding, reactivity, applications)

Nitrogen: structure and bonding of selected N-oxides

Organophosphorus compounds: P(V) compounds (structure, bonding, reactivity), P(III) Compounds: diphosphenes, phosphalkenes, iminophosphanes, P-containing ring systems (phosphabenzene, phosphole), phosphazenes

**Chemistry of the Group 16 Elements** (mostly S; structure, bonding, reactivity, applications)

Sulfur: element modifications, polycationic and –anionic species, SN compounds

**Chemistry of the Group 17 Elements** (F, Cl, Br, I; structure, bonding, reactivity, applications)

Interhalogen compounds, main group element fluorides, Halogen-O compounds

**“The Renaissance of Main Group Chemistry”**

Modern aspects of main group chemistry

**Structural methods (mainly NMR spectroscopy, X-ray crystallography) in main group chemistry**

**RECOMMENDED ADDITIONAL RESOURCES:**

Selected review articles, as provided via links on Desire2Learn:

CHEM 533 L01 - (Winter 2016) - Advanced Inorganic Chemistry II (<https://d2l.ucalgary.ca/d2l/home/123627>)