

UniCat Colloquium

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Lecturer: **Prof. Dr. Oliver Einsle**, Institute of Biochemistry, BLOSS Centre of Biological Signalling Studies, Albert-Ludwigs-Universität Freiburg, Germany

Title: **Biochemical Conversion of Dinitrogen: Making and Breaking a Triple Bond**

Abstract: The biogeochemical nitrogen cycle includes some of the most challenging catalyses known to biology. This is particularly true for the making and breaking of dinitrogen (N_2), a highly inert and stable gas that constitutes a natural sink for 99% of all [N] cycling through the biosphere. It is generated from nitrous oxide (N_2O) by copper-containing nitrous oxide reductase, and its reductive fixation to bioavailable ammonia is exclusively carried out by nitrogenase. Intricate metal clusters are found at the active sites of both proteins, and in spite of decades of extensive work the details of how these enzymes activate their inert substrates are not well understood.

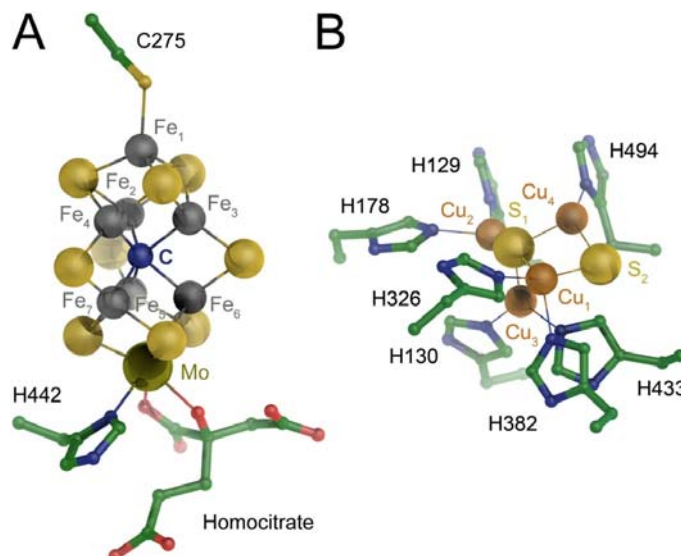


Fig. 1: Metal clusters in dinitrogen conversion

A) The FeMo cofactor of nitrogenase is the largest and most complex [Fe:S] center known, with the composition [Mo:7Fe:9S:C]:homocitrate.

B) The Cu_2 site of N_2O reductase is a unique [4Cu:2S] cluster.

Only recently the true active-state compositions of the crucial cofactors of nitrogenase [1,2] and nitrous oxide reductase [3] were elucidated, giving rise to new functional hypotheses that will be discussed in the context of crystallographic and spectroscopic data.

- [1] O. Einsle, F.A. Tezcan, S.L.A. Andrade, B. Schmid, M. Yoshida, J.B. Howard, and D.C. Rees, *Science*, 297, 1696 (2002).
 [2] T. Spatzal, M. Aksoyoğlu, L. Zhang, S.L.A. Andrade, E. Schleicher, S. Weber, D.C. Rees, and O. Einsle, *Science*, 334, 940 (2011).
 [3] A. Pomowski, W.G. Zumft, P.M.H. Kroneck, and O. Einsle, *Nature*, 477, 234 (2011).

Find more about Prof. Einsle on: <http://portal.uni-freiburg.de/xray>

Date: **Wednesday, May 8th, 2013 at 5:15 pm**

Location: **TU Berlin, Department of Chemistry, Building C
 Straße des 17. Juni 115, 10623 Berlin, Hall C 264**

Organiser: **Prof. H. Dobbek (HUB), Prof. N. Budisa (TUB) and
 Dr. Berta M. Martins (HUB)**

Coffee and tea will be served thirty minutes prior to the lecture start.
Guests are cordially invited to attend!

Prof. Dr. Matthias Driess, Chair of the Cluster of Excellence UniCat