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: Nitrogen effects on the kinetics and microstructural evolutions during tempering of a low alloyed steel**	**Experiment number**: MA5426
Beamline: ID11	**Date of experiment**: from: 24/01/2023 to: 26/01/2023	**Date of report**:
Shifts: 6	**Local contact(s)**: Jonathan WRIGHT	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

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Report:

The experiment was conducted according to the proposal and the optimizations that were previously discussed with the beamline responsible. To carry out these optimizations, the first plateau over the hexapod had to be removed to allow our furnace to be correctly positioned at the desired beam height. A maximum movement of 0.5 mm/s was introduced in the z-axis to scan the sample's height.

In practical terms, the sequence of treatment consisted of welding the thermocouple onto the sample, placing it into the furnace, correcting its position to avoid platinum diffraction, turning on the furnace cycle under argon on the furnace program, opening the beam shutter, closing the beam shutter once the thermic treatment was completed, and recovering the sample from the furnace. Two different thermic cycles were performed on different samples: heating continuously until 900 °C at 1 °C/s, followed by gas fast cooling in the dilatometer, and heating continuously until the desired temperature at 1 °C/s and then holding at that temperature for one hour before gas fast cooling. The desired holding temperatures for the experiments were 160 °C, 300 °C, and 400 °C.

Regarding difficulties, the hutch was too small for our experiment and furnace, making it challenging to change and position samples between experiments. There was also a period of "no beam," which resulted in a gap in the data for one experiment.