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:** Organic semiconductor growth on self assembled monolayers: Real-time and in-situ study of thin film growth kinetics	**Experiment number**: SC-2099
Beamline: ID10B	**Date of experiment**: from: 31/01/2007 to: 6/02/2007	**Date of report**: 26/02/2007
Shifts: 18	**Local contact(s)**: Dr. F. Zontone	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):
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Report:

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

In in situ and real time X-ray scattering provided information on the microscopic structure as well as the film morphology of pentacene films on organic substrates. Very high structural

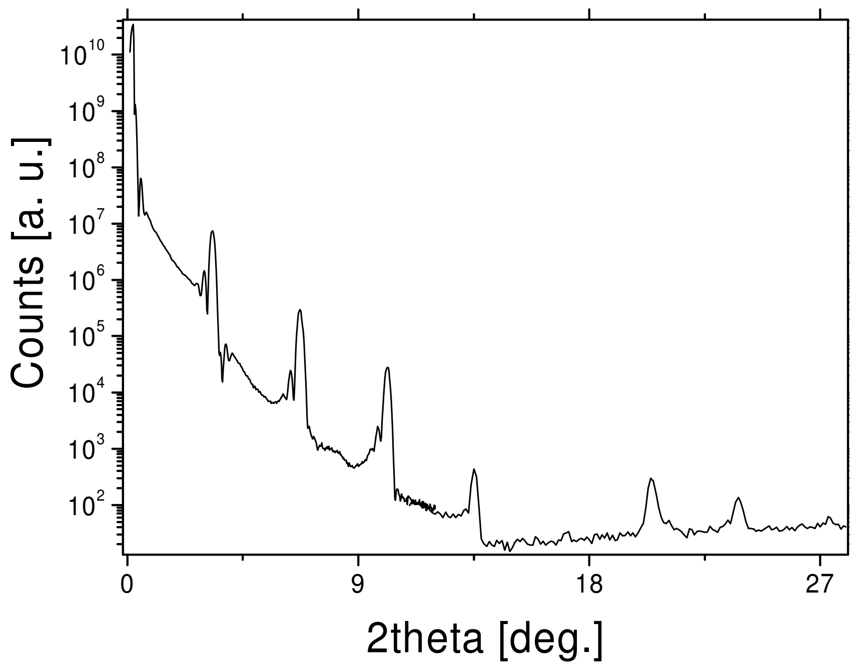

Fig. 1 High out of plane structural order was found for growth on an organic substrate as demonstrated by the occurrence of Bragg reflections up to the 8th order.

order was found as can be seen from the scan of the specular reflectivity in Fig. 1. From real-time scans of the specular reflectivity we can extract the evolution of the film roughness during growth and therefore the corresponding scaling laws for organic heterostructures.

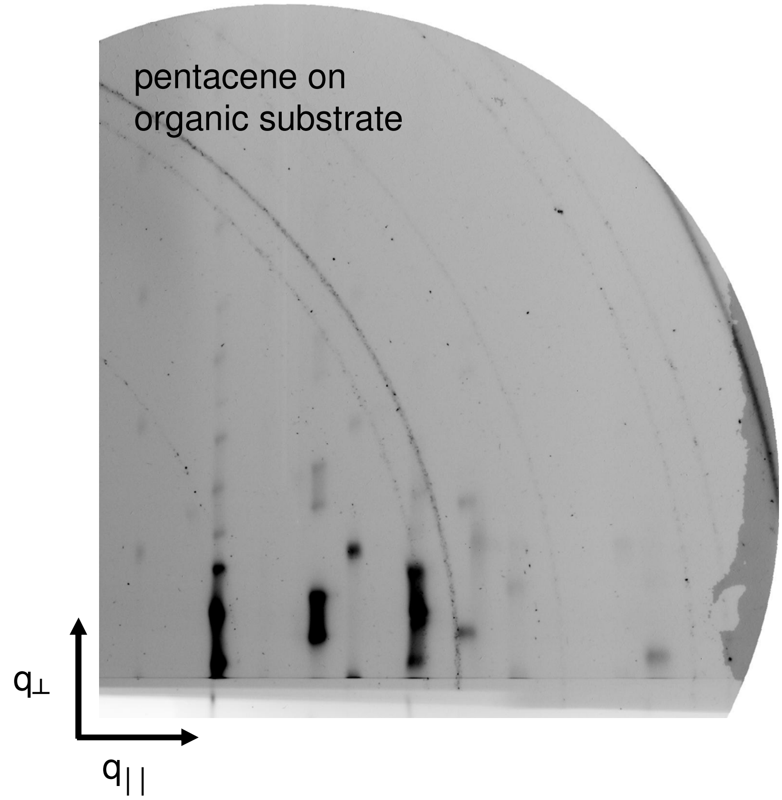

Fig. 2 Using a MarCCD detector for grazing incidence diffraction allows to acquire Bragg reflections along $q_{\|}$. Out of plane the crystallites show only very little mosaicity, so that the crystal truncation rods and Bragg reflections can be seen along $q_{\perp}$. Powder diffraction rings visible in the not yet background corrected image are due to scattering from the Be-window of the UHV chamber.

To obtain in plane information we used a scintillation counter and a MarCCD camera to detect Bragg reflections in grazing incidence geometry. Several reflections are detected simultaneously as the sample is an in-plane powder.

A large number of reflections can be acquired with the CCD-camera within a comparatively short time of ~ 40 sec (see Fig. 2). This allows one to study the evolution of *in-plane reflections in real-time during growth*. From this data-set - of which Fig. 2 is a single frame only - we can extract the evolution of the thin film unit cell during growth of the pentacene thin film. A comparison of growth on a soft organic substrate with growth on silicon oxide substrates will yield insight into strain evolution at the interface during evaporation.

We wish to acknowledge the excellent collaboration with the local contact Dr. F. Zontone which made this challenging experiment a success.