

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.



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|---|---|-------------------------------------|
| | Experiment title: Dynamic spatial mapping of metal phase formation inside a catalyst body during catalyst preparation | Experiment number: MA-718 |
| Beamline: ID15 | Date of experiment: from: 1/04/2009 to: 7/04/2009 28/10/2009 to: 3/11/2009 | Date of report: 8/4/2010 |
| Shifts: 18 | Local contact(s): Marco Di Michiel | <i>Received at ESRF:</i> |
| Names and affiliations of applicants (* indicates experimentalists): Dr M. G. O'Brien, Dr. L. Espinosa-Alonso, Dr. E. Santillan-Jimenez, Dr A. M. Beale (University of Utrecht)* Dr. S. D. M. Jacques (University College London)* | | |

Report:

Our attempts to combine Absorption-Diffraction tomography for the profiling of catalyst bodies during catalyst preparation via a calcination, were met with various degrees of success. For the first beamtime allocation, it proved difficult to obtain the combined data due to several software/hardware communication problems. As such we were awarded compensation time in the latter part of 2009 where the earlier experiences in 2009 proved useful in ensuring second time round the successful collection of combined Absorption/Diffraction tomography data in 3D. Data were collected on a 3 x 3 mm (d x H) Ni-Al₂O₃ sample with a 10 µm pencil beam with a height of 300 µm. Thus it was possible to obtain 3D tomography data in two formats: a) the collection of static 3D 'slices' down the length of the sample and b) the collection of 2D slices under dynamic conditions. The combined approach revealed important differences between the two measurements and thus were able to more comprehensively determine the active phase distribution and the nature of these species as a function of time. An example of the diffraction data recorded during these experiments is given in figure 1. We were able to collect data on two different Ni-Al₂O₃ containing samples during both calcination and during catalytic reaction. The Absorption data is currently being progressed.

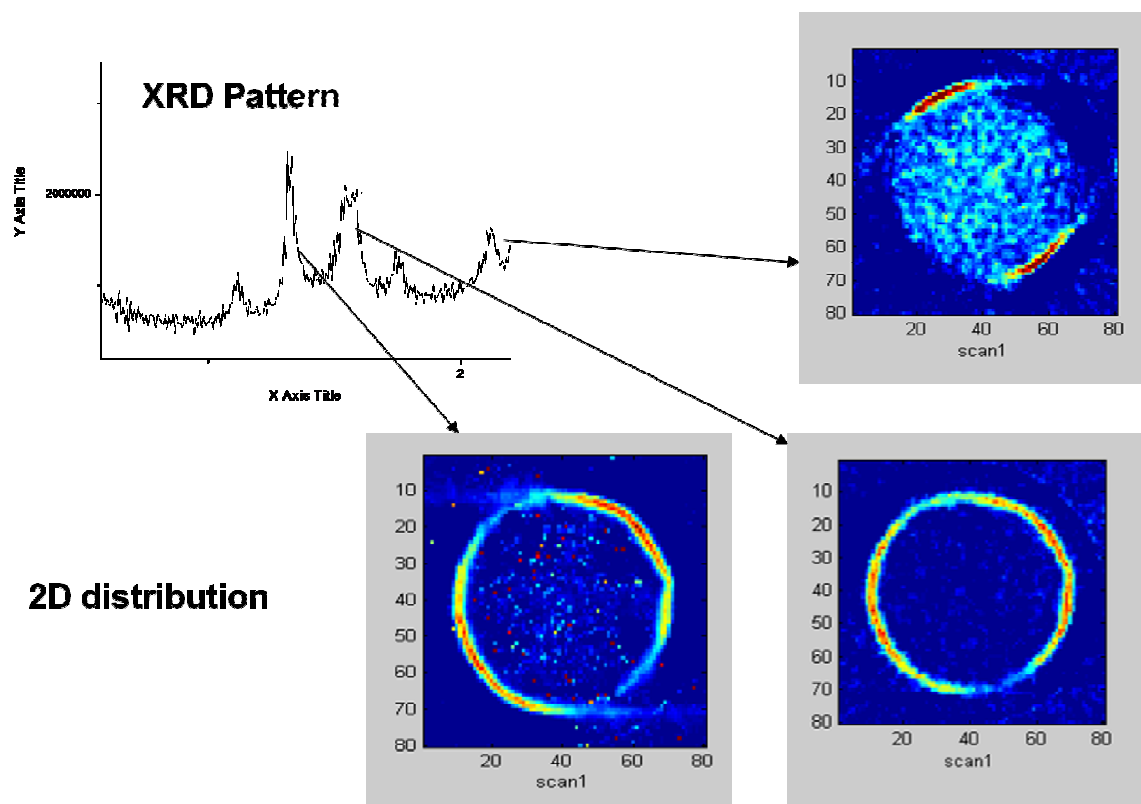


Figure 1. 2D summed data plot (top left hand side) and accompanying 2D distribution maps (slices) for the various peaks (3) identified. Clear differences in the distributions can be seen for each of the 3 phases suggesting the initial phase distribution at the beginning of the experiment is not homogeneous.