



Experiment title: Nematic to centered rectangular to hexagonal transitions in neutral DNA lamellar phase: a supported film experiment	Experiment number: sc2260	
Beamline: ID10B	Date of experiment: from: 27.06.2007 to: 03.07.2007	Date of report: 01.09.2010
Shifts: 18	Local contact(s): Jiří Novak	<i>Received at ESRF:</i>
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Report:

Special efforts have been devoted to the study of a single DNA–lipid film deposited onto a glass slide, as it was of a fairly large size horizontally (nearly 10 mm perpendicular to the beam) and thin enough to reach an appropriate state of homeotropic orientation. The film was enclosed into a custom-made humidity control device that turned out to be inadequate for a proper control of the hydration state of the film. As revealed by scanning the film along the horizontal axis perpendicular to the beam, the *d*-spacing of the lamellar phase was not homogeneous, with significantly *dryier* states close to the lateral edges of the film. In addition, though the short-term control of the overall humidity was good (quickly repeated scans across the film led to the same GI-SAXS pictures and to the same *d*-spacings at repeated positions), the long-term–and slow–dehydration procedure required to reach the 2D-ordered DNA phase embedded into the 1D-stacked lipid bilayers could not be tuned as desired. Still, owing to the very good performances of the detector (high spatial resolution and high sensitivity), distinct off-axis Bragg spots, in particular at ± 30 deg from the vertical axis and also perhaps at ± 60 deg (but in part buried below the horizon), have been identified in several regions across the film when the humidity reached low, poorly-known values.

The feasibility of our project was thus qualitatively demonstrated. The technical shortcomings of our equipment led us to design a new humidity control device that later proved quite appropriate for our project [1]

References

- [1] E. Andreoli de Oliveira, E.R. Teixeira da Silva, A. Février, É. Grelet, F. Nallet, L. Navailles, *EPL* **91** (2010) 28001