

Supporting Information

Characterization of Robust and Free-Standing 2D-Nanomembranes of UV-Polymerized Diacetylene Lipids

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Supporting Information

