

UniCat Colloquium

DR. STÉPHANE MÉNAGE

CEA Grenoble

A bio inspired approach for catalytic oxidations: mimicking biocatalysis and photosynthesis

The need for a sustainable chemistry urges on the scientific community to design new cleaner chemical processes. Catalysis plays a paramount role in the chemical development for the safe production of a large range of chemicals. A bio-inspired approach for catalysis has driven the research methodology of our group since its creation, aiming at mimic the active site structure of enzymatic catalysts in order to reproduce their catalytic activities and selectivities. A non-heme metal catalysis has been developed in order to increase the diversity of ligand and metals complexes and so the scope of the possible reaction. Reactions of interest such as epoxidation, hydroxylation or sulfoxidation have then been tackled in order to cope with industrial requirements.

The presentation will illustrate our recent implication into green chemistry through a variety of strategies: (i) the requirement of cheap, less hazardous, energetically efficient catalysis operating under safe reaction conditions has led us to design original catalysts: the association of a photosensitizer with a metal catalysts within a single entity (dyad) provides the first efficient photocatalyst for oxygen transfer reactions using water as oxygen source. A version implicating dioxygen as oxidant is also available [1] (ii) the bio-inspired approach has been pushed to the limit with the design of artificial metalloenzymes: selective oxidation of sulfides and alkene has been achieved using NiKA as a protein scaffold [2] (iii) the search for degradation of pollutants led us to design catalysts bio-inspired from N₂O reductase [3].

[1] Knör G, Chem :Eur. J. 2009, 15, 568; Iali W. et al. Angew. Chemie Int Ed., 2015, 52, 8415.

[2] Pecoraro V. Chem. Rev. 2014, 114, 3495 ; Esmieu C. et al., Angew. Chemie Int Ed., 2013, 52, 3922-3925.

[3] Esmieu C. et al., Chem. sci. 2014, 5, 4774.

Wednesday, February 17, 2016 at 5:15 PM

TU Berlin, Institute of Chemistry
Straße des 17. Juni 115, 10623 Berlin

Building C, Lecture Hall **C 264**

Prof. Limberg (HUB)

Organizer

Coffee and cake will be served 30 minutes before the lecture. Guests are cordially invited to attend!
Prof. Dr. Matthias Driess - Chair of the Cluster of Excellence UniCat - www.unicat.tu-berlin.de



Location has been changed!