© 2021 Wiley-VCH GmbH

NANO MICRO small

Supporting Information

for *Small,* DOI: 10.1002/smll.202006229

In Situ Visualization of the Structural Evolution and Alignment of Lyotropic Liquid Crystals in Confined Flow

*Adrian Rodriguez-Palomo, Viviane Lutz-Bueno, Xiaobao Cao, Roland Kádár, Martin Andersson, and Marianne Liebi**

Supporting Information

In Situ Visualization of the Structural Evolution and Alignment of Lyotropic Liquid Crystals in Confined Flow

*Adrian Rodriguez-Palomo, Viviane Lutz-Bueno, Xiaobao Cao, Roland Kádár, Martin Andersson, Marianne Liebi**

Small angle X-ray scattering

Small angle X-ray scattering (SAXS) was performed on the lyotropic liquid crystals in glass capillaries (2 mm internal diameter) 72 hours after preparation using a Mat:Nordic instrument (Xenocs) at the Chalmers Materials Analysis Laboratory (CMAL) at the Chalmers University of Technology. A high brilliance X-ray laboratory source with microfocus (Rigaku 003+) and the scattering signal was recorded by a Pilatus 300K detector. A total exposure time of 1800 s was employed for all the measurements.

Polarized light microscopy

The signal of the liquid crystals under polarized light was collected using a microscope Axio Imager Z2m (Zeiss) at room temperature. The signal showed in figure S2a and S2d is in agreement with the signal observed in previous works using lyotropic liquid crystals. [1, 2]

Birefringence microscopy

The retardance and angle of the optical fast axis was measured with the imaging system Exicor Birefringence MicroImager^{TM} (Hinds Instruments, Inc., OR) using a wavelength of 475 nm. A linear polarizer at 0°, a photoelastic modulator (PEM) at 45°, a PEM at 0° and a linear polarizer at 45° were used to collect the birefringence signal in a CCD camera.

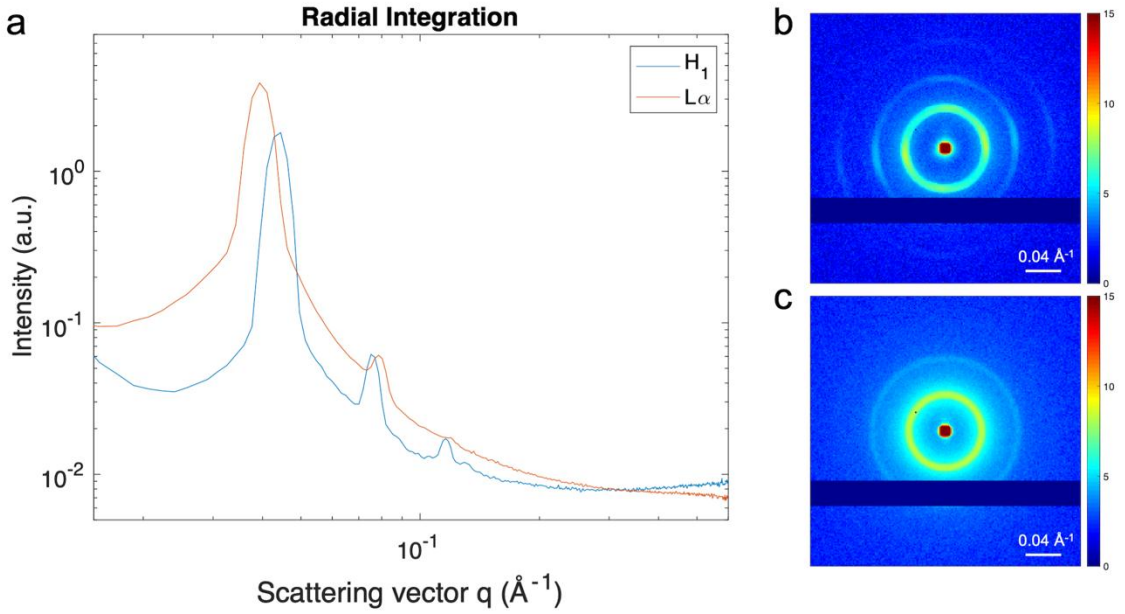

Figure S1. SAXS signal of the lyotropic liquid crystals in equilibrium conditions. Radial integration (a) and scattering patterns (b and c) of the hexagonal and lamellar phases respectively.

