

## SCIENTIFIC AND METHOD MODULES

<b>Module name</b>	<b>Smart and Active Assemblies</b>
<b>Number</b>	2012-A1
<b>Aims</b>	This module links molecular sciences to catalysis on complex, multicomponent and multifunctional active sites. It imparts knowledge on the interaction of active sites and active nanocatalysts with their local environment and the catalytic reaction system, and discusses cutting-edge applications in modern homogeneous, heterogeneous and biocatalysis with the goal of understanding emerging catalytic applications for future needs.
<b>Basics</b>	<b>Recommended knowledge:</b> thematic modules T1, T2, T4 <b>Required knowledge:</b> Organometallic compounds, Transition metal complexes, Nanoparticles, Electronic structure (metals, oxides), Porous solids, Enzymes, Chirality, Catalytic chemistry and kinetics.
<b>Contents</b>	Complex assemblies (specific synthesis, modification, structure and catalytic properties, various environments with optimised catalytic activity, selectivity and stability), Complex catalysts (functionalized mixed metal (oxide) nanoparticles, metal complexes, MOFs, immobilisation of catalysts (on solid or in liquid supports)), Complex biocatalysts (developing of engineered enzymes, immobilization of enzymes, surface modification, improved tailor-made biocatalysts, biomimetic catalyst assemblies (zeozymes, artizymes)), Catalytic activation by smart assemblies (activation of unreactive molecules or solids), enantioselective catalysis), Theory (novel modelling tools, large-scale computations of real-world applications of complex structures and their properties, local and electronic structure of active sites).
<b>Methods</b>	Active site assemblies (synthesis, characterisation of electronic and structural properties by molecular spectroscopy), Catalysts (spectroscopy under working conditions, advanced testing, e.g., via high-throughput experimentation), Theoretical methods.
<b>Type</b>	Two-day block course/ yearly recurrence with modification
<b>Date (month/year)</b>	18 and 19 October 2012
<b>Time</b>	
<b>Work load</b>	15 hours presence/ 45 hours self-study
<b>Examination</b>	Written, 26 October 2012, 1-2 pm, room: S015, Johannisallee 29
<b>Credit points</b>	2
<b>Responsible scientists</b>	Gläser, Hey-Hawkins
<b>Guest lecturers</b>	Prof. Paul C.J. Kamer, St. Andrews, UK; Dr. Marc Armbrüster, MPI für Chemische Physik fester Stoffe, Dresden; Prof. Sven Kureti, TU Freiberg; Prof. Martin Bertau, TU Freiberg; Prof. Martin Hartmann, Friedrich-Alexander-Universität Erlangen-Nürnberg.
<b>Industrial partners</b>	-
<b>Recommendations for literature, e-learning</b>	Nanocatalysis (U. Heiz, U. Landmann, Springer 2006, ISSN 1434-4904), Nanoparticles and Catalysis (D. Astruc, Wiley 2008, ISBN 978-3-527-31572-7). See also listed citations in pdf versions of lectures.

## SCHEDULE for Module 2012-A1

Thursday, 18 October 2012

Time	Lecturer	Program	Location
Day 1 (Thursday, 18 October 2012)			
09:00 – 09:05	Roger Gläser, Leipzig	Welcoming address	Faculty of Chemistry and Mineralogy, Johannisallee 29  Seminar Room 101 (SR101)
09:05 – 10:30	<del>Sven Kureti, Freiberg</del> Katrin Mackenzie, Leipzig	<del>Oxidation of Soot on Nano-Sized Iron Oxide Catalysts</del> Nanoparticles for Water Treatment	
10:30 – 10:45	Coffee & Tea, Refreshments		
10:45 – 12:15	Martin Bertau, Freiberg	Silicones, Sugar and Coffee – News from Biocatalysis	SR101
12:15 – 13:15	Lunch break		
13:15 – 14:45	Paul Kamer, St. Andrews, UK	Ligand Design and Biological Concepts in Homogeneous Catalysis	SR101
14:45 – 15:00	Coffee & Tea, Refreshments		
15:00 – 16:30	Marc Armbrüster, Dresden	Synthesis and Catalytic Properties of Intermetallic Nanoparticles	SR101
18:00 – 21:00	Dinner		
Day 2 (Friday, 19 October 2012)			
09:00 – 10:30	Martin Hartmann, Erlangen-Nürnberg	MOFs in Catalysis - What are they good for	SR101
10:30 – 10:45	Coffee & Tea, Refreshments		
10:45 – 12:15	Roger Gläser, Leipzig	Selective Oxidation on Novel Nanoporous Transition Metal Catalysts	SR101
12:15 – 13:15	Lunch break		
13:15 – 14:45	Evamarie Hey-Hawkins, Leipzig	Ferrocene-based Functionalised Building Blocks in Homogeneous and Heterogeneous Catalysis	SR101
14:45 – 15:00	Coffee & Tea, Refreshments		
15:00 – 16:00	Discussion / Closing Remarks		