Synthesis of pyrazine-pyrane-dithiolene complexes mimicing specific features of the molybdenum cofactor (MoCo)

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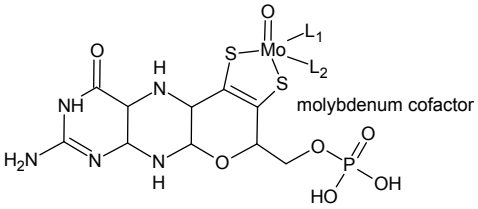
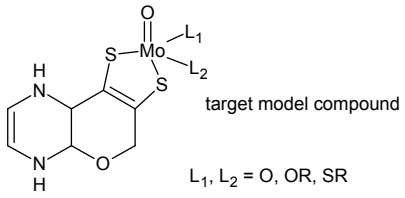
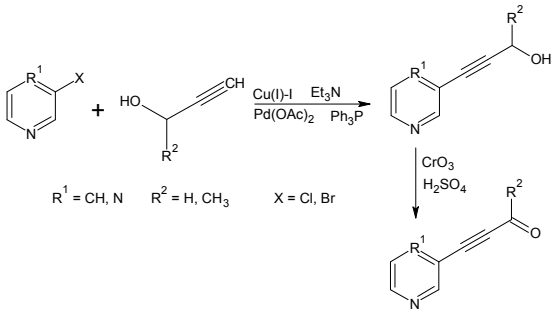
Molybdopterin (MPT) dependent enzymes are part of nearly any known organism on earth ranging from ancient archaea over plants to modern human beings.

The aim of the project is the synthesis of model compounds for the molybdopterin depending cofactor, which are able to catalyse oxygen atom transfer reactions and which can be incorporated into the apoenzyme. The focus of our research are the development of ligand precursors addressing the dithiolene function, the pyrane ring and the adjacent pyrazine ring and their coordination with molybdenum to understand the influence of various structural units on the stability, the catalytic properties or the redox potential.





N-heterocyclic substituted alkynes serve as intermediates in reaction series for such model compounds. None of the investigated compounds was stable for long. Because of their substantial reactivity and their N-heterocyclic functions they do have great potential for synthetic developments in different fields of research.



References

1. Ben Bradshaw, Andrew Dinsmore, David Collison, C. David Garner, John A. Joule, J. Chem. Soc., Perkin Trans. 1, 2001, 3232-3238.

2. Edward C. Taylor, Reinhard Dötzer, J. Org. Chem., No. 5, 1991.

3. Ulf Ryde, Carola Schulzke, Kerstin Starke, J. Biol. Inorg. Chem., 2009, 1053-1064.