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# Einladung

Im Rahmen der gemeinsamen Kolloquien der Fakultät für Chemie und Chemische Biologie der Technischen Universität Dortmund hält

## Herr Prof. Dr. Christoph Kerzig

*JGU Mainz, Department of Chemistry, Duesbergweg 10-14, 55128 Mainz, Germany*

einen Vortrag mit dem Thema:

## *Using visible light as efficiently as possible in photocatalysis*

Many photocatalytic reactions suffer from lousy quantum yields owing to poorly understood and chemically unproductive loss channels. To improve the light-to-chemical-energy conversion efficiencies, we develop new concepts that rely on molecular dyads consisting of a metal complex unit and a covalently attached organic chromophore. These dyads were employed for efficient key reaction steps in photocatalysis[1,2] and a novel approach for controlling the triplet quenching mechanism was established[3]. Guided by our recent study on Coulomb effects on the energy transfer kinetics,[4] we have developed the Coulombic dyad strategy for obtaining the advantages of molecular dyads without the time- and resource-consuming synthesis of tailored photocatalysts.[5]

Challenging photoreactions usually require UV light and cannot be driven by one visible photon for thermodynamic reasons. With the aim in mind to replace inefficient UV light sources, we are working on different strategies to pool the energy of two visible photons for achieving similar photochemical reactivities as obtained upon direct (one-photon) UV excitation. Upconversion via sensitized triplet-triplet annihilation is among the most promising two-photon mechanisms and recent results from our lab will be presented.[6,7]

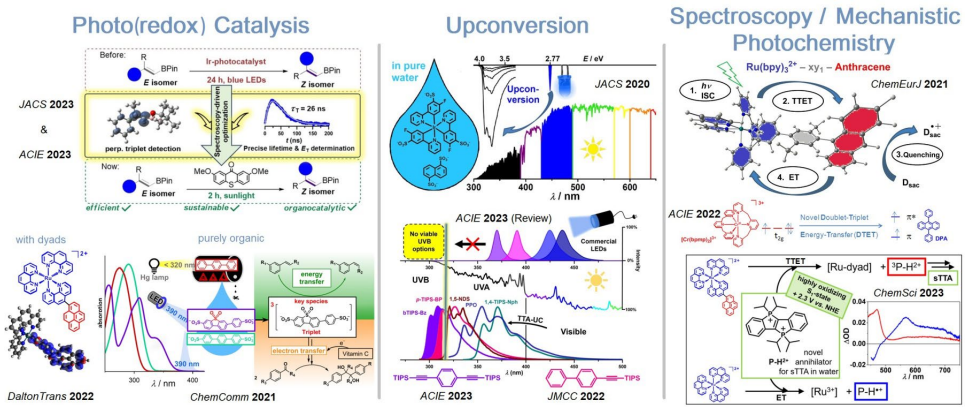


Figure 1: Recent projects.

All projects are characterized by a synergistic interplay of molecular design, time-resolved optical spectroscopy and lab-scale irradiation (photocatalysis) experiments, which allows us to obtain deep mechanistic insights.

[1] S. Neumann, O. S. Wenger, **C. Kerzig**, *Chem. Eur. J.* **2021**, *27,* 4115. [2] **A. C. Sell, J. C. Wetzel, M. Schmitz**, A. W. Maijenburg, G. Woltersdorf, R. Naumann, **C. Kerzig**, *Dalton Trans.* **2022**, *51*, 10799. [3] **M.-S. Bertrams**, **K. Hermainski**, J.-M. Mörsdorf, J. Ballmann, **C. Kerzig**, *Chem. Sci.* **2023**, *14*, 8583. [4] **F. Glaser**, **M. Schmitz**, **C. Kerzig**, *Nanoscale* **2024**, *16*, 123. [5] **M. Schmitz**, **M.-S. Bertrams**, **A. C. Sell**, **F. Glaser**, **C. Kerzig**, *J. Am. Chem. Soc.* ***2024***, *146*, 25799. [6] **T. J. B. Zähringer**, **J. A. Moghtader**, **M.-S. Bertrams**, B. Roy, M. Uji, N. Yanai, **C. Kerzig**, *Angew. Chem. Int. Ed.* **2023**, e202215340. [7] M. Uji, **T. J. B. Zähringer**, **C. Kerzig**, N. Yanai, *Angew. Chem. Int. Ed.* **2023**, e202301506.

## Zeit: Dienstag, 21.01.2025, um 17.15 Uhr

## Ort: Hörsaal 1, Chemiegebäude, Campus Nord

Im Anschluss an den Vortrag findet eine Nachsitzung statt.

Für die Dozenten der Chemie
Im Auftrag des Dekans

Betreuer: Prof. Dr. M. Hansmann