



	<b>Experiment title:</b> Polymer crystallization after short time pressure	<b>Experiment number:</b> 26-02 518
<b>Beamline:</b> BM26B	<b>Date(s) of experiment:</b> From 13/07/2010 at 08:00 to 16/07/2010 at 8:00	<b>Date of report:</b> 20/09/2010
<b>Shifts:</b> 9	<b>Local contact(s):</b> Dr. G. Portale	
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### Report:

A series of crystallization experiments under flow and with/without application of pressure before shearing was performed at beamline B26 DUBBLE of the European Synchrotron Research Facility (ESRF) in Grenoble, France. All experiments were carried out in the Multipass Rheometer (MPR) shown in Fig. 1.

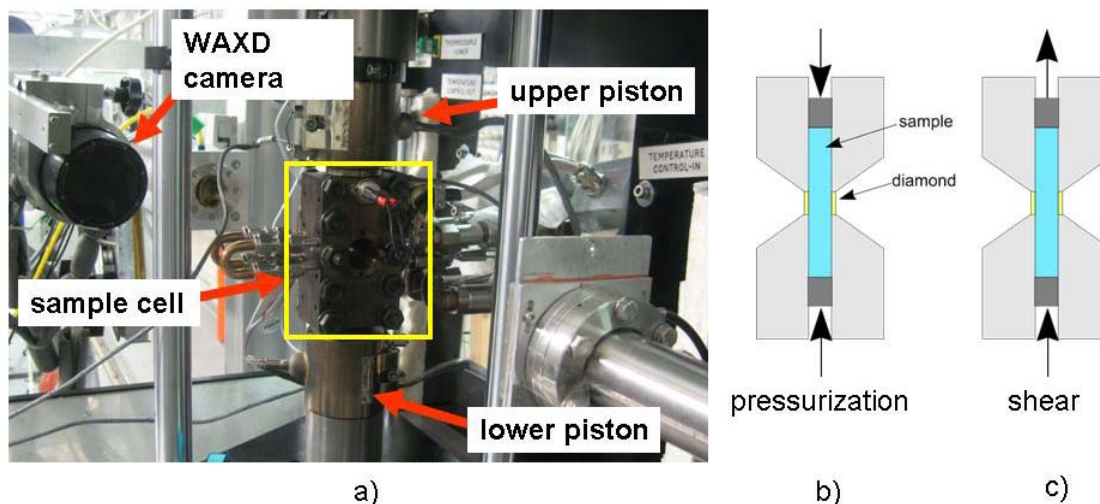


Figure 1: a) Pressure cell installed at DUBBLE/BM26; b) Pressurization; c) Shear

In these studies, the amount of shear (200 mms/s, 8 mm displacement) was kept constant while the timing (before or after shear) and the amount of applied pressure varied. In these experiments, we focused on the formation of oriented structures upon cessation of shear, with and without the application of pressure.

The first material used was an ethylene copolymer of low “crystallizability” doped with 0.3 wt% of UHMW-PE. Experiments as described above showed that a pressure pulse of 200 bar before shearing can induce the

formation of shish (Fig. 2b), whereas shear alone does not have this effect (Fig. 2a).

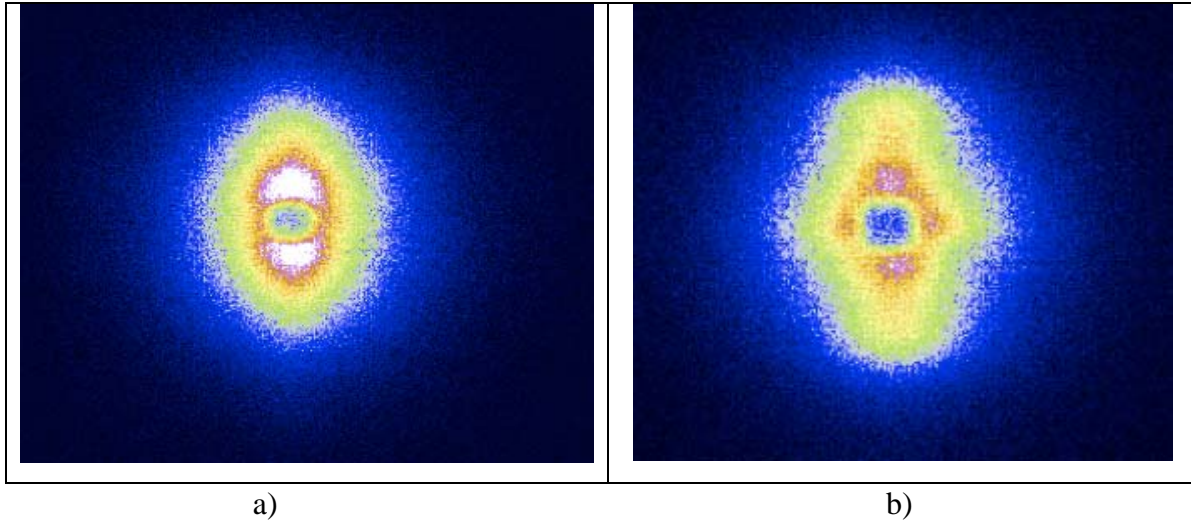


Figure 2: SAXS patterns a) after a shear pulse of 200 mm/s, 8mm; b) after application of 200 bar for 60s, release of pressure and subsequent application of 200 mm/s, 8mm

Further SAXS and WAXD data analysis is ongoing.