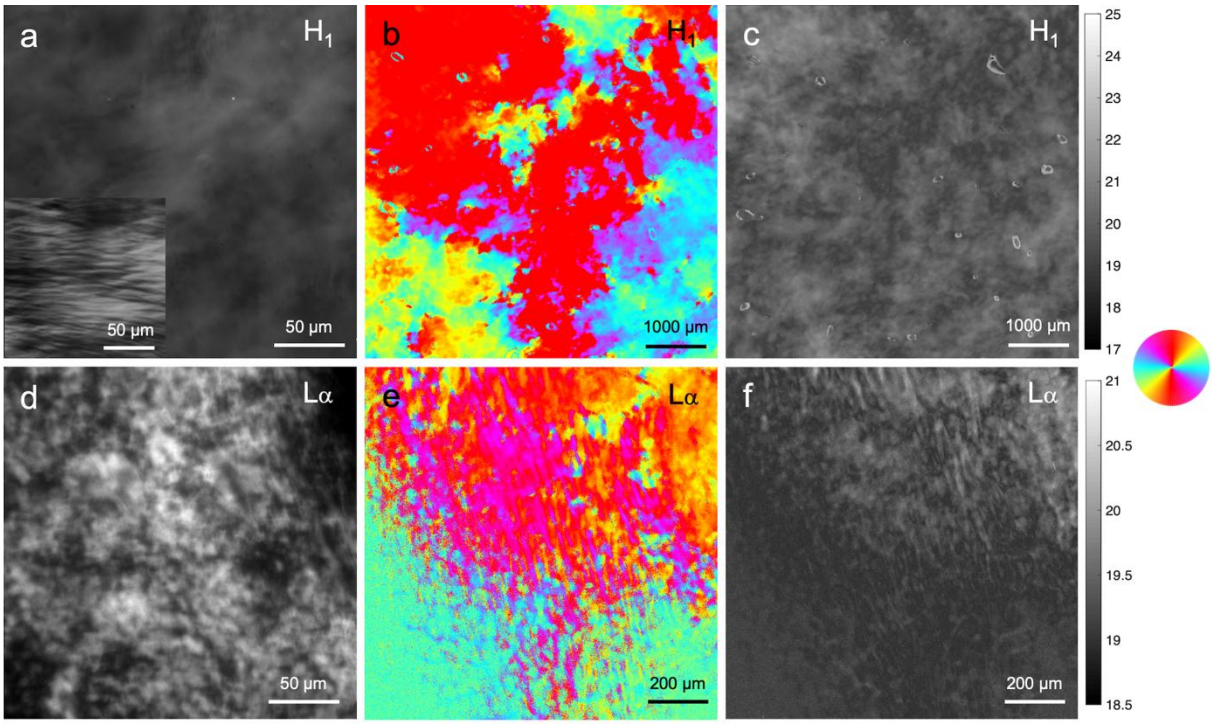

Figure S2. Hexagonal (H_1) (a-c) and lamellar (L_α) (d-f) lyotropic liquid crystals in static conditions visualized by polarized light microscopy (a and d) and birefringence microscopy showing the angle of the fast axis (b and e) and the retardance (c and f). The inset in (a) shows the signal of the hexagonal phase after being sheared between two glass slides perpendicular to the incident light. The angle of the optical fast axis was color coded according to the color-wheel displayed for an easier reading.

References

[1] H. Li, L. Dang, S. Yang, J. Li, H. Wei, *Colloids Surf, A Physicochem Eng Asp*, **2016**, 495, 221-228.

[2] X.-W. Li, J. Zhang, B. Dong, L.-Q. Zheng, C.-H. Tung, *Colloids Surf, A Physicochem Eng Asp*, **2009**, 335, 80–87.