



<b>Experiment title:</b> A grazing-incidence x-ray diffraction study on polythiophene films	<b>Experiment number:</b> 28-01-731	
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**Report:**

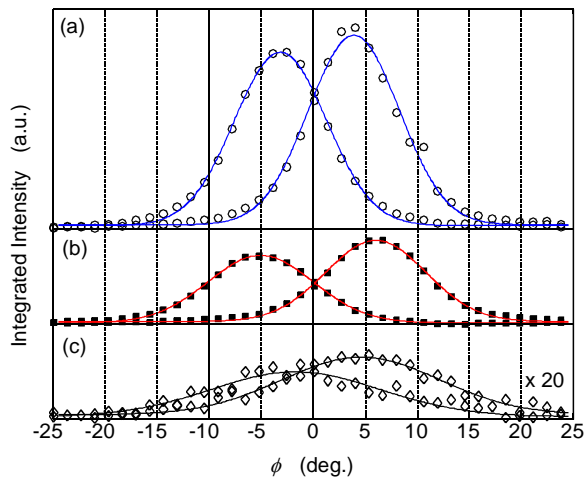
Our plan was to study thin film morphology and self-organized structure formation of 12 different polythiophene polymers. However, it turned out that only one of the studied polymers formed nanoscale assemblies in thin films. The data of this one sample were too thin to be published.

While polythiophenes represented our plan, we were also prepared to conduct some spare measurements in the case where the primary plane was unsuccessful.

Therefore we studied additionally the degree of meridional alignment of equatorially distinct crystallite types in biaxially aligned polyfluorene films. This system is described in Ref. [1] in detail.

To conduct such an experiment the scattering was measured using a 2 dimensional MarCCD detector as a function of azimuthal rotation about the surface normal ( $\phi$ ). The zero of the rotation angle,  $\phi=0$ , was defined when the scattering plane was coincident with the direction of uniaxial (meridional) alignment of rodlike polyfluorene. The data were normalized to the incident flux using an ionization chamber mounted just before the sample. Typical data are plotted in Fig. Each point corresponds to a single MarCCD image.

As this type of scan took several hours, attention was put on the possible radiation damage. However, as no change in the scattering patterns was observed on repetition of  $\phi$ -scans, no overt radiation damage was detected.



**Fig.** Integrated intensities of the second hexagonal GIX reflections of aligned PF2/6 film corresponding to sample of which data shown in Figure 4. (a) Type I. (b) Type II. (c). Type III. These types are described in Ref.[1]. Solid lines are corresponding Gaussian fits. Adapted from Ref. [2].

These data have been submitted for publication and we hope that they are accepted soon. We also hope to improve our polythiophene system and gain better data in the future.

[1] M. Knaapila et al. Adv. Funct. Mater. 2005 15 1517.

[2] M. Knaapila et al. submitted