

Module name	From molecules to materials
Number	2008-M02
Aims	1. Link molecular sciences and materials science; 2. Understand how materials with optimized catalytic activity and adjustable magnetic, electronic, or optical properties are obtained from molecules; 3. Understand the properties and applications of these materials.
Basics	Molecular Precursors, Supramolecular Coordination Compounds, MOFs, Polymers, Organic, Inorganic and Hybrid Nanostructures: covered in the module "Smart Molecules"
Contents	1. Novel materials 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, metal-organic frameworks (MOFs), thin films and nanostructures. 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, MOFs), for gas separation or gas storage (MOFs), as sensors, in electronics,...
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	27.03.2008-28.03.2008
Time	Day 1: 8.30 – 16.15, Day 2: 8:30 – 14:45
Work load	15 hours presence/ 45 hours self-study
Examination	Written / Oral Contribution
Credit points	2
Responsible scientists	Buchmeiser, Kersting, Krautscheid
International guest lecturers	Guido Kickelbick
Industrial partners	A&F Hygiene; Evonik (angefragt)
Recommendations for literature, e-learning	G. Kickelbick (ed.), Hybrid Materials, Synthesis, Characterization and Applications, Wiley-VCH, 2007; M. R. Buchmeiser (ed.), Polymeric Materials in Organic Synthesis and Catalysis, Wiley-VCH, 2003;

2008-M02 SCHEDULE

Time	Lecturer	Program	Location
Day 1, 26.03.2008 (optional)			
14:00-15:15	Kickelbick	Lecture: Metalloxid-Polymer Hybridmaterialien - Einblicke in das chemische Design der Grenzfläche	IOM
Day 2, 27.03.2008			
8:30	Buchmeiser	Introduction	IOM
8:45-10:45	Kickelbick	Lecture: Methoden zur Herstellung von Hybridmaterialien und Nanokompositen	IOM
10:45-11:15		(Coffee Break), Discussion	IOM
11:45-12:45	Buchmeiser	Lecture: Polymeric Supports for Catalysis: Matrices, Functionalization, Properties	IOM
	<i>Lunch break</i>		
13:45-15:15	Krautscheid	Lecture: MOFS: Synthesis, Structures, and Applications	IOM
15:15-16:45	Buchmeiser	Lecture: Supported (Metathesis) Catalysts	IOM
17:00-18:00	Buchmeiser	lab tour through the IOM (non mandatory)	IOM
Day 3, 28.03.2008			
8:30-10:30	Kersting	Hybrid Materials: Synthesis and Applications	Jo29
10:30-11:00		(Coffee Break), Discussion	
11:00-12:30	Krautscheid	Lecture: From Molecular Precursors to Materials	Jo29
	<i>Lunch break</i>		
13:30-15:00		Discussions or contributions of the doctoral candidates	Jo29
15:00-15:15		(Coffee Break), Discussion	
15:15-16:00		Discussions or contributions of the doctoral candidates	Jo29

Didactic elements:

Lecture, discussions, presentations.

Expected performance:

Active participation in discussions