



	Experiment title: The development of a high frequency, high voltage electric field setup for use in long range ordering of various block copolymers.	Experiment number: SC-1793
Beamline: ID 2	Date of experiment: from: 9.3.2007 to: 12.3.2007	Date of report: 5. Feb. 2008
Shifts: 9	Local contact(s): Dr. M. Sztucki, Dr. E. di Cola	<i>Received at ESRF:</i>
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Report:

This report deals with the last beam time of the long term project SC-1793, finished in March 2007. Here, we observed in detail the influence of the electric field on the order-disorder-transition of a lamellar polystyrene-*b*-polyisoprene block copolymer system ($S_{43}I_{57}^{108}$). For these experiments we developed a new temperature-controlled closed sample cell in order to be able to apply high temperature and high voltage over a large period of time without evaporation of the solvent.

We conducted heating and cooling runs at very slow rates (~ 0.8 K/min, see Figure 1*a*) and at different electric field strengths in order to show its influence on the order-disorder temperature. We determined the order-disorder temperature via the broadening of the first order Bragg peak and the disappearance of the second order peak. Using this reliable method, we found a distinct decrease in the order-disorder temperature with increasing electric field strengths as well as a decreasing hysteresis between the heating and the cooling runs (Figure 1*b*). The results found during this beam time will be published soon.

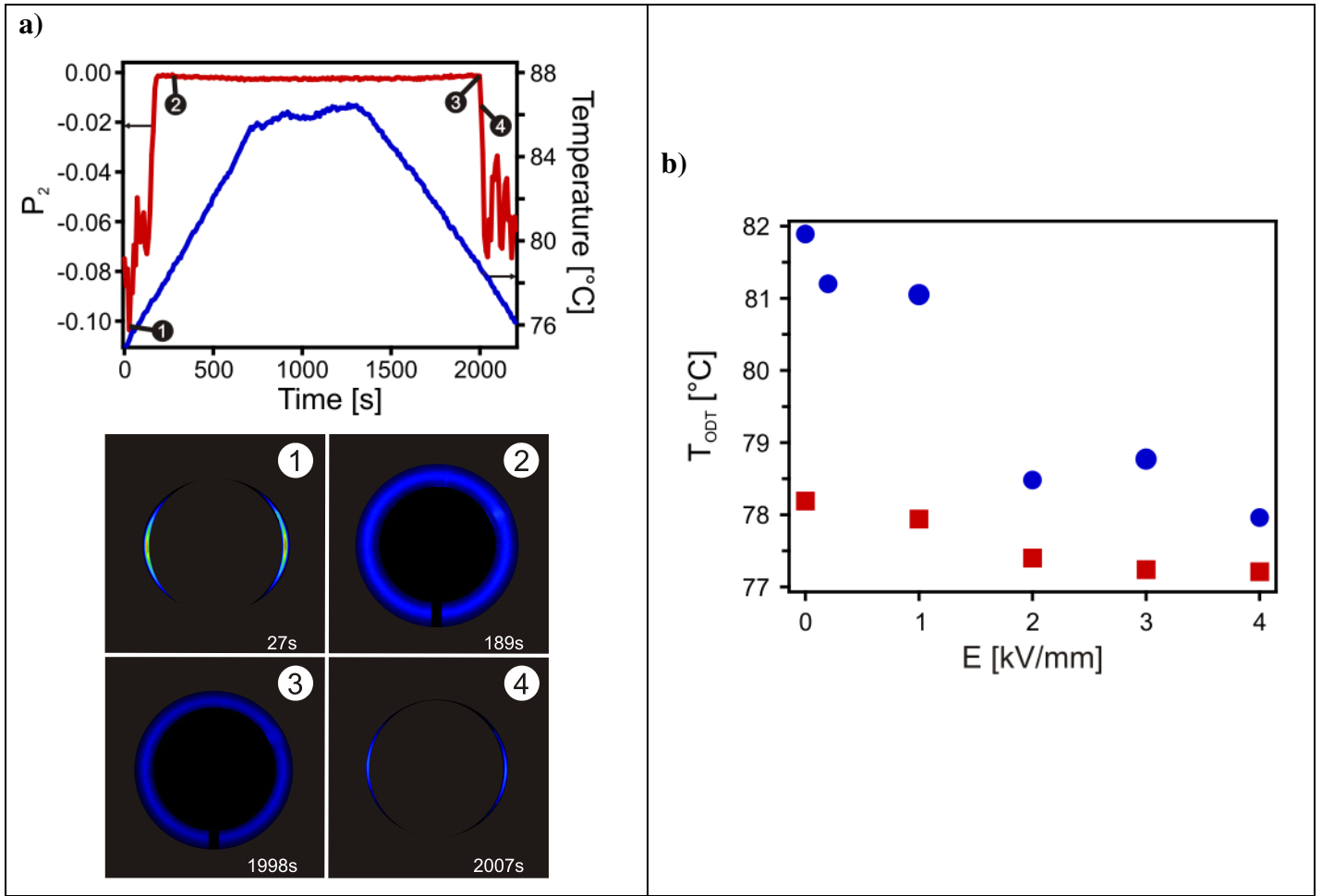


Figure 1: (a) Temperature curves and orientational order parameters for heating and cooling run of a 35 wt.% solution of $S_{43}I_{57}^{108}$ in toluene and corresponding 2D scattering patterns (b) Dependence of the order-disorder temperature on the electric field strength for the same polymer solution. Blue dots: cooling runs; red squares: heating runs.