

A Trip into the Blue - OLED Research from a Synthetic Point of View

Prof. Dr. Stefan Bräse, Karlsruhe Institute of Technology (KIT), Kaiserstrasse 12,
76131 Karlsruhe

This talk will describe our research on organic and inorganic TADF molecules and their applications in OLEDs [1]. As an experimental chemistry group, our work processes include designing, synthesizing, and analyzing small to medium-sized organic (sometimes metal-organic) molecules, which includes digital chemistry [2-5]

The first part will start with an introduction and our effects on metal complexes [6]. The second part concerns our organic material OLED research, featuring TADF effects and synthetic paracyclophane chemistry. [7]

Literature:

[1] G. Hong, X. Gan, C. Leonhardt, Z. Zhang, J. Seibert, J. Busch, S. Bräse, *Adv. Mat.* 2021., e2005630. A brief History of OLEDs - Emitter Development and Industry Milestones DOI:10.1002/adma.202005630 [2] F. Tristram, N. Jung, P. Hodapp, R. Schröder, C. Wöll, S. Bräse, *Adv. Funct. Mat.* 2024, in press. The Impact of Digitalized Data Management on Material System Workflows - 10.1002/adfm.202303615. [3] P. Tremouilhac, A. T. C. Nguyen, Y.-C. Huang, S. Kotov, D. Lütjohann, F. Hübsch, N. Jung, S. Bräse, *J. Cheminform.* 2017, 9, 54. Chemotion ELN: An Open Source Electronic Lab Notebook for chemists in academia - 10.1186/s13321-017-0240-0. [4] P. Tremouilhac, C.-L. Lin, P.-C. Huang, Y.-C. Huang, A. Nguyen, N. Jung, F. Bach, R. Ulrich, B. Neumair, A. Streit, S. Bräse, *Angew. Chem.* 2020, 22771-22778. The repository Chemotion: infrastructure for sustainable research in chemistry - 10.1002/anie.202007702. [5] P. Tremouilhac, P.-C. Huang, C.-L. Lin, Y.-C. Huang, A. Nguyen, N. Jung, F. Bach, S. Bräse, *Chem. Meth.* 2021, 8-11. Chemotion repository, a curated repository for reaction information and analytical data - 10.1002/cmtd.202000034. [6] J. Busch, D. Zink, P. Di Martino-Fumo, F. Rehak, O. Fuhr, M. Gerhards, W. Klopper, S. Bräse, *Dalton Trans.* **2019**, 48, 15687-15698. *Highly Soluble Fluorine Containing Cu(I) AlkylPyrPhos TADF Complexes* [7] J. Seibert, Y. Xu, H. Hafeez, J. Podlech, E. Spuling, O. Fuhr, Z. Hassan, I. D. W. Samuel, E. Zysman-Colman, S. Bräse, *Adv. Funct. Mat.* 2024, in press. *A Novel Carbazolophane: A Comparison of the Performance of Two Planar Chiral CP-TADF Emitters*