SPECIAL ORGANIC SEMINAR

Catalytic Photochemical Deracemization Reactions

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Photochemistry enables an access to reaction pathways that are not viable in conventional transformations. The talk will revolve around the conversion of a racemic mixture to a single enantiomer in a catalytic photochemical deracemization reaction.[1,2] In an ideal scenario, quantitative yields of enantiomerically pure (>90% *ee*) compounds can be achieved in a single operation.

The entropically disfavored and thermally impossible process is driven by light energy. Product classes which have been successfully deracemized include chiral allenes, olefins, cyclopropanes, and heterocyclic compounds. The reactions are catalyzed by a single photocatalyst which either acts by energy transfer[3] or by a reversible hydrogen atom transfer.[4] Possible applications, the underlying mechanistic considerations, and ongoing work on the topic will be presented.

1. First report: A. Hölzl-Hobmeier, A. Bauer, A. V. Silva, S. M. Huber, C. Bannwarth, T. Bach; *Nature* **2018**, *564*, 240.
2. Review: J. Großkopf, T. Bach; *Angew. Chem. Int. Ed.* **2023**, *62*, e202308241.
3. For an example, see: T. Kratz, P. Steinbach, S. Breitenlechner, G. Storch, C. Bannwarth, T. Bach; *J. Am. Chem. Soc.* **2022**, *144*, 10133.
4. For an example, see: J. Großkopf, M. Plaza, R. J. Kutta, P. Nuernberger, T. Bach, *Angew. Chem. Int. Ed.* **2023**, *62*, e202313606.

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