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ESRF

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.

ESRF	**Experiment title:** In-situ and real-time optical and structural investigation during PDI derivative thin film growth	**Experiment number**:
Beamline:	**Date of experiment**: from: 2/02/2011 to: 8/02/2011	**Date of report**: 28/02/2011
Shifts:	**Local contact(s)**: Roberto Nervo, Federico Zontone	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

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Report:

The experiments have been performed along the lines of our proposal, focussing on *in situ and real time* growth studies of PDI8-CN2 molecule. Since the experiments were performed only two weeks ago and the data analysis is still in progress, we can only report the most important findings.

In situ and *real time* X-ray scattering provided information on the structure evolution as well as the growth mode of PDI8-CN2 films on Si substrates. The previous experiment (MA-964) showed that the deposition parameters, such as substrate temperature, T_{sub}, and deposition flux, are crucial in determining the film growth mode and the structure/morphology of the resulting film. For this reason in this experiment we have decided to fix the deposition flux (1Å/min) and to perform the in-situ XRR measurements at

different T_{sub} (30°C, 60°C and 100°C). XRR curves have been recorded by means of a linear PSD during the PDI8-CN2 deposition and the acquisition time of ~ 2 min per reflectivity scan was chosen to enable the study of the relatively slow growth process. In this way, XRR as a function of time as well as of q during PDI8-CN2 growth has been collected. XRR data in a q-range, exceeding the Bragg point, have been measured in real time during PDI8-CN2 deposition. From each deposition, the AntiBragg (AB) oscillation *vs* deposition time (or film thickness) can be extracted. As an example, the AB curve for PDI8-CN2 deposited at T_{sub}=30°C is reported in **Figure 1a**.

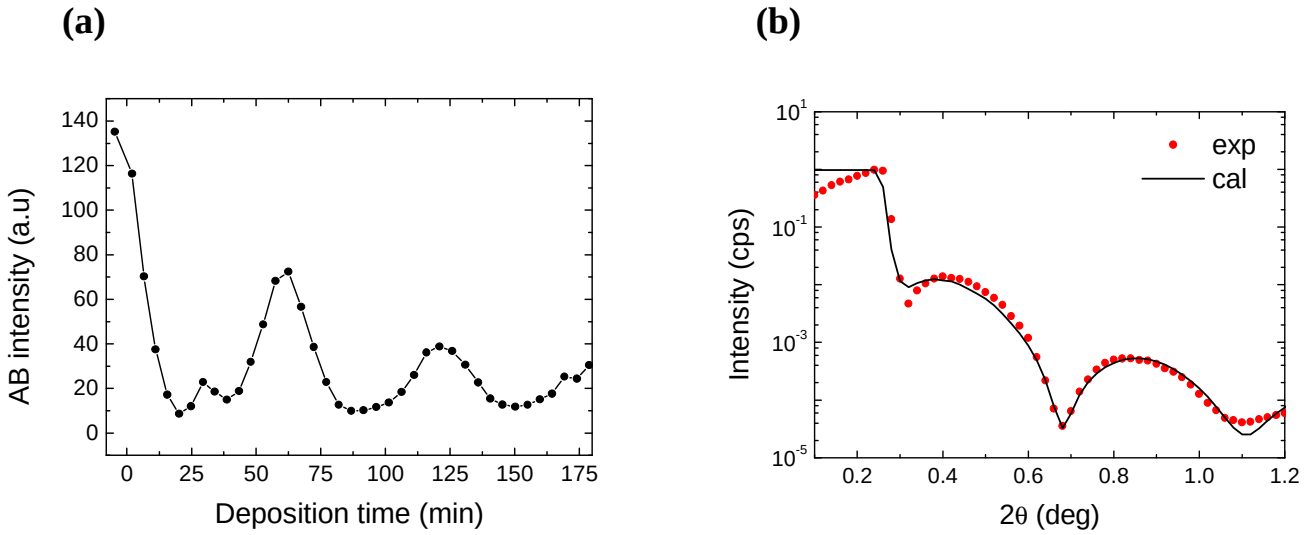

Figure 1: *For PDI8-CN2 deposited at T_{sub}=30°C* **(a)** *AB oscillation vs deposition time extracted from the real time reflectivity curve;* **(b)** *post-growth XRR experimental and calculated curves.*

The proper analysis of this data set will allows us to determine the film growth mode and its dependence on the deposition parameters.

After each deposition a XRR scan (**Figure 1b**) together with a XRD specular scan and Grazing Incidence In-plane measurements (not shown here) here have been recorded in order to have a complete characterisation of the deposited film.

We wish to acknowledge the excellent collaboration with the local contacts Dr. Roberto Nervo and Dr. Federico Zontone which made this challenging experiment a success.