

BIOINSPIRED APPROACHES TO SMALL MOLECULE ACTIVATION AND ENERGY-RELATED CATALYSIS

Franc Meyer

Georg-August-University, Institute of Inorganic Chemistry, Tammanstrasse 4, D-37077 Göttingen, Germany
e-mail: franc.meyer@chemie.uni-goettingen.de

Metalloenzyme active sites provide great inspiration for the design of new types of catalysts for small molecule activation, and for substrate transformations relevant to sustainable energy schemes. Recent work in our group has targeted (i) the development of highly preorganized dinucleating ligand scaffolds for exploiting, in a biomimetic approach, cooperativity effects in O₂, H₂O and H₂ activation at bimetallic sites,^[1,2] and (ii) the stabilization and catalytic application of biorelevant reactive intermediates in organometallic complexes.^[3,4] Spectroscopic and kinetic investigations as well as DFT calculations have revealed electronic structure contributions to reactivity, and have provided crucial mechanistic insight. Some aspects of this work will be discussed.

References

- 1) (a) K. E. Dalle, T. Grüne, S. Dechert, S. Demeshko, F. Meyer, *J. Am. Chem. Soc.* **2014**, *136*, 7428-7434; (b) N. Kindermann, E. Bill, S. Dechert, S. Demeshko, E. J. Reijerse, F. Meyer, *Angew. Chem. Int. Ed.* **2015**, *54*, 1738-1743.
- 2) (a) S. Neudeck, S. Maji, I. López, S. Meyer, F. Meyer, A. Llobet, *J. Am. Chem. Soc.* **2014**, *136*, 24-27; (b) A. C. Sander, S. Maji, L. Francàs, T. Böhnisch, S. Dechert, A. Llobet, F. Meyer, *ChemSusChem* **2015**, *8*, 1697-1702; (c) S. Berardi, L. Francàs, S. Neudeck, S. Maji, J. Benet-Buchholz, F. Meyer, A. Llobet, *ChemSusChem* **2015**, *8*, 3688 – 3696.
- 3) (a) S. Meyer, I. Klawitter, S. Demeshko, E. Bill, F. Meyer, *Angew. Chem. Int. Ed.* **2013**, *52*, 901-905; (b) C. Kupper, A. Schober, S. Demeshko, M. Bergner, F. Meyer, *Inorg. Chem.* **2015**, *54*, 3096-3098.
- 4) K.F. Kalz, A. Brinkmeier, S. Dechert, R.A. Mata, F. Meyer, *J. Am. Chem. Soc.* **2014**, *136*, 16626-16634.