BuildMoNa

UNIVERSITÄT LEIPZIG

SCIENTIFIC AND METHOD MODULES

Module name	From Molecules to Materials: Photocatalysis
Number	2021-T4
Aims	This module links molecular sciences and materials science. Starting with basic concepts it will teach how photocatalysis can be applied as versatile synthetic tool in various fields, incl. (asymmetric) organic synthesis, and ligand design. Furthermore, the development of new molecular (incl. biobased), immobilised and heterogeneous catalysts will be described. Insights into photocatalyst characterisation, implementation in multi-catalytic transformations and mechanistic understanding will be provided.
Basics	Covered in basic module B1 (Basic Concepts in Chemistry).
Contents	Photocatalysts based on “hard” (synthetic molecules, crystalline nanostructures, covalent organic frameworks (COFs), immobilised catalysts) building blocks for the application in synthesis, including combinations with “soft” (enzymes, biomolecules) co-catalysts. Properties of these materials (optical, redox and photocatalytic properties); applications (photocatalysis, immobilised catalysts, (solar) energy conversion and storage; theoretical and mechanistic aspects.
Methods	Synthesis, immobilisation techniques, characterisation, photocatalytic studies
Type	Single-day online block course / bi-yearly recurrence with modifications
Date (month/year)	9 September, 2021
Time	8.45 – 18.00
Work load	9 hours presence (online course), 51 hours self-study
Examination	2-page report/essay on a specific topic of the module (self-selected)
Credit points	2
Responsible scientists	E. Hey-Hawkins, K. Zeitler
Guest lecturers	Prof. Burkhard König, Universität Regensburg; Prof. Cristina Nevado, Universität Zürich; Prof. Robert Wolf, Universität Regensburg; Prof. Bettina Lotsch, LMU München& MPI Festkörperforschung Stuttgart; Prof. Jennifer Strunk, Likat, Rostock; Prof. Jan Weigand, TU Dresden; Prof. Todd Hyster, Cornell University
Industrial partners	-
Recommendations for literature, e-learning	see *Book of Abstracts*

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SCHEDULE for Module 2021-T4
Location: *wherever@ZOOM*

Time	Lecturer	Title
Thursday, September 9th 2021, Location: ZOOM/wherever		
8:50 Hey-Hawkins / Zeitler **Welcome**		
9:00	**Burkhard König**	Visible light photocatalysis: Basic concepts, recent advances and future perspectives
9:45	**Cristina Nevado**	Photoredoxcatalysis as a versatile tool for (asymmetric) synthesis
10:30 – 11:00 *Coffee break* *Breakout Room* with **Burkhard König**		*Breakout Room* with **Cristina Nevado**
11:00	**Jan Weigand**	Flowers as versatile photoredox catalysts
11:45	**Bettina Lotsch**	Beyond molecules: 2D frameworks as platforms for energy conversion and storage
12:30 – 13:30 *Lunch break* till 13:00 *Breakout Room* with **Jan Weigand**		till 13:00 *Breakout Room* with **Bettina Lotsch**
13:30	**Jennifer Strunk**	Supported molecular photocatalysts based on vanadium and titanium oxide: Mode of action characterization with *in situ* spectroscopy
14:15	**Todd Hyster**	Photoenzymatic catalysis – Using light to unlock new enzymatic functions
15:00 – 15:30 *Coffee break* *Breakout Room* with **Jennifer Strunk**		*Breakout Room* with **Todd Hyster**
15:30	**Robert Wolf**	Metal-mediated methods for the functionalization of white phosphorus
16:15 Hey-Hawkins / Zeitler **Closing Remarks**		
16:20 – 17:15 *Discussions, Socialising* *Breakout Room* with **Robert Wolf**		

Didactic elements:
Lectures, discussions, etc.

Expected performance:
Active participation in discussions during breaks etc.