ESRF EUROPEAN SYNCHROTRON RADIATION FACILITY

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Experiment Report Form

The double page inside this form is to be filled in by all users or groups of users who have had access to beam time for measurements at the ESRF.

Once completed, the report should be submitted electronically to the User Office using the **Electronic Report Submission Application:**

http://193.49.43.2:8080/smis/servlet/UserUtils?start

Reports supporting requests for additional beam time

Reports can now be submitted independently of new proposals – it is necessary simply to indicate the number of the report(s) supporting a new proposal on the proposal form.

The Review Committees reserve the right to reject new proposals from groups who have not reported on the use of beam time allocated previously.

Reports on experiments relating to long term projects

Proposers awarded beam time for a long term project are required to submit an interim report at the end of each year, irrespective of the number of shifts of beam time they have used.

Published papers

All users must give proper credit to ESRF staff members and proper mention to ESRF facilities which were essential for the results described in any ensuing publication. Further, they are obliged to send to the Joint ESRF/ ILL library the complete reference and the abstract of all papers appearing in print, and resulting from the use of the ESRF.

Should you wish to make more general comments on the experiment, please note them on the User Evaluation Form, and send both the Report and the Evaluation Form to the User Office.

Deadlines for submission of Experimental Reports

- 1st March for experiments carried out up until June of the previous year;
- 1st September for experiments carried out up until January of the same year.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report, in English.
- include the reference number of the proposal to which the report refers.
- make sure that the text, tables and figures fit into the space available.
- if your work is published or is in press, you may prefer to paste in the abstract, and add full reference details. If the abstract is in a language other than English, please include an English translation.

ESRF	**Experiment title: Cytochrome b6f**	**Experiment number**: 30-01-561
Beamline: BM30A	**Date of experiment**: from: 15.9.2002 to: 16.12.02	**Date of report**: 18.12.2002
Shifts: 4	**Local contact(s)**:Jean-Luc Ferrer, Richard Kahn, Franck Borel	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

Daniel Picot CNRS UMR 7099 Institut de Biologie Physico-Chimique Paris
David Stroebel CNRS UMR 7099 Institut de Biologie Physico-Chimique Paris
Pierre-Damien Coureux Institut Curie Paris

Report:

The long term aim of this experiment is to determine the crystallographic structure of the membrane protein cytochrome b_6f complex (cyt b_6f) which catalyzes the transfer of electrons between the photosystem II and photosystem I in oxygenic photosynthesis, and couples this transfer with the translocation of proton through the thylacoid membrane. It is a membrane protein that contains 2x8 polypeptide chains with a molecular weight of ca 200000 Da. It is one of the last large complex protein of photosynthesis whose structure is still not known, although the soluble portions of the Rieske protein (Carrell et al., 1999) and the cytochrome *f* (Martinez et al. 1997) have already been determined. Some functional and structural homologies exist with the cytochrome bc_1 of the respiratory chain of mitochondria, whose structure is known(for a review see Berry et al, 2000).

During the previous experiments shifts we obtained crystals diffracting to 3.5 Å resolution. Since the crystal were very fragile, and needed slow progressive soaking in cryoprotective solution, we circumvent the problem by adding a mixture of cryoprotectant in the crystallisation solution. This produces crystals diffracting to 3.0 Å resolution and to collect data set to 3.14 Å resolution, with an overall Rsym 7.4 % (3.33 – 3.14 Å 0.31 %) with a completeness of 98 %.

The first trial with crystals in heavy atom solutions were very deceptive yielding only porly diffracting crystals. However, when we introduced the above improvement, the crystal wistand much better the soaking procedure and 8 data sets could be collected, with two heavy atom showing some interesting Patterson maps (shifts 14-15.12.2002). The data set exhibit a decent statistics for heavy atoms although a reduced resolution limit around 3.8 to 4.0 Å. Data analysis for an initial phasing are in progress.

We tried to use the Fe peak to help in the phasing process and locate the 5 Iron atoms of the native structure. However the first tested crystals were a bit to small, the expected signal is anyway low, and we had some difficulting in tuning the wavelength around the Fe peak.

Although, some further heavy atom will probably be necessary, this series of experiments seems to us very encouraging.