EUROPEAN SYNCHROTRON RADIATION FACILITY

INSTALLATION EUROPEENNE DE RAYONNEMENT SYNCHROTRON

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 via the User Portal:
https://wwws.esrf.fr/misapps/SMISWebClient/protected/welcome.do

Deadlines for submission of Experimental Reports

Experimental reports must be submitted within the period of 3 months after the end of the experiment.

Experiment Report supporting a new proposal ("relevant report")

If you are submitting a proposal for a new project, or to continue a project for which you have previously been allocated beam time, you must submit a report on each of your previous measurement(s):

- even on those carried out close to the proposal submission deadline (it can be a *"preliminary report"),*
- even for experiments whose scientific area is different form the scientific area of the new proposal,
- carried out on CRG beamlines.

You must then register the report(s) as "relevant report(s)" in the new application form for beam time.

Deadlines for submitting a report supporting a new proposal

- 1st March Proposal Round - **5th March**
- 10th September Proposal Round - **13th September**

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.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report in English.
- include the experiment number 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:** Metallome diagnosis of one of the oldest bona fide microbial cell fossils.	**Experiment number**: ES108
Beamline: ID16B ID21	**Date of experiment**: from: 25 Jan 2014 to: 28 Jan 2014 from: 16 Apr 2014 to: 18 Apr 2014	**Date of report**: 24/2/21
Shifts: 6 9	**Local contact(s)**: Julie Villanova Murielle Salome	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):
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Report: This experimental work was published in
L. Lemelle, A. Simionovici, T. Schoonjans, R. Tucoulou, E. Enrico, M. Salomé, A. Hofmann, B., Cavalazzi Analytical requirements for quantitative X-ray fluorescence nano-imaging of metal traces in solid samples. Trends in Analytical Chemistry, 91, 104-111, **2017**.
DOI:10.1016/j.trac.2017.03.008

Analytical requirements for quantitative X-ray fluorescence nano-imaging of metal traces in solid samples.

Quantitative nano-imaging of metal traces in a solid is a recent capability arising from the construction of hard X-ray nanoprobes dedicated to X-ray Fluorescence (XRF) imaging on upgraded third generation synchrotrons. Micrometer sample preparation valid for trace analysis is a fundamental part of the required developments to capitalize on the reduced Minimum Detection Limits. Practical guidelines lead us to propose a customized use of Focused Ion Beams (FIB) backed by state of the art Monte Carlo XRF modeling to initiate preparations of new samples and certified standards. The usefulness of these developments is illustrated by the first detection of Ni traces (4.57E+07 ± 3.2E+06 (7.1 %) at.µm-3) in a 3.35 Ga old microstructure of putative microbial origin from Barberton (South Africa). A list of feasibility checks provides a way of getting below 5 ppm MDLs for acquisition-times of 10 seconds with an analytical precision better than 10%.