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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 via the User Portal:

https://wwws.esrf.fr/misapps/SMISWebClient/protected/welcome.do

Reports supporting requests for additional beam time

Reports can 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 determination of defect densities in pentacene thin film transistors during growth and under gas exposure	**Experiment number**: SC4126
Beamline: ID10B	**Date of experiment**: from: 06.05.2015 to: 12.05.2015	**Date of report**:
Shifts: 18	**Local contact(s)**: Giovanni calogero Li destri nicosia	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

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Report:

As stated in the proposal, we have grown organic thin films on SiO_2 and on an organic template layer.We performed *in situ* real-time X-ray reflectivity and grazing incidence X-ray diffraction (GIXD) measurements during growth. After each growth, post growth scans were applied to measure-a large range in q-space. Since the analysis of the data is still in progress, we present only some important findings in this report.

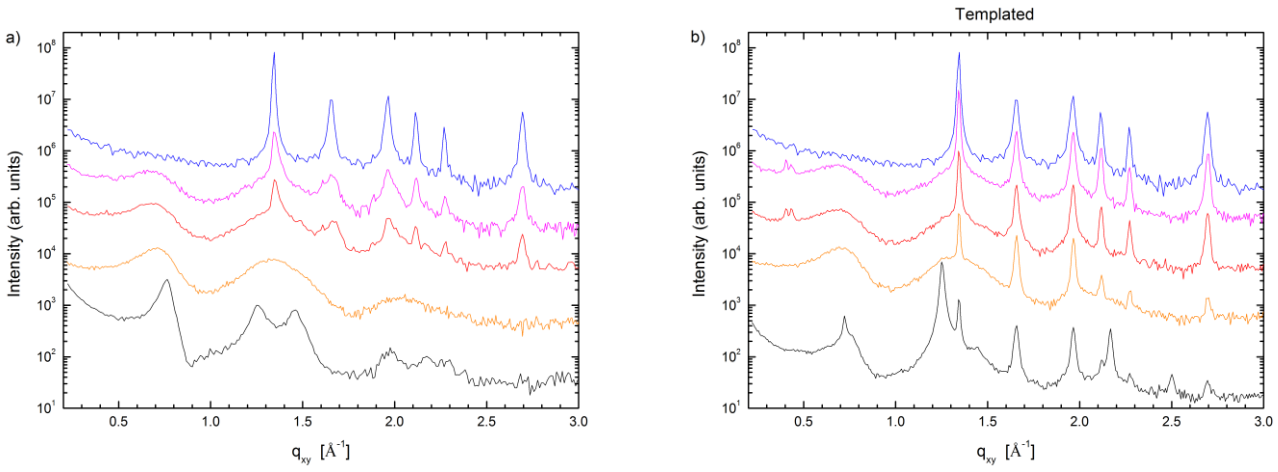

Fig. 1: GIXD of two series' of organic thin films for different depostion parameters. a) deposited on SiO_2; b) deposited on a pentacene templating layer.

Fig 1. shows the postgrowth GIXD data of two series of organic films deposited on SiO_2 (Fig. 1a) and on an organic template layer (Fig. 1b). The peak width of the in-plane Bragg reflections is clearly different for templated and non-templated films. From the peak width we can estimate the average defect density of the crystalline domains.

In addition, we have obtained for each sample realtime GIXD data during growth. Fig. 2 shows for example thickness dependent GIXD data of pentacene. With the combination of these results with ultra-high-sensitivity UPS data, which we currently measure, we are confident to establish a quantitative connection between the average structural defect density and the electronic trap state spectrum.

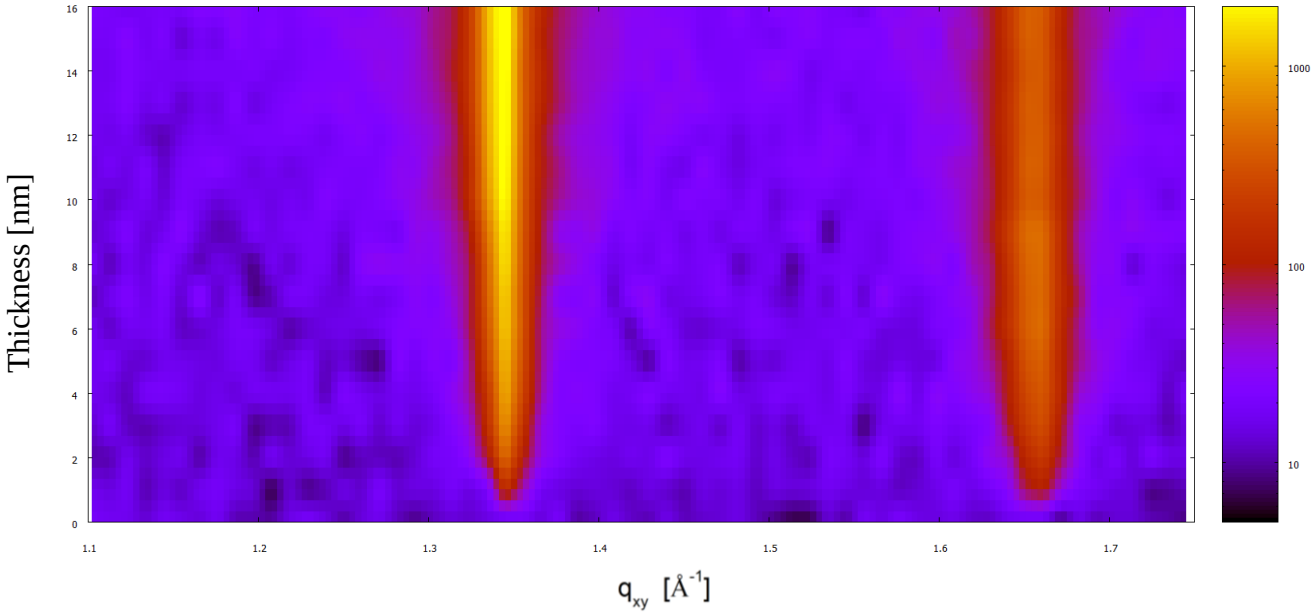

Fig 2: Real-time GIXD of pentacene on SiO_2 obtained during growth showing the evolving 110 and 020 Bragg reflections.

We wish to acknowledge the excellent collaboration with the beamline staff, which made this challenging experiment a success.