

Wintersemester 2023/2024

Titel

Activation of Small Molecules: Can Boron act as a Transition Metal?

Vortragender

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Abstract

The activation of small molecules is generally associated with transition metals (TM) and constitutes the basis of catalysis. It was believed that TM catalysts are required to facilitate processes such as the activation of H₂ and other unreactive substrates. However, recent exciting developments in main group element chemistry showed, that carbenes, FLPs and heavy main group species are capable of TM-like activation reactions.[1] Our ongoing studies on borylenes, diborenes, and diborynes have shown that these low-valent species exhibit a very rich chemistry, which is distinctly different from that of common compounds deriving from boron in oxidation state +3. Particularly interesting is the metal-like behavior of some borylenes and diborynes, which form CO complexes analogous to TMs, bind H₂ and unsaturated organic substrates under mild conditions and even activate N₂. [2]

Literature

1) a) P. P. Power, *Nature*, **2010**, *463*, 171; b) G. C. Welch, R. R. San Juan, J. D. Masuda, D. W. Stephan, *Science*, **2006**, *314*, 1124; c) G. D. Frey, B. Lavallo, B. Donnadieu, W. W. Schoeller, G. Bertrand, *Science*, **2007**, *316*, 439.

2) a) H. Braunschweig, R. D. Dewhurst, F. Hupp, M. Nutz, K. Radacki, C. Tate, A. Vargas, Q. Ye, *Nature*, **2015**, 327; b) H. Braunschweig, K. Radacki, A. Schneider, *Science*, **2010**, *328*, 345; c) H. Braunschweig, R. D. Dewhurst, K. Hammond, J. Mies, A. Vargas, K. Radacki, *Science*, **2012**, *336*, 1420; d) M.-A. Légaré, G. Bélanger-Chabot, R. D. Dewhurst, E. Welz, I. Krummenacher, B. Engels, H. Braunschweig, *Science*, **2018**, *359*, 896 ; d) M.-A. Légaré, M. Rang, G. Bélanger-Chabot, J. I. Schweizer, I. Krummenacher, R. Bertermann, M. Arrowsmith, M. C. Holthausen, H. Braunschweig, *Science*, **2019**, *363*, 1329 ; e) M.-A. Légaré, G. Bélanger-Chabot, M. Rang, R. D. Dewhurst, I. Krummenacher, R. Bertermann, H. Braunschweig; *Nature Chem.* **2020**, *12*, 1076.

Ort

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Zeit

Dienstag, 14.11.2023, 17:00 ct

Kaffeerunde: ab 16.30 Uhr (Raum C2-07-330)

gez. Professor Dr. Daniel Rauh
Gesellschaft Deutscher Chemiker
Ortsverband Dortmund