RUHR-UNIVERSITÄT BOCHUM
Fakultät für Chemie und Biochemie

Interdisciplinary Lecture Series
Gemeinsames Kolloquium – Summersemester 2019
In Cooperation with the GRK Confinement-Controlled Chemistry

Thursday, 09.05.2019
17:15 hrs, Lecture Hall HNC 30

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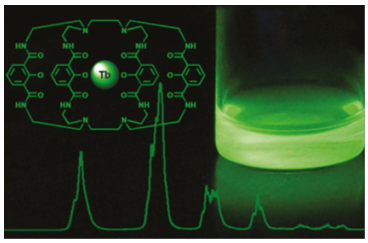
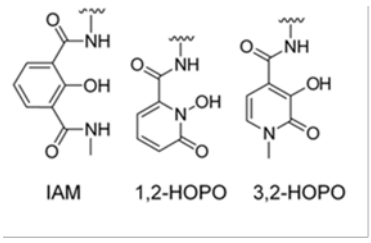
Lanthanide Coordination Chemistry: from Basics to Business

Abstract:

Until recently there was no known natural biological function for the lanthanides. That changed with the discovery of lanthanide containing enzymes in some extremophile bacteria [1]. The development of lanthanides as magnetic resonance imaging (MRI) agents was based on the availability of common chelating agents, rather than on a rational design based on natural complexing agents [2]. Some comments on the history and current status of gadolinium MRI contrast agents will be presented.
A large family of multidentate sequestering agents based on three types of ligand groups has been developed. These groups are shown at right. In each case the wavy line denotes a point of attachment to a skeletal group of a larger molecule. Remarkably, these groups are often very effective antenna ligands for excitation of the f element center. This was first found for the IAM complexes of Tb(III). Highly luminescent Ln(III) complexes (with Ln = Tb, Eu) for applications in biotechnology have been developed and will be briefly described. Tri-macrocyclic Tb(III) complexes in this class (shown at right) display long-term stability, with little if any change in their spectral properties (including lifetime, quantum yield, and emission spectrum) over time or in different chemical environments. Functionalized derivatives with terminal amine, carboxylate, and N-hydroxysuccinimide groups suitable for derivatization and protein bioconjugation have also been developed and are in use commercially for human, veterinary and forensic diagnostic assays as well as new drug development [3]. The status of this development will be discussed.





[1] Pol A., Barends T, Dietl A. Khadem A., Eygensteyn J., Jetten M. and Op Den Camp M., "Rare earth metals are essential for methanotrophic life in volcanic mudpots", *Environ. Microbiol.*, Vol. 16, No. 1, (2014), pp 255-264.
[1] Kanal E. and Tweedle M., "Residual or Retained Gadolinium: Practical Implications for Radiologists and Our Patients" *Radiology,* Vol 275, No. 3, (2015) pp. 630-634.
[2] www.lumiphore.com

Gäste sind herzlich willkommen – Guests are most welcome!

gez. Ch. Hättig
GSCB

gez. K. Morgenstern
Dekanin

gez. St. Huber
GDCH