



DUBBLE – EXPERIMENT REPORT

We kindly request you to answer the questions (max 2 pages) and return the form to NWO within 2 months of the completion of the experiment to dubble@nwo.nl

Beam time number: 26-02-822		File number:
Beamline: BM26B	Date(s) of experiment: 11-09-2017 – 15-09-2017	Date of report: 24-4-2018
Shifts: 9	Local contact(s): D. Hermida-Merino	

1. Who took part in the experiments? (Please indicate names and affiliations)

M. van Drongelen (UTwente), T. Verspagen (DSM), A. Stroeks (DSM).

2. Were you able to execute the planned experiments?

Yes. In our original proposal 12 shifts were requested, and three different materials were to be studied. The beam time granted contained a total of 9 shifts. Since limited time was available, and the measurement setup takes a significant amount of time for installation and fine-tuning, only two out of three materials were studied. Some experimental problems further reduced the time available for measurements, see below. Fortunately, both SAXS and WAXD were measured simultaneously, which, in the end, allowed for a careful study of both materials in the time provided.

3. Did you encounter experimental problems?

Yes. 1) The compact film blowing setup was placed on a xyz table. The original idea was to translate the height of the table to alter the position of the incoming XRD beam on the blown film (in-situ). Unfortunately, the table height could not be reduced in large quantities, such that only a limited range of the blown film could be studied along the machine direction. 2) The crystallinity of the film was very low in this region close to the die (high temperatures close to polymer melt). The air flow required to facilitate the process caused a significant amount of background scattering. In order to increase the crystallinity content, and to promote the scattering signal above the background scattering signal, the processing conditions were altered from their ideal settings (which were relevant to industrial processing conditions). In the end, and by trial and error, processing conditions were found such that significant amounts of crystallinity were reached and measurements could continue for all materials involved.

4. Was the local support adequate?

Yes, the support of the DUBBLE staff was adequate. The hardware problems were treated in the best possible way. Recommendations were given for possible follow-up experiments (modifications to our setup to be able to study a larger area of the blown film)

5. Are the obtained results at this stage in line with the expected results as mentioned on the project proposal?

Yes, the results obtained answer our main research questions in the original proposal. The role of co-polymers content on type and rate of crystal formation has become clear.

6. Are you planning follow-up experiments at DUBBLE for this project?

Not at the moment, but perhaps in the future. Depends on the industrial partner and availability of instrumentation and continuation of Dubble at ESRF in a number of years.

7. Are you planning experiments at other synchrotrons in the near future?

No follow up experiments are scheduled in the near future at other synchrotrons.

8. Do you expect any scientific output from this experimental session (publication, patent, ..)

Yes. The experimental data analyses has finished. Current work involves model development. The experimental data obtained serves as model validation. Both model and experimental work will be summarized in a scientific publication, the exact journal is not yet decided.

9. Additional remarks

Non.