

CiQUS Lecture



An organometallic perspective to first-row transition metal catalysis: searching for unconventional reactivity patterns

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More info: Research Group website

**Friday, June 10, 2022**
10:15 a.m. CiTIUS Seminar RoomFONDO EUROPEO DE DESENVOLVEMENTO REGIONAL
PO FEDER Galicia 2014-2020 – *Unha maneira de facer Europa*Link to group website: <https://www.uni-marburg.de/en/fb15/researchgroups/casitas-research-group>Email: casitasm@chemie.uni-marburg.de**Abstract:**

Catalysis plays a pivotal role in the development of environmentally friendly and efficient chemical processes towards the synthesis of high-value chemicals from abundant and renewable feedstocks. On the quest of more sustainable synthesis, our research group focuses on the discovery and development of organic reactions catalyzed by middle and late first-row metals (Mn, Fe, Co, Ni).

Transition-metal catalyzed nucleophilic allylic substitutions are well-established methods for the construction of carbon-carbon and carbon-heteroatom bonds in organic synthesis. In this communication, I will present our work in regioselective cobalt(I)-catalyzed nucleophilic allylic substitution reactions. This project aims at finding complementary reactivity to the well-established methods that involve precious metals, while providing an in-depth mechanistic understanding.

In the second part of the talk, I will introduce fundamental insights into the reactivity of organoiron species in high oxidation state, which may ultimately find application in catalysis towards organic synthesis. Thus, synthetic strategies to prepare FeIII and FeIV cyanide complexes using hypervalent iodine reagents will be disclosed.^[1] Finally, I will present our ongoing work on the synthesis of highly reactive organometallic FeIII and FeIV complexes and their involvement in carbon-carbon bond-forming reactions.

[1] C. Souilah, S. A. V. Jannuzzi, D. Demirbas, S. Ivlev, M. Swart, S. DeBeer, A. Casitas. *Angew. Chem. Int. Ed.* 2022, accepted. DOI: 10.1002/anie.202201699.

Biosketch:

Alicia Casitas (b. 1985, Girona) obtained her PhD from University of Girona in 2012 under the supervision of Prof. Xavi Ribas and Prof. Miquel Costas funded with a FPU fellowship. She investigated the reactivity of well-defined organometallic copper(III) complexes. During this period, she was a visiting student in the

group of Prof. Shannon S. Stahl at University of Madison-Wisconsin (US, 2009) and in the group of Prof. Matthew J. Gaunt at University of Cambridge (UK, 2011).

In 2013, she joined the group of Prof. Alois Fürstner at the Max-Planck Institut für Kohlenforschung (Germany) funded with a Ramón Areces Fellowship where she worked in the field of organoiron chemistry. In 2016, Alicia joined the group of Prof. Julio Lloret-Fillol at Institut Català d'Investigació Química (ICIQ) in Spain as a Juan de la Cierva-Incorporación fellow, where she did research in the field of photocatalysis.

In July 2018, she moved to Institut de Química Computacional i Catàlisi (IQCC) in Girona as a junior group leader funded by a Junior-Leader LaCaixa Postdoctoral Fellowship. One year later, Alicia was appointed Junior Professor (W1) in Organic Chemistry at Philipps-Universität Marburg (Germany). In 2021, she was selected Thieme Chemistry Journal Awardee.