

Katalyse

Studienschwerpunkt 2

30. Juli 2021

Aim of the courses

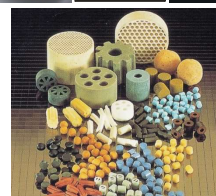
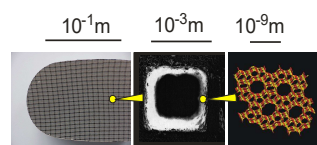
Unifying concepts of

- Homogenous catalysis
- Heterogenous catalysis
- Bio-/Enzyme catalysis
- Photo-/Electro catalysis

Strategies for synthesis, characterization, simulation of catalysts, catalytic reactions and reaction mechanisms

Concepts and realization of industrial processes

- Refining
- Petrochemistry
- Synthesis of fine chemicals
- Biochemistry
- Photo and electro catalytic processes
- ...



Zweiter Studienschwerpunkt Katalyse

- Fundamentals of Catalysis (Lercher, WS 5 ECTS)
- Methods of Catalysis (SS 5 ECTS)
- Praktikum - Grundlagen und Anwendung der Katalyse (SS 10 ECTS)

Elective modules:

- Catalysis for Energy (Lercher, WS)
- Catalysis for Synthesis (Khare, SS)
- Catalysis in Industrial Practice (R. W. Fischer, WS)
- Metalorganic and Biocatalysis (T. Brück, M. Cokoja, R. W. Fischer, C.R. Hess, V. Sieber, SS)
- Industrial relevant Activation of Small Molecules (R.W. Fischer, SS)

2 Modules (each Module: 5 ECTS: 2SWS + 1 SWS Seminar)

Zweiter Studienschwerpunkt Katalyse

Fundamentals of Catalysis (Lercher, WS 5 ECTS)

Unifying concepts in homogeneous, heterogeneous and bio-catalysis, thermodynamics, and kinetics. Interactions and surface chemistry, acid/base metals and redox reactions.

Methods of Catalysis (SS 5 ECTS)

15.04.2021	A. Jentys	X-ray absorption spectroscopy
22.04.2021	S. Günther/L. Patera	Photoelectronspectroscopy/-microscopy
29.04.2021	Th. Brück	Bio-catalytic methods
06.05.2021	K. Köhler	Preparation of supported catalysts
20.05.2021	O. Hinrichsen	Additive manufacturing of catalystst
27.05.2021	R. Khare	Characterization of acid/base sites
10.06.2021	R. A. Fischer	BET/H ₂ sorption
17.06.2021	J. Hauer	Femtosecond spectroscopy
24.06.2021	F. Esch	STM/AFM
01.07.2021	M. Sanchez	Raman spectroscopy
08.07.2021	G. Kieslich	X-ray diffraction
15.07.2021	H. Gasteiger	Electro catalytic methods

Praktikum - Grundlagen und Anwendung der Katalyse (SS 10 ECTS)

Elective modules: Catalysis

Catalysis for Energy (Lercher, WS)

Physico-chemical and technical/technological concepts of chemical processes in the field of energy conversion (e.g.. Refinery processes, synthesis gas and alternative fuels gas to liquid). Excursion to refinery (if possible)

Catalysis for Synthesis (Khare, SS)

Physico-chemical and technical/technological concepts of chemical processes in the synthesis of bulk and commodity chemicals with respect to catalyst design, reaction mechanisms and process technologies.

Catalysis in Industrial Practice (R.W. Fischer, WS)

Introduction to the history and landmarks of major catalysis-based processes of the chemical industry. Concepts of applied catalysis in state of the art industrial applied catalysis, highlighting the latest developments.

Metalorganic and Biocatalysis (T. Brück, M. Cokoja, R.W. Fischer, C.R. Hess, V. Sieber ..., SS)

Current challenges in molecular catalysis, also from the perspective of bio-inorganic and enzymatic catalysis

Industrial relevant Activation of Small Molecules (R.W. Fischer, SS)

Efficient and applied catalytic technologies to activate small molecules like N_2 , SO_2 , CO, CO_2 , methane and its homologous (C_2 to C_4). Comprehensive presentation of applied and novel catalytic technologies, covering catalyst preparation and properties as well as process specifics in the context of economics and sustainable, ecological aspects