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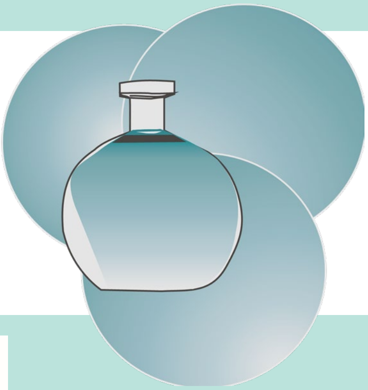

GDCh
GESELLSCHAFT
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lädt ein

gemeinsam mit der Gesellschaft Deutscher Chemiker
zum
Vortrag
von Herrn

Prof. Dr. Frank Breher

Institute of Inorganic Chemistry
Karlsruhe Institute of Technology (KIT)

“New Perspectives for Main Group Organometallics: Frustrated Lewis Pair Chemistry and Photoinitiated Radical Reactivity”

am: 16. April 2026
um: 09:30 Uhr
wo: im Raum 1/232

Gäste sind herzlich willkommen!

TECHNISCHE UNIVERSITÄT
IN DER KULTURHAUPTSTADT EUROPAS
CHEMNITZ

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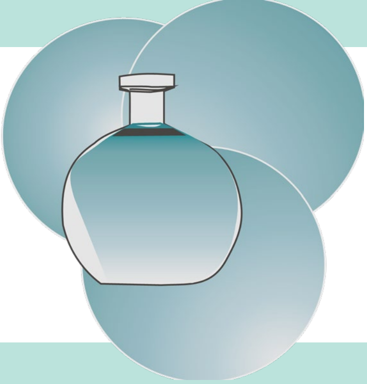

Prof. Dr. Frank Breher

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New Perspectives for Main Group Organometallics: Frustrated Lewis Pair Chemistry and Photoinitiated Radical Reactivity

Since its first report, the use of so-called frustrated Lewis pairs (FLPs), consisting of sterically hindered Lewis acids and Lewis bases to prevent adduct formation in the activation of small molecules, has increased considerably. Notwithstanding these achievements, ambiphilic molecules are promising candidates for splitting highly stable bonds, for example, N–H bonds in NH3. B/P-based FLPs have been used for inter- and intramolecular hydroaminations of alkynes with secondary amines. In addition, quantum chemical studies present FLPs as promising candidates in the dehydrogenation of ammonia borane involving N–H bond activation. However, the combination of Al- or Ga-based Lewis acids and carbon-based Lewis base is uncommon in the field of FLP chemistry. In the first part of the talk, we discuss the synthesis of Al/C and Ga/C ambiphiles and their reactivity towards small molecules such as NH3.[1-3]

In the second part, we address the photoinitiated homolysis of M–C bonds within organometallic compounds, which is an important mode of carbon radical formation.[4] In this respect, the use of earth-abundant main group elements such as aluminum or silicon is attractive. However, these elements form strong E–C bonds, so that short-wave UV radiation is usually required for E–C homolysis, which impedes their use as a radical source. Some reports in the literature show that visible-light-induced E–C homolysis is possible when a redox noninnocent ligand (NIL)[5] is coordinated to the organometallic fragment. Although the concept is not yet broadly established and needs to be further explored, the key point is that the presence of redox non-innocent ligands allows for homolysis of the E–C bond with wavelengths in the visible-light range.[6]

References:
[1] F. Krämer, J. Paradies, I. Fernández, F. Breher, *Nat. Chem.* **2024**, *16*, 63.
[2] F. Krämer, J. Paradies, I. Fernández, F. Breher, *Chem. Eur. J.* **2024**, *30*, e202303380.
[3] F. Krämer, P. Weisenburger, I. Fernández, F. Breher, *Eur. J. Inorg. Chem.* **2025**, *28*, e20250016.
[4] J. O. Wenzel, J. Werner, F. Breher, *Angew. Chem. Int. Ed.* **2025**, *64*, e202507060.
[5] J. O. Wenzel, I. Fernández, F. Breher, *Eur. J. Inorg. Chem.* **2023**, *26*, e202300315.
[6] J. O. Wenzel, J. Werner, A. Allgaier, J. van Slageren, I. Fernández, A.-N. Unterreiner, F. Breher, *Angew. Chem. Int. Ed.* **2024**, *63*, e202402885.

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