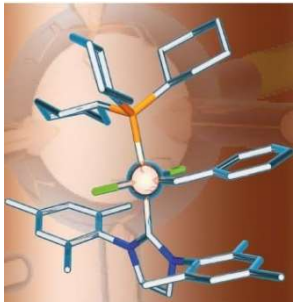
MiniCurso: Organometallics in Organic Synthesis



Prof. Leonardo Álvarez Galán

Organic Chemistry/Univeristy of Costa Rica

Data: 07, 08, 09, e 10/15 no Instituto de Química da UFF

Duração: 15h

Programa de Pós Graduação em Química

Inscirções on line no site www.uff.br/posquimica

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Organometallics in Organic Synthesis

Course Description:
The course gives a thorough introduction to organometallic chemistry with focus on the transition metals. The course starts with a review of classic organometallic chemistry, then with the fundamental molecular properties of organometallic compounds and gradually develops this into practical applied synthesis and catalysis. Structure and bonding issues in organometallic compounds are discussed in view of the 18-electron rule. Different reactive ligand types are discussed. Organometallic reaction mechanisms are thoroughly discussed with emphasis on ligand substitution, oxidative addition, reductive elimination, insertion and elimination reactions, nucleophilic and electrophilic addition and abstraction at ligands. Topics may include recent developments in organic synthesis, organometallics and heterocyclic chemistry.

Number of Credit Hours: 15 hours: an initial 3-hour lecture and three 4-hour lectures.

Course Prerequisites and Corequisites: Permission of Instructor.

Course Objective: The relationship among topics in organic chemistry will be explained.

Learning Outcome:

Having complete the course you should:

• have a good overview of the fundamental principles of organotransition-metal chemistry and know how chemical properties are affected by metals and ligands.

• be able to use knowledge about structure and bonding issues to understand the stability and reactivity of simple organometallic complexes.

• understand fundamental reaction types and mechanisms and how to combine these to understand efficient catalytic processes.

• know important applications of organometallic homogeneous catalysis in the production of large-scale (bulk) and smaller-scale (fine chemicals) production.

Main Program:

Introduction to organometallic chemistry

Organometallic chemistry of main group metals

- Li, Mg, Si, Sn, B

Organometallic chemistry of transition metals

- Formalisms, Oxidation States
- Elemental Mechanisms
- Ligand reactivity

Organic synthesis using transition metal organometallics

- Co, Pd, Ni, Ru, Ir, Zr, Ti, Fe
- New trends in Reduction and Oxidation Chemistry

Mini CV

Prof. Leonardo Álvarez Galán, got his Licenciature degree in Organic Chemistry from the Univeristy of Costa Rica in 1998. From 1999 to 2005 he worked as a Senior Scientist doing Pheromone and Agrochemical Synthesis on the Costa Rican Chemical Industry. In 2005 he joined the research group of Dr. Alexander Sorokin at the University Claude Bernard (Lyon, France) where he got his Masters degree in Organic Synthesis and Catalysis. In 2006 he moved to the University Joseph Fourier (Grenoble, France) where under the supervision of Prof. Jacques Einhorn and Prof. Andrew Greene, got his Ph. D. degree on Synthetic Organic Chemistry and Catalysis. In 2009 he moved back to Lyon to rejoin Dr. Sorokin´s group as a post-doctoral associate where he worked studying the catalytic applications of iron phthalocyanines. Finally in 2010 joined Prof. Piet van Leeuwen´s group at the Chemical Institute of Catalognia (ICIQ) where as an invited scientist he worked designing wide-bite-angle ligands. In January 2011 he went back to the University of Costa Rica as an invited professor and early this year he became Assistant Professor. He has co-authored several papers on recognized journals and is currently working in the field of Green Organic Synthesis.-