A High Pressure XRD Experiment of Polyfluorene Polymer

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Polyfluorenes are fluorescent polymers with complicated phase behaviour. Guha and coworkers have shown that a branched side chain poly[2,7-bis(2-ethylhexyl)fluorene-2,7-diyl] polyfluorene (or PF2/6) shows an optical transition with increasing pressure between 25 and 40 kbar [1]. We have carried out a preliminary experiment using high pressure XRD on 711 at MAX-lab and shown that this transition is concomitant with a structural transition [2]. This transition points either to the transformation from a hexagonal phase to a glassy nematic phase or to the planarization of helical PF2/6 main chain.

In order to clarify this question, we have made a test beamtime at P02.2. We focused on the control of scattering background in terms of collimation, beamstop selection and background subtraction. An important factor is the geometry of employed diamonds. There is also a need to control radiation damage, which requires slight movement of the sample during the measurements. We are going to continue this work during a scheduled beamtime in 2012 and we will introduce several improvements such as perforated diamonds.

References