



Swiss Science Concentrates

A CHIMIA Column

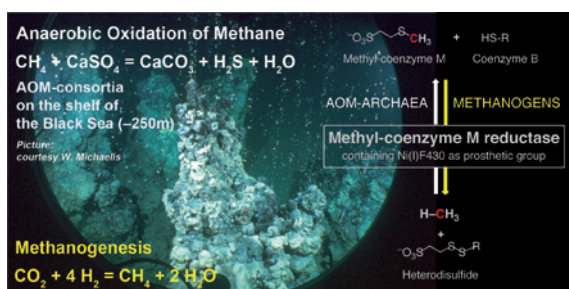
Short Abstracts of Interesting Recent Publications of Swiss Origin

The Key Enzyme of Methanogenesis Catalyses the Anaerobic Oxidation of Methane

S. Scheller, M. Goenrich, R. Boecher, R. K. Thauer, and B. Jaun*, *Nature* **2010**, 465, 606

ETH Zürich and MPI for Terrestrial Microbiology, Marburg (D) The nickel-containing methyl-coenzyme M reductase (MCR) is a key enzyme in the biological formation of methane by methanogenic archaea. The authors now report that MCR converts methane into methyl-coenzyme M.

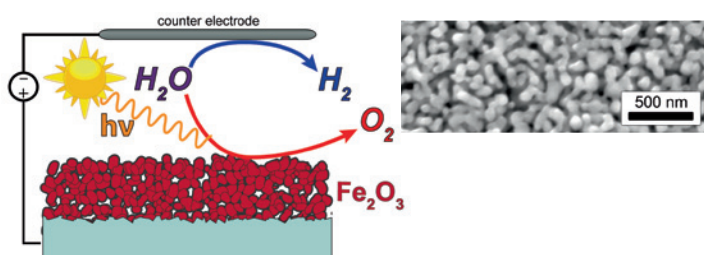
Activation of a C–H bond of methane is considered by many as a Holy Grail in chemistry: achieving this feat without the involvement of highly reactive oxygen-derived intermediates opens fascinating perspectives for the functionalization of abundant methane.



Photoelectrochemical Water Splitting with Mesoporous Hematite Prepared by a Solution-based Colloidal Approach

K. Sivula*, R. Zboril, F. Le Formal, R. Robert, A. Weidenkaff, J. Tucek, J. Frydrych, and M. Grätzel, *J. Am. Chem. Soc.* **2010**, 132, 7436

EPF Lausanne, Palacky University (CZ) and EMPA Dübendorf. Sustainable hydrogen production through photoelectrochemical water splitting using hematite (α -Fe₂O₃) is a promising approach for the chemical storage of solar energy, but is complicated by the material's nonoptimal optoelectronic properties. In this work, the authors show relatively high water-splitting photocurrents obtained using mesoporous hematite photoanodes prepared by a solution-based colloidal method. Additionally, this study suggests that independent control over the crystal distortion, doping, and particle size will be necessary to achieve high efficiencies with hematite.



Prepared by N. Bruns, V. Köhler, R. Kramer, P. Mauleón, F. Monnard, and T. R. Ward

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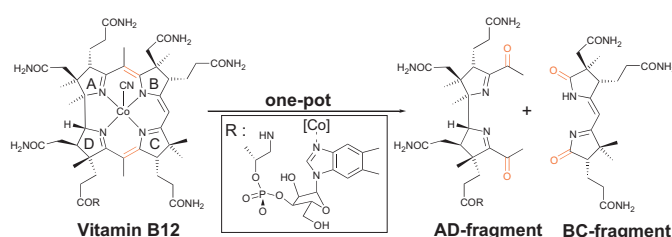
Please contact concentrates@chimia.ch

One-pot Synthesis of the Metal-free AD and BC Fragments of Vitamin B₁₂

F. H. Zelder*, C. Buchwalder, R. M. Oetterli, and R. Alberto, *Chem. Eur. J.* **2010**, 16, 6155

University of Zurich.

The authors report the preparation of the fragments, which are reminiscent of the western and eastern fragments described in the first total synthesis of B₁₂ by Eschenmoser and Woodward. These can be isolated after a single workup starting from vitamin B₁₂. The synthesis combines photo-oxidative scission with unprecedented subsequent demetallation. This result is particularly interesting since the synthesis of vitamin B₁₂ analogues with metals other than cobalt (met-balamins) remains an unsolved chemical challenge.



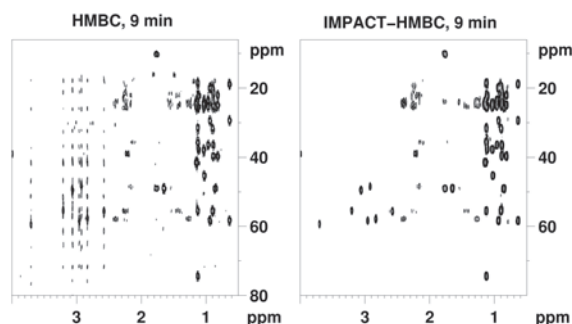
A Robust, Sensitive, and Versatile HMBC Experiment for Rapid Structure Elucidation by NMR: IMPACT-HMBC

J. Furrer, *Chem. Commun.* **2010**, 46, 3396

Service Analytique Facultaire, University of Neuchâtel.

IMPACT-HMBC (*improved and accelerated constant-time heteronuclear multiple-bond correlation*) is a new HMBC pulse sequence. The experiment results in improved suppression of unwanted ¹J_{CH} correlations and takes advantage of the high resolution in the indirect dimension due to the constant time evolution scheme. The new sequence is compatible with short repetition times and, therefore, the overall experimental time can be drastically reduced. In addition, the robustness and simplicity of the sequence make it suitable for less experienced users and automation procedures.

CYCLOSPORINE



Prepared by N. Bruns, V. Köhler, R. Kramer, P. Mauleón, F. Monnard, and T. R. Ward

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