BuildMoNa

UNIVERSITÄT LEIPZIG

SCIENTIFIC AND METHOD MODULES

Module name	From molecules to materials
Number	2009-M02
Aims	1. Link molecular sciences and materials science; 2. Understand how materials with optimized catalytic activity are obtained from molecules or molecular precursors; 3. Understand the properties and applications of these materials.
Basics	Molecular Precursors, Catalysts, Catalytic Supports, Polymers, Organic, Inorganic and Hybrid (Nano) Structures covered in the module “Smart Molecules”
Contents	1. Catalytic supports from “hard” (synthetic molecules and crystalline nanostructures) and/or “soft” (polymers) building blocks, which include: polymers, hybrid materials, supramolecular arrangements together with modifications to improve the material qualities. 2. Properties of these materials: mass transfer, porosity, pore size distribution, specific surface areas, functionality, thermal properties, thermodynamics 3. Application of these materials in catalysis (immobilized catalysts), for gas separation or gas storage (MOFs), as sensors etc.
Methods	Templated Synthesis, Immobilization Techniques, Polymer Synthesis, Generation of Porosity by Micro- and Macrophase Separation, Heterogeneous Molecular Catalysis,
Type	Two-day block course/ yearly recurrence with modification
Date (month/year)	03. and 04.06.2009
Time	Day 1: 8.30 – 16.45, Day 2: 8:30 – 16:00
Work load	15 hours presence/ 45 hours self-study
Examination	written
Credit points	2
Responsible scientists	Buchmeiser, Gläser
International guest lecturers	F. Schüth (confirmed) M.-O. Coppens (confirmed)
Industrial partners	
Recommendations for literature, e-learning	R. J. Wijngaarden, A. Kronberg, K. R. Westerterp (Eds.), Industrial Catalysis, Wiley-VCH, 1998; G. Ertl, H. Knözinger, F. Schüth, J. Weitkamp (Eds.) Handbook of Heterogeneous Catalysis, Wiley-VCH, 2008; J. Hagen (Ed.) Technische Katalyse, Wiley-VCH 1996; D. Astruc (Ed.) Nanoparticles and Catalysis, Wiley-VCH, 2008; M. R. Buchmeiser (Ed.), Polymeric Materials in Organic Synthesis and Catalysis, Wiley-VCH, 2003.

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SCHEDULE 2009

Time	Lecturer	Program	Location
Day 1			
8:30	Buchmeiser	Introduction	IOM, Permoserstr. SR Gbde 32.0 (1.Stock)
8:45-10:15	Gläser	Lecture: Inorganic Functional Nanomaterials: from Preparation to Application	
10:15-10:45		(Coffee Break), Discussion	
10:45-12:15	Buchmeiser	Lecture: Polymeric Supports for Catalysis: Matrices, Functionalization, Properties	
	Lunch break		
13:15-14:45	M.-O. Coppens	Guest Lecture: Design and Synthesis of Hierarchically Structured Porous Catalysts with Minimized Diffusion Limitations	IOM, Permoserstr. SR Gbde 32.0 (1.Stock)
15:15-16:45	Buchmeiser	Lecture: Supported Polymerization Catalysts	
Day 2			
8:30-10:30	H. Krautscheid	Lecture: MOFs – Synthesis, Structures and Applications	Johannisallee 29, room 114
10:30-11:00		(Coffee Break), Discussion	
11:00-12:30	F. Schüth	Guest Lecture: Nanoscale Design for the Synthesis of Catalysts and Functional Solids	
	Lunch break		
14:00-15:00	F. Schüth (GDCh lecture)	Guest Lecture: Chemische Verfahren zur Energiespeicherung	Johannisallee 29, room 114
15:00-15:15		Break	
15:15-16:00	R. Gläser	Discussions or contributions of the doctoral candidates	
		written test: one week later	

Didactic elements:
Lecture, discussions, presentations.

Expected performance:
Active participation in discussions