UPPSALA UNIVERSITET

Molbio / Fyskem Seminar

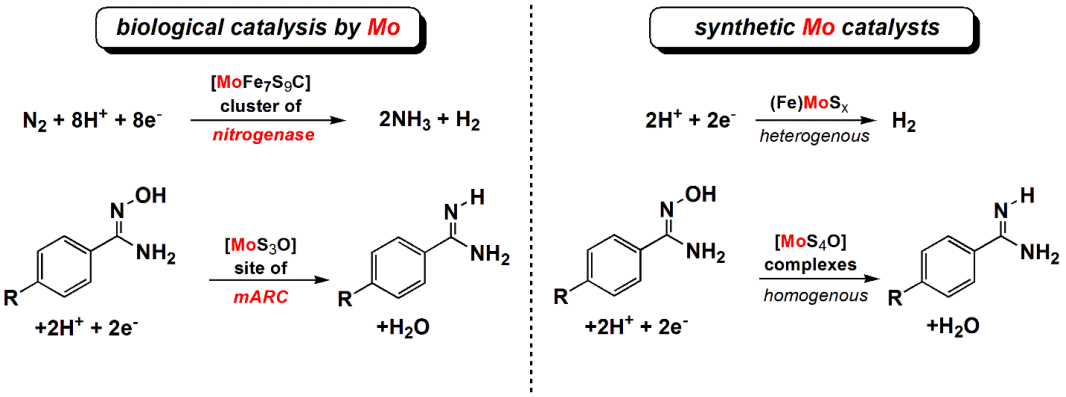
28th March, 10.15h, Seminar room House 7, floor 1

Prof. Philipp Kurz

Institute for Inorganic and Analytical Chemistry
and Freiburg Materials Research Center (FMF),
University of Freiburg, Albertstraße 21, 79104 Freiburg

Bio-inspired, molybdenum-based reduction catalysts: one molecular and one solid-state example

Molybdenum is a “special element” for bioinorganic chemistry as it is the only 4d metal known to be part of the active sites of metalloenzymes. Due to its good availability, biocompatibility and unusual redox properties, it is very attractive to develop synthetic Mo-based catalysts inspired by these biological examples. Here, two very different examples of reduction catalysis by molybdenum from ongoing projects of the Kurz group will be presented: the heterogeneous reduction of protons to hydrogen and the homogenous conversion of amidoximes to amidines (see Figure).



In the first project, iron-doped molybdenum sulphide materials were prepared, inspired by the composition of the FeMo cofactor of the enzyme nitrogenase. By immobilizing such materials on carbon-based supports, we were able to prepare MoS_x/C-cathodes that can be used for extended times (weeks) to produce H_2 from acidic wastewater electrolytes.

In a second example, we were able to synthesise Mo coordination compounds that served as structural and functional models for the mitochondrial amidoxime reducing component (mARC). Using a combination of synthetic variations, spectroscopy and electrochemistry, it was possible to significantly extend our knowledge about the electron transfer processes involved in the reduction of the benzamidoxime substrate by the molybdenum centre.

Recent publications:

- E. Bauch, D. Reichmann, R.-R. Mendel, F. Bittner, A.-M. Manke, Ph. Kurz, U. Girreser, A. Havemeyer, B. Clement; *ChemMedChem*, **10**, 360 (2015)
- M. Kokko, F. Bayerköhler, J. Erben, R. Zengerle, Ph. Kurz, S. Kerzenmacher, *Appl. Energy* **190**, 1221 (2017)