

A2-11

Development of Chemo- and Enantioselective Arene Hydrogenation and of Additional Tools for Improving Synthesis

Frank Glorius (Organic Chemistry, Westfälische Wilhelms-Universität Münster)

Catalysis is a key technology of our modern societies, since it allows for increased levels of selectivity and efficacy of chemical transformations. Chiral, saturated carbo- and heterocycles are important structural elements of secondary metabolites and active ingredients in drugs and agrochemicals. Arene hydrogenation could - in principle - represent a straight-forward, efficient method for the formation of these sought-after product motifs. However, overcoming the resonance stabilization energy, tolerating versatile functional groups and high levels of enantioselectivity represent formidable challenges. In this talk the advances of the Glorius group in the field of enantioselective and non-enantioselective arene hydrogenation will be discussed.^{1,2}

1. a) M. P. Wiesenfeldt, Z. Nairoukh, W. Li, F. Glorius, *Science* **2017**, *357*, 908; b) Z. Nairoukh, M. Wollenburg, C. Schlepphorst, K. Bergander, F. Glorius, *Nat. Chem.* **2019**, *11*, 264.
2. For a few selected recent references, see: a) Mook, T. Wagener, T. Hu, T. Gallagher, F. Glorius, *Angew. Chem. Int. Ed.* **2021**, *60*, 13677-13681; b) A. Heusler, J. Fliege, T. Wagener, F. Glorius, *Angew. Chem. Int. Ed.* **2021**, *60*, 13793-13797; c) T. Wagener, L. Lückemeier, C. G. Daniliuc, F. Glorius, *Angew. Chem. Int. Ed.* **2021**, *60*, 6425-6429; d) T. Wagener, A. Heusler, Z. Nairoukh, K. Bergander, C. G. Daniliuc, F. Glorius, *ACS Catal.* **2020**, *10*, 12052-12057.

PROFILE

Frank Glorius (Organic Chemistry, Westfälische Wilhelms-Universität Münster)

① Academic background and career:

Frank Glorius was educated in chemistry at the Universität Hannover, Stanford University (Prof. Paul A. Wender), Max-Planck-Institut für Kohlenforschung and Universität Basel (Prof. Andreas Pfaltz), and Harvard University (Prof. David A. Evans). He began his independent research career at the Max-Planck-Institut für Kohlenforschung (Mentor: Prof. Alois Fürstner) in 2001 and was appointed Associate Prof. at the Philipps-Universität Marburg in 2004. Since 2007 he is a Full Professor of Organic Chemistry at the Westfälische Wilhelms-Universität Münster.

② Specialized field:

His research program focusses on the development of new concepts for diverse areas of catalysis such as photocatalysis, C-H activation, data science and machine learning, N-heterocyclic carbenes (NHCs) in organocatalysis and as surface modifiers and in (asymmetric) arene hydrogenation. In addition, molecules are designed and synthesized for applications in biological systems (membrane analogues, drugs) and material science (semiconductors, battery additives, heterogeneous catalysts).

③ Selected Prizes and Professional Recognition:

This work was acknowledged by a couple of distinguished awards, such as the OMCOS award, the Leibniz award of the DFG (highest German research award), membership in the German National Academy of Sciences, Leopoldina, two ERC grant, annual the Thomson Reuters/Clarivate Highly Cited Researcher acknowledgments since 2014, the Gay-Lussac-Humboldt Award, the Arthur C. Cope Scholar Award (ACS), the MSD Award (RSC) and the Mukaiyama Award (SSOCJ).

④ The Ten Most Important Publications

Nature Chem. **2013**, *5*, 597–601. *J. Am. Chem. Soc.* **2014**, *136*, 17722–17725. *Nature Chem.* **2015**, *7*, 842–847. *Angew. Chem. Int. Ed.* **2016**, *55*, 4361–4366. *Nature Chem.* **2017**, *9*, 152–156. *Science* **2017**, *357*, 908–912. *Nature Chem.* **2018**, *10*, 981–988. *Nature Chem.* **2019**, *11*, 264–270. *Chem* **2020**, *6*, 1379–1390. *Science* **2021**, *371*, 1338–1345.

⑤ Others

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> 370 scientific publications (peer reviewed) and 4 book chapters; H-index 106.