technische universität dortmund

EINLADUNG

Vorträge im Rahmen der gemeinsamen Kolloquien der Fakultät für Chemie und Chemische Biologie der TU Dortmund:

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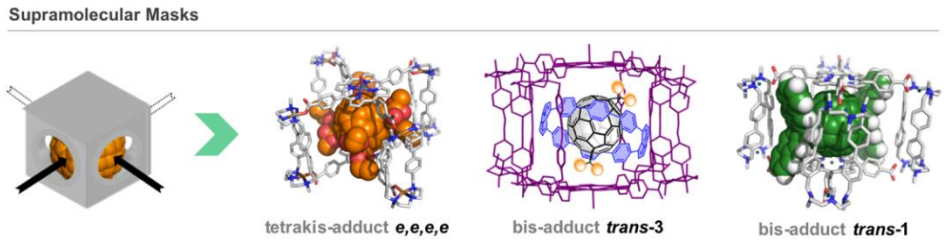
"Supramolecular Nanocapsules as Masks for Regioselective Functionalization of Fullerenes"

The regioselective functionalization of fullerenes and the control of the number of adducts is highly important to unbar the development of fullerene chemistry. Nowadays, easy-accessible C_{60} and C_{70} fullerene mono-adducts are mainly used in any application[1] due to the hampered accessibility to pure alternative fullerene poly-adduct derivatives. In a general basis, multi-adduct mixtures with uncontrolled regioselectivity (multi-isomers) are obtained, and chromatographic purification is too costly and time consuming to be used in the synthesis of multi-adduct fullerene species. Herein, porphyrin-based supramolecular nanocapsules[2,3] are used as supramolecular shadow masks to tame the over-reactivity of Bingel-Hirsch-type cyclopropanation reactions and, more importantly, to have full control on the equatorial regioselectivity and on the number of additions. Thus, exclusively equatorial bis-, tris- and tetrakis-C_{60} adducts using ethyl-bromomalonate are stepwise obtained and fully characterized (NMR, UV-vis and XRD). Furthermore, the regioselectivity control is finely tuned using a three-shell Matryoshka-like assembly towards the synthesis of a single *trans*-3 bis-Bingel-C_{60} for the first time.[4] Also, the mask strategy is extended to Diels Alder reactions with full control of the regiolectivity in the synthesis of *trans*-1 bis-pentacene-C_{60}.[5] The mask strategy is also extended to the regiofunctionalization of C_{70}.[6] These results, fully attributed to the confinement control imposed by the capsule's cavity, represent a novel and unique strategy to infer regio-control to the synthesis of fullerene multi-adducts. We envision that the described protocol will produce a plethora of derivatives for applications such as solar cells.



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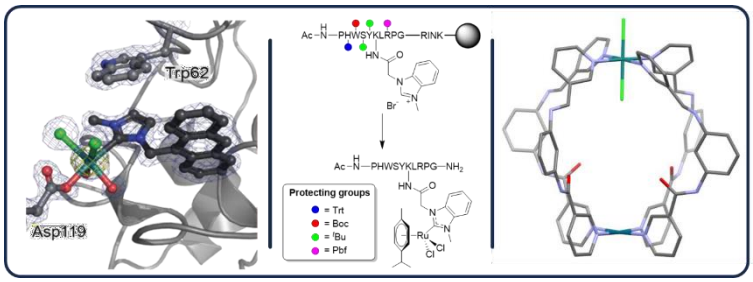
"From Supramolecular Interactions Between Anticancer Metal Complexes and Proteins to the Design of Supramolecular Architectures"



Protein interactions of metal complexes are important contributors to the modes of actions of metallodrugs, whether their bioactivity is driven by protein binding, or such conjugation leads to detoxification and/or deactivation. However, bioactive metal complexes are often considered promiscuous in their binding to proteins, in that they interact with a variety of proteins and a multitude of amino acids on a protein surface can be metalated both covalently or through interactions we find in classic supramolecular chemistry. In this seminar, I will discuss the specific, such as found for the organometallic anticancer agent plecstatin-1,1,2 and site-unspecific, promiscuous targeting of proteins by anticancer metal complexes, the adducts of which depending on the nature of the metal center and co-ligands.3 This will lead to approaches in the selective functionalization of peptide carriers with organometallic moieties for drug delivery,4 and the use of the same structural motifs in our quest to the stepwise formation of stimulus-responsive supramolecular structures.5 In the last part, I will focus on heterobimetallic M2L4 architectures based on metal centers such as PtII/IV, PdII and RuII, expanding on the range of low-symmetry supramolecular architectures with interesting properties, both when it comes to biological activity and guest binding.

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Zeit: **Montag, 02.09.2024, 17:15 Uhr**
Ort: **SRG I Raum 1.001**

Für die Dozierenden der Chemie
Im Auftrag des Dekans

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