

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.



	Experiment title: Structure development in a polymer melt in the presence of NA11	Experiment number: SC-2296
Beamline: ID02	Date of experiment: from: 04 October 2007 to: 07 October 2007	Date of report: 29/03/08
Shifts:	Local contact(s): Dr.Peter Boesecke	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): Carmine Invigorito [*] , Nilesh Patil [*] , Sanjay Rastogi, Luigi Balzano		

Report:

We make use of a commercial isotactic polypropylene (iPP) with M_w of 365 kg/mol and a polydispersity M_w/M_n of 5.4, blended with a different amount of special nucleating agents such as sodium 2,2-methyl-ene-bis (4,6-di-*tert*-butylphenyl) phosphate, NA11. The composition of polymer blends is 0.1%, 0.2% and 0.5%wt of NA11, respectively.

Flow-induced crystallisation experiments were carried out to investigate how chain orientation is influenced in the presence of nucleating agent. We discovered that for the same flow conditions compared to neat polymer orientation can be enhanced on the addition of NA11.

Considering the high melting point of the additive, it remains crystalline in the polymer melt prior to orientation. However, on shear the additives are likely to orient the polymer chains thus enhancing the oriented structure..

The figure shows two dimensional SAXS patterns acquired on ID02. Integration along the azimuthal angle (60 degrees) was performed along the equator, meridian and diagonal (see figures 1 and 2).

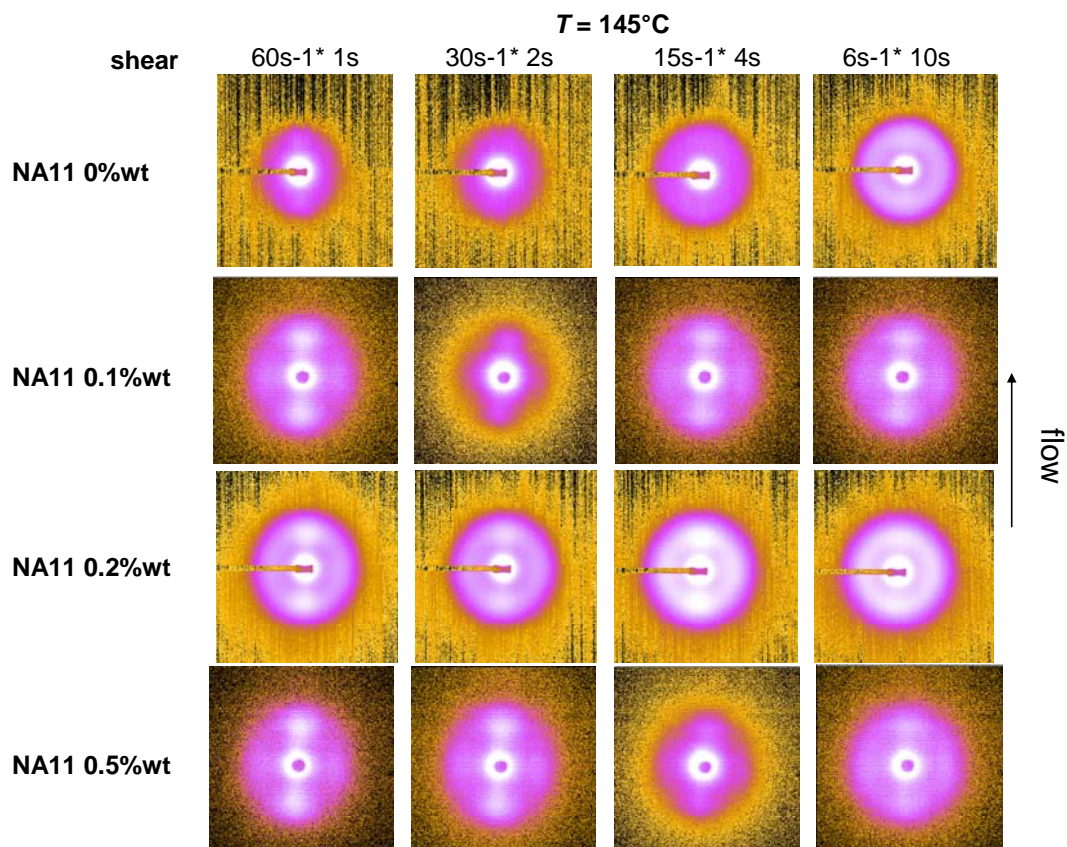


Fig.1. The figure shows 2D SAXS patterns acquired at $t = 1050\text{s}$ after shear at four different shear conditions for four different samples having different amount of nucleating agents.

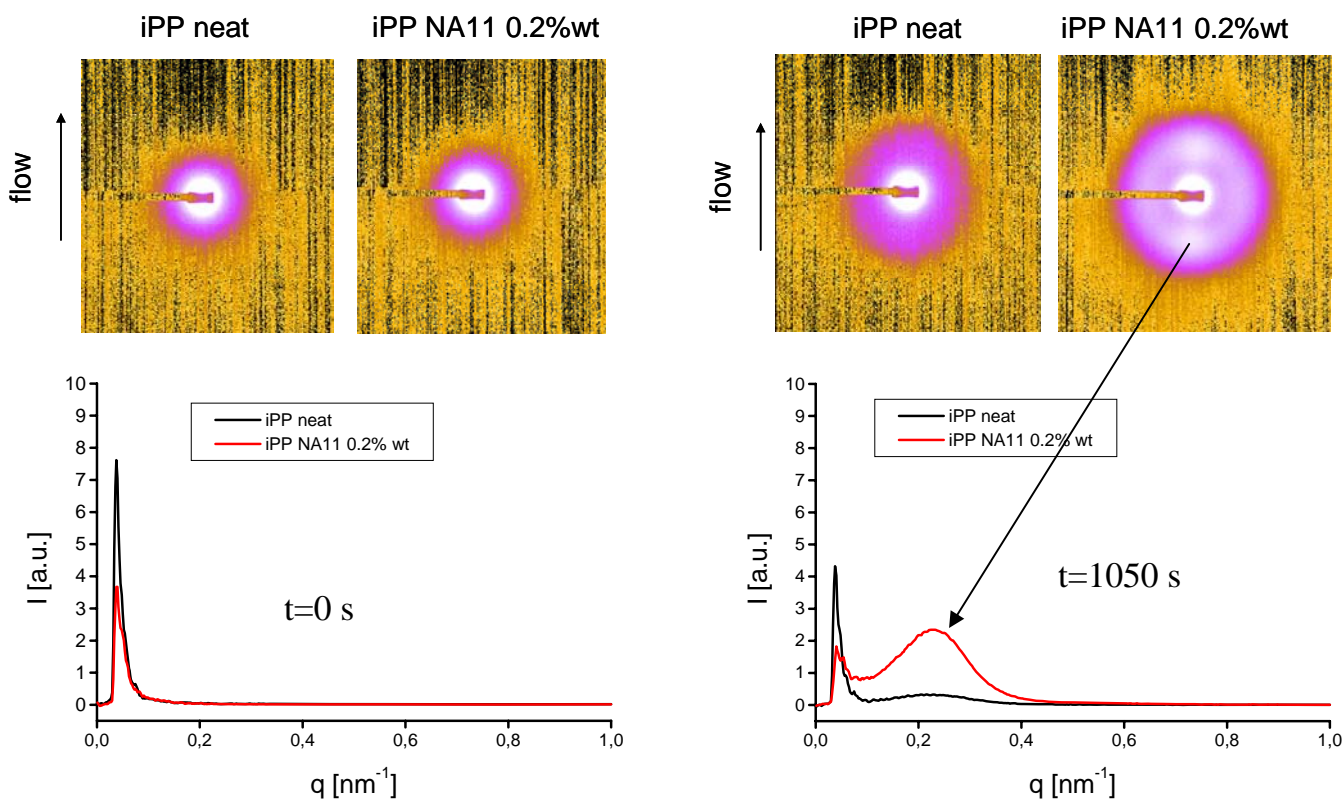


Fig.2. The figures show 2D SAXS patterns acquired for same shear conditions (shear rate 30s^{-1} , shear time 2sec) for polypropylene with and without NA11. From the integrated intensity along the meridian it is apparent that the oriented structure is dominant in iPP having 0.2 wt% of nucleating agent.