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:** Ferroelectric plastic crystals in situ structural	**Experiment number**: A01-2-1234
Beamline: BM01	**Date of experiment**: from: 10/06/2021 to: 14/06/2021	**Date of report**: 19.09.2023
Shifts: 12	**Local contact(s)**: Dmitry Chernyshov	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

Julian Walker – Norwegian University of Science and Technology
Mari-Ann Einarsrud – Norwegian University of Science and Technology

Report:

The experiment was designed to look at powder diffractino of plastic crystal material tetramethylammonium bromotrichloroferrite and tetraethylammonium bromotrichloroferrite.
Mixtures of these two materials were prepared and annealed before the experiment.
The experiment looked at powder diffractino as a functino of temperature between 200K and 400 K. We were able to map the distinctive mesophase transtiino temperautre as a functino of changing composition.
The data revealed a change in the abbruptness with which the transtiino was able to take place.
There were also distinct changes in the solvent phase of the mixture which exhibited large lattice change sthroug hthe transition- this was observed in the form of sharp ticks in the waterfall plots as a function of temperature.

The multiple phase transntions present in the tetramethylammonium material as a functino of temperature made the mappnig of phase s vs composition rather challenging. This is still to be resolved, but the experiment itself was highly successful and ther experimental aparatus with the cryostreme temperautre control was perfect for the designed experiment.