BuildMoNa

UNIVERSITÄT LEIPZIG

SCIENTIFIC AND METHOD MODULES

Module name	Smart molecules
Number	2008-M05
Aims	This module aims at linking molecular sciences, homogeneous, heterogeneous and bio-catalysis.
Basics	Organometallic compounds, transition metal complexes, bioorganics, peptides
Contents	Specific synthesis, modification and understanding of the changes in the (electronic) structure of molecules that are precursors for materials with optimized catalytic activity. 1. Small molecules: organometallic and transition metal complexes, homogeneous catalysis (principles, examples, applications), immobilization of catalysts (on solid or in liquid supports), building blocks for metal-organic frameworks (MOFs). 2. Design and application of nanoporous catalysts for sustainable chemical processes, catalysis on zeolites and related materials (fundamentals and applications), introduction of catalytic functionalities into nanoporous materials, green synthesis of smart molecules (fine chemicals). 3. Designing and synthesizing smart molecules that contain biological and chemical segments, strategies to introduce metals into biomolecules by selectively introduced chelators, monitoring structural changes.
Methods	Synthesis of new building blocks, characterization of their properties by molecular spectroscopy (IR, NMR, UV-Vis, etc.), structural changes due to interconnection, protein expression, modification and biochemical characterization of enzymes, native chemical ligation (NCL) and expressed protein ligation (EPL).
Type	Two-day block course/ yearly recurrence with modification
Date (month/year)	23/24 June 2008
Time	Day 1: 9.00 – 17.00, Day 2: 9.00 – 16.00
Work load	15 hours presence/ 45 hours self-study
Examination	Oral, on Thursday, June 26th , 12:30-15:00, Faculty of Chem., Room 153
Credit points	2
Responsible scientists	Beck-Sickinger, Hey-Hawkins
International guest lecturers	Moris S. Eisen (Technion, Haifa, Israel), Paul Kamer (University of St. Andrews, UK), Katharina Welser (University Nottingham, UK)
Industrial partners	Convertex, IRL
Recommendations for literature	G. Rothenberg, Catalysis - Concepts and Green Applications, 2008, Wiley VCh; Cornils, Boy / Herrmann, Wolfgang A. / Muhler, Martin / Wong, Chi-Huey (Hrsg.), Catalysis from A to Z, A Concise Encyclopedia

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SCHEDULE 2008

Time	Lecturer	Programme	Location
Day 1			
23 June 2008			Faculty of Chemistry Room 102
9.00-10.30	Evamarie Hey-Hawkins, UL	Basics in Catalysis: Catalysis – Quo Vadis?	
		coffee break	
11.00-12.30	Roger Gläser, UL	Green Chemistry with Heterogeneous Catalysis	
		lunch break	Room 153
14.00-15.00	Paul Kamer, St. Andrews, UK	Transition Metal Complexes in Catalysis	
		coffee break	
15.30-17.00	Moris Eisen, Israel Institute of Technology	Chiral Catalysts in the Production of Macromolecules	
Day 2			
24 June 2008			Faculty of Chemistry Room 102
9.00-10.00	Ines Neundorf, UL	Introduction in Peptide Synthesis: How to Design Selectively Modified Peptides	
		coffee break	
10.30-11.30	Annette Beck-Sickinger, UL	Chemical Modification of Proteins: Novel Tools for Heterocatalysis in Biosystems	
		lunch break	Room 153
13.00-14.30	Katharina Welser, Univ. Nottingham, UK	Polymeric Nanoprobes: A new Approach for the Detection of Protease Activity	
		coffee break	
15.00-16.00	Paul Kamer, St Andrews, UK	Biological concepts in homogeneous catalysis (hybrid transition metal and enzyme catalysis)	

A *Guided Tour* through the labs (inorganic, bioorganic) will be available on appointment in June/July 2008 (please enrol for this tour).

Didactic elements: Lectures, discussions
Expected performance: Active participation in discussions