

Oral Presentations
Organometallic Chemistry (CHE-334/534)
Fall 2011

Nov. 8, 2011

During the last two weeks of class, we will review seven different literature articles in organometallic chemistry. You and your fellow students will organize the discussions and present recent literature articles in your chosen topic. Everyone must read the articles to be presented and come prepared to ask questions and engage in a discussion. The organizers will be graded on their presentation and the audience will be graded on their participation and contributions. Listed below are the topics that I have chosen.

Presentation Day	Presenters	Topic and Article
Nov. 29, 8:25 AM	<i>Ben and Michele S.</i>	13: Nature 2010 , <i>463</i> , 523-526.
Nov. 29, 9:05 AM	<i>Doug and Andy</i>	9: Science 2007 , <i>318(5851)</i> , 783-7
Dec. 1, 8:25 AM	<i>Meredith and Maggie</i>	5: Science 2011 , <i>333(6043)</i> , 733-736
Dec. 1, 9:05 AM	<i>Alex and Ariana</i>	12: J. Am. Chem. Soc. , 2011 , <i>133</i> , 13268–13271
Dec. 6, 8:25 AM	<i>Michelle C. and Kim</i>	2: J. Am. Chem. Soc. 2009 , <i>131</i> , 10974–10983.
Dec. 6, 9:05 AM	<i>Maria and Eesha</i>	18. J. Am. Chem. Soc. , 2010 , <i>132</i> , 14379–14381.
Dec. 8, 8:25 AM	<i>Suyin and Sharan</i>	4. Science 2011 , <i>333(6049)</i> , 1613-1616

Potential Topics and Articles:

C-H functionalization

1. “The Catalytic Cross-Coupling of Unactivated Arenes” K. Fagnou et al. [Science](#)**2007**, *316(5828)*, 1172-5.
2. “Detailed Study of C–O and C–C Bond-Forming Reductive Elimination from Stable C₂N₂O₂-Ligated Palladium(IV) Complexes” M. Sanford, Joy Racowski (BMC ‘05) et al. [J. Am. Chem. Soc.](#) **2009**, *131*, 10974–10983.
3. “Ligand-Enabled Reactivity and Selectivity in a Synthetically Versatile Aryl C–H Olefination” J-Q. Yu et al. [Science](#)**2010**, *327(5963)*, 315-9.
4. “Selective Catalytic C–H Alkylation of Alkenes with Alcohols” Chae S. Yi et al. [Science](#) **2011**, *333(6049)*, 1613-1616.

Bioinorganic

5. “A Synthetic Model of the Mn₃Ca Subsite of the Oxygen-Evolving Complex in Photosystem II” Theodor Agapie et al. [Science](#)**2011**, *333(6043)*, 733-736.

6. "Conversion of a Side-On Peroxo to an End-On Hydroperoxo Complex" Jin-Gang Liu et al. [*Angew. Chemie Int. Ed.***2009**, *48*, 9262–9267.](#)

Metal-Nitrogen Complexes

7. "Synthesis, Structure, and Reactivity of an Iron(V) Nitride" Karsten Meyer, Jeremy M. Smith et al. [*Science***2011**, *331*\(6020\), 1049-1052.](#)

8. "A molybdenum complex bearing PNP-type pincer ligands leads to the catalytic reduction of dinitrogen into ammonia" Kazuya Arashiba et al. [*Nature Chemistry***2011**, *3*, 120–125.](#) (ILL order)

Oxidation reactions

9. "A Predictably Selective Aliphatic C–H Oxidation Reaction for Complex Molecule Synthesis" M. Christina White et al. [*Science***2007**, *318*\(5851\), 783-7.](#)

10. "Direct Synthesis of Amides from Alcohols and Amines with Liberation of H₂" D. Milstein et al. [*Science***2007**, *317*\(5839\), 790-2.](#)

11. "Primary Alcohols from Terminal Olefins: Formal Anti-Markovnikov Hydration via Triple Relay Catalysis" Robert H. Grubbs et al. [*Science*, **2011**, *333*\(6049\), 1609-1612.](#)

