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Unifying Concepts in Catalysis

UniCat Colloquium

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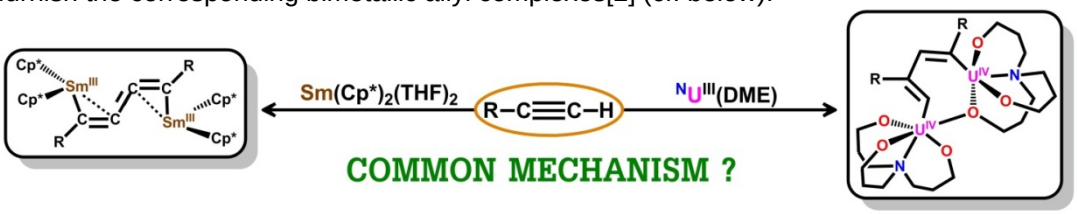
Lecturer: **Prof. Laurent Maron,** Alexander von Humboldt Awardee, Laboratoire de Physique et Chemie de Nano-Objets (LPCNO), Institut National des Sciences Appliquées (INSA), Université Paul Sabatier (UPS), Toulouse, France

Title: **Can redox chemistry of divalent lanthanide and trivalent uranium complexes be catalytic? Some insights from theory**

Abstract: Uranium complexes are capable of producing some of the most extraordinary reactions, which are most of the time impossible to form with other type of metals (e.g. main group or transition metals). This is mainly due to the oxophilicity, Lewis acidity, and highly reducing nature of U(III) congeners. From the other side, samarium low-valent complexes can give the same peculiar reactions, in order to form a variety of new classes of organosamarium compounds. In both cases, the products of these reactions can serve as active catalysts or intermediates in catalytic transformations (CO and CO_2 activation), or/and oligomerization processes. For example, addition of terminal mono-alkynes to $^{N}U^{III}$(DME) complexes, lead to the immediate formation of vinyl bridged dinuclear complexes of uranium (IV),[1] while addition of the same substrates to $Sm(Cp^*)_2(THF)_2$ complexes will furnish the corresponding bimetallic allyl complexes[2] (cf. below):



Based on experimental observations, DFT calculations were conducted, in order to predict the corresponding reaction mechanisms. After briefly discussing, the reactions mechanism for CO2 transformation, we will discuss the mechanism of alkyne dimerization. We will in particular compare the theoretically determined reaction profiles for both U(III) and Sm(II) that share some common features but also some differences that we will be underlined.

[1] B. Kosog, C.E. Kefalidis, F.W. Heinemann, L. Maron, K. Meyer, *J. Am. Chem. Soc.* 2012, *134*, 12792. [2] W.J. Evans, R.A. Keyer, J.W. Ziller, Organometallics 1990, *9*, 2628.

Find more about Prof. Maron on: http://lpcno.insa-toulouse.fr/spip.php?article422&lang=en

Date: **Wednesday, July 10th, 2013 at 5:15 pm**

Location: **TU Berlin, Department of Chemistry**
Straße des 17. Juni 115, 10623 Berlin
Building C, Lecture Hall C 264

Organiser: **Prof. Martin Kaupp (TUB)**

Coffee and tea will be served thirty minutes prior to the lecture start.
Guests are cordially invited to attend!

Prof. Dr. Matthias Driess, Chair of the Cluster of Excellence UniCat