



SCIENTIFIC AND METHOD MODULES

Module name	Smart Molecules - Supramolecular Anions Chemistry
Number	2018-T1
Aims	This module provides an overview of some recent developments in the field of anion recognition and links it to topics in supramolecular chemistry, biomedical applications and nanochemistry. The doctoral researchers will gain insight into specific syntheses and modifications of anion receptors, their specific functions and their integration into functional materials with optimized catalytic activity and adjustable physical, magnetic, electronic, biological and optical properties.
Basics	covered in type B modules
Contents	Anion recognition chemistry has grown from its beginnings in the late 1960s and a variety of charged and neutral, cyclic and acyclic, inorganic and organic supramolecular host systems for the selective complexation, detection, and separation of anionic guest species have been developed. Recent developments include exciting advances in anion-templated syntheses, directed self-assembly, ion-pair recognition, the function of anions in supramolecular catalysis, anion recognition in aqueous systems, fluorescence sensing of anion, recognition of anions in metal-organic frameworks. The present two day module will provide an introduction into the field and will look at recent developments, covering anion recognition based on biomolecules, polymers, and nanoparticles.
Methods	Synthesis of macrocyclic receptors, anion as templates in synthesis, macrocyclic chemistry, molecular spectroscopy (fluorescence spectroscopy, IR, NMR, UV-Vis, etc.), Solution thermodynamics, Structural changes due to anion binding, calculations (quantum chemistry).
Type	Two-day block course
Date (month/year)	20 – 21 September 2018
Time	8:30 – 17:30 (1 st day), 8:30 – 14:00 (2 nd day)
Work load	ca 15 hours presence/ 45 hours self-study
Examination	Written, short tests
Credit points	2
Responsible scientists	Berthold Kersting, Harald Krautscheid
Guest lecturers	Markus Albrecht (RWTH Aachen, Aachen, Germany), Anthony P. Davis (University of Bristol, Bristol, UK), Enrique García-España (Universidad de Valencia, Valencia, Spain), Evgeny Kataev (TU Chemnitz, Chemnitz, Germany), Stefan Kubik (TU Kaiserslautern), Carmelo Sgarlata (University of Catania, Italy)
Industrial partners	none
Recommendations for literature, e-learning	P.D. Beer, P. A. Gale, <i>Angew. Chem. Int. Ed.</i> 2001 , <i>40</i> , 486-516; Kataev, E. A., C. Müller (2014). <i>Tetrahedron</i> 2014 , <i>70</i> , 137-167.

SCHEDULE for Module 2018-T1

Thursday, September 20th, 2018

Time	Lecturer	Programme	Location
Thursday, September 20th, 2018			
8:30-10:00	Markus Albrecht	Anion- π interactions in a general context with anion recognition	Faculty of Chemistry and Mineralogy, Johannisallee 29, SR101
<i>Coffee break</i>			
10:15-11:45	Anthony P. Davis	From anion receptors to transmembrane anion transport (additional keywords: Hydrogen bonding, podands, non-polar media)	SR101
11:45-12:30		Discussion and Test	SR101
<i>Lunch break</i>			
13:30-15:00	Enrique García-España	Polyamines and polyamine metal complexes in anion recognition: from basic principles to biomedical applications	SR101
<i>Coffee break</i>			
15:15-16:45	Stefan Kubik	Anion recognition in water & anion binding cyclopeptides and cyclopeptideptides	SR101
16:45-17:30		Discussion and Test	SR101
Friday, September 21th, 2018			
8:30-10:00	Evgeny Kataev	Fluorescence sensing of anions	SR101
<i>Coffee break</i>			
10:15-11:15	Carmelo Sgarlata	Solution thermodynamics of anion-templated capsules in water	SR101
11:45-12:30	Krautscheid	Anion recognition by metal organic frameworks	SR101
12:30-13:00		Discussion and Test	SR101
		Closing remarks	SR101

Didactic elements:

Lecture, discussions

Expected performance:

Active participation in discussions