BuildMoNa

SCIENTIFIC AND METHOD MODULES

Module name	**Smart molecules**
Number	2009-M05
Aims	This module aims at linking molecular sciences, as well as topics from solid-state chemistry and physics, homogeneous, heterogeneous and biocatalysis.
Basics	Quantum-electronic structures, transition metal complexes, organometallic compounds
Contents	Specific synthesis, modification and understanding of the changes in the electronic structure of molecules that are precursors for materials with optimized catalytic activity and adjustable magnetic, electronic, and optical properties. 1. Small molecules: organometallic and transition metal complexes, building blocks for metal-organic frameworks (MOFs), immobilization of catalysts (on solid or in liquid supports), electronic structure of active units. 2. Designing and synthesizing smart molecules that contain biological and chemical segments, strategies to introduce metals into biomolecules by selectively introduced chelators, monitoring structural changes. 3. Clusters and polynuclear compounds: links between mononuclear complexes and the corresponding solid-state phase, homo- and heterometallic systems, metallated container molecules, supramolecular chemistry. 4. Supramolecular chemistry, self-assembly (concepts, strategies).
Methods	Synthesis of new building blocks, characterization of their electronic properties by molecular spectroscopy (IR, NMR, UV-Vis, etc.), structural changes due to interconnection.
Type	Two-day block course/ yearly recurrence with modification
Date (month/year)	November 25th - 26th 2009
Time	Day 1: 9.00 – 16.00, Day 2: 9.00 – 16.00
Work load	15 hours presence/ 45 hours self-study
Examination	oral/ written
Credit points	2
Responsible scientists	Haase, (Bertmer)
International guest lecturers	YuYe Tong, Georgetown University, Washington D. C., USA Martin Hartmann, University Erlangen-Nürnberg, Erlangen
Industrial partners	Convertex, IRL
Recommendations for literature, e-learning	

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SCHEDULE 2009

Time	Lecturer	Programme	**Location**
Nov. 25th			
9.00-10.30	Jürgen Haase	Size Effects of Electronic Properties: From the Particle in a Box to Correlated Matter	**S 205**[1]
		Coffee break	
11.00-12.30	Marko Bertmer	Molecular Optical Switches and Memories	**S 205**[1]
		Lunch break	
14.00-15.30	Andreas Pöppl	Primary Processes in Photosynthesis	**S 205**[1]
Nov. 26th			
9.30-10.30	YuYe Tong	*In situ* Electrochemical NMR of Nanomaterials: from Pt-based Electrocatalysts to Metal-Molecular Wire Junctions	**SR 221**[2]
		Coffee break	
11.00-12.30	Martin Hartmann	Design of Metal Organic Frameworks for Separation and Catalysis	**SR 218**[2]
		Lunch break	
14.00-15.00	YuYe Tong	Tuning the Activity of Pt-based Electrocatalysts by Surface Composition, Size, Shape, and Capping Polymer	**SR 218**
Nov. 30th		Oral/written test	

Didactic elements:
Lectures, discussions

Expected performance:
Active participation in discussions

[1] Der Raum S 205 befindet sich im neuen Seminargebäude in der Universitätsstraße 5.

[2] Der Seminarraum 218/221 befindet sich in der Fakultät für Physik und Geowissenschaften, Linnéstraße 5, 04103 Leipzig.