



	Experiment title: Metal-free hydrogenase from methanogenic archaea	Experiment number:
Beamline: ID13	Date of experiment: from: 8.11.00 to: 9.11.00	Date of report: 28.02.01
Shifts: 1.5	Local contact(s): Dr. Manfred Burghammer	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): B. Mamat*, T. Ostermann*, M. Venturi*, H. Michel Max-Planck-Institute of Biophysics Heinrich-Hoffmann-Str. 7, 60528 Frankfurt, Germany email: mamat@mpibp-frankfurt.mpg.de		

Report:

In some methanogenic archaea an unusual type of hydrogenase has been identified, which catalyzes the reversible hydride transfer from molecular hydrogen to methenyl-H₄MPT. The most interesting feature of this enzyme is the capability to split hydrogen without any redox-active transition metals. This is in contrast to all other hydrogenases known. The structure of both the enzyme itself and its recently found small molecular weight cofactor is not known yet. Our aim is to determine the crystal structure which should allow a deeper understanding of this unique biochemical reaction.

We took advantage of the highly focussed beam at experimental station ID13 for testing tiny crystals of the apoprotein from *Methanococcus jannaschii* heterologously produced in *E. coli*. Although of only about 25x25x25 μm³ in size, these tetragonal crystals diffract to a maximum resolution of around 2 Å. Due to the severe radiation damage, the best data set collected was 90% complete to 3.0 Å resolution with a R_{merge} of 8.9% in the range between 50 and 3.0 Å. The crystals were of space group I4 with cell dimensions of 128, 128 and 171 Å, respectively.

We are planning to increase this type of crystals in size for a MAD experiment on SeMet-labelled protein for phasing.