



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://www.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 from 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.



	Experiment title: Scanning 3D XRD for characterization of Cu ₂ O solar cells	Experiment number:
Beamline: ID11	Date of experiment: from: 07/10/2022 to: 10/10/2022	Date of report: 22/02/2023
Shifts: 9	Local contact(s): Jonathan Wright	
Names and affiliations of applicants (* indicates experimentalists): Mr. Aditya Shukla Technical University of Denmark Professor Jens Wenzel Andreasen Technical University of Denmark Dr Salvatore De Angelis Technical University of Denmark		

Report:

Aim

We wanted to do a scanning 3DXRD experiment and wanted to study much smaller grains and their orientations than what has been studied before. The originally planned sample system was not prepared successfully, despite many attempts over the preceding year. Instead we did the S3DXRD experiment using Ni/YSZ. Our idea was to see grain coarsening effects as we heat the sample at 800C for a long time.

Experiment

We used fluorescence imaging to get an idea of which region we should measure on our sample. We performed the S3DXRD experiment on a 8*8*8 micron field of view as shown in Figure 1. The first experiment lasted for 12 hours.

We then changed samples and used a different sample to measure for 8 hours. During this time we performed heating in a controlled environment at 800 deg C for 12 hours.

We used fluorescence to roughly get to the same sample position and repeated the 18 hour experiment.

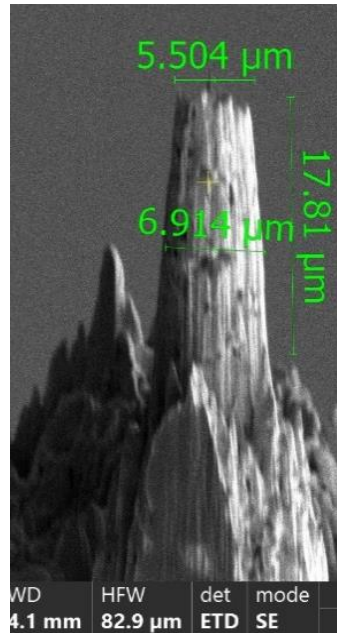


Figure 1: Sample geometry measured during experiment

Results

We can confirm that the S3DXRD experiment worked and we could see orientation of grains as small as 300 nm. We also observed Ni coarsening with both the fluorescence imaging and diffraction imaging which would help us confirm our claims in this study. [Figure 2]

Figure 2