12. "Reaction of O₂ with [(-)-Sparteine]Pd(H)Cl: Evidence for an Intramolecular [H–L]+ "Reductive Elimination" Pathway" Shannon S. Stahl et al. [*J. Am. Chem. Soc.*, **2011**, *133*, 13268–13271.](#)

New Chemical Transformations

13. "Cleaving carbon–carbon bonds by inserting tungsten into unstrained aromatic rings" Aaron Sattler et al. [*Nature***2010**, *463*, 523-526.](#)

14. "Selective, Nickel-Catalyzed Hydrogenolysis of Aryl Ethers" J. F. Hartwig et al. [*Science***2011**, *332*, 439-443](#)

15. "Catalytic and Stoichiometric Reactivity of β -Silylamido Agostic Complex of Mo: Intermediacy of a Silanimine Complex and Applications to Multicomponent Coupling" Georgii I. Nikonov et al. [*J. Am. Chem. Soc.*, **2011**, *133*, 7033–7053.](#)

16. "Highly Selective Methods for Synthesis of Internal (α -) Vinylboronates through Efficient NHC–Cu-Catalyzed Hydroboration of Terminal Alkynes. Utility in Chemical Synthesis and Mechanistic Basis for Selectivity" Amir H. Hoveyda et al. [*J. Am. Chem. Soc.*, **2011**, *133*, 7859–7871.](#)

Metal-Carbene Chemistry

17. "Nucleophilic Scandium Carbene Complexes" Nicolas Mezailles et al. [*J. Am. Chem. Soc.*, **2010**, *132*, 13108–13110.](#)

18. "Regioselective C–H Activation and Sequential C–C and C–O Bond Formation Reactions of Aryl Ketones Promoted by an Yttrium Carbene" Stephen T. Liddle et al. [*J. Am. Chem. Soc.*, **2010**, *132*, 14379–14381.](#)

Asymmetric Synthesis

19. "Enantioselective Synthesis of Alkyne-Substituted Quaternary Carbon Stereogenic Centers through NHC–Cu-Catalyzed Allylic Substitution Reactions with (i-Bu)₂(Alkynyl)aluminum Reagents" Amir H. Hoveyda et al. [*J. Am. Chem. Soc.*, **2011**, *133*, 4778–4781.](#)

Unusual Metal Complexes

20. "Molecular heterometallic hydride clusters composed of rare-earth and d-transition metals" Takanori Shima et al. [*Nature Chemistry* **2011**, *3*, 814–820.](#) (ILL order)

Guidelines:

- Groups will be chosen randomly in class on Oct. 20. The first group presenting at 8:25 AM on Nov. 29 will have the first choice of article, the second presenters on Nov. 29 will have the second choice and so on.
- Each group will present one article during their 40 min. presentation period. I have listed articles with various topics, but if you find another interesting organometallic chemistry article that you would rather discuss then you may do that with my permission.
- The group needs to decide how to divide the presentation of the material. Nevertheless, each student in a particular pair should plan on presenting for roughly 15 minutes, which leaves 10 minutes for audience questions and other unanticipated events for each group.
- The presenters should:
 - Highlight the key methods, reactions or innovations used in the articles.
 - Understand metal oxidation states and electron count.
 - Describe the type of organometallic reaction mechanism.
 - Discuss problems encountered in the synthesis and how they were overcome.
 - Discuss analytical techniques that confirm the author's conclusions.
- Tips for presentations:
 - Use PowerPoint and ChemDraw (ACS Document 1996 template)
 - Highlight or color the portion of the structure that is undergoing reaction to make the transformation clearer to the audience.
 - Use correct chemical descriptions of reagents, reactions and metals. When describing a reaction of a complex molecule focus the audience attention on the functional group that is undergoing the change or is involved in the reaction.
- You will be graded on four categories: Speaking/Presentation, Organization/Clarity, Visuals/Handouts, and Audience Questions.
- All students should read all the articles being presented and be ready to discuss the articles. You will be graded on your class participation.
- And if that doesn't motivate you to pay attention, then this should: At least 60% of the final exam will come from material in these articles and presentations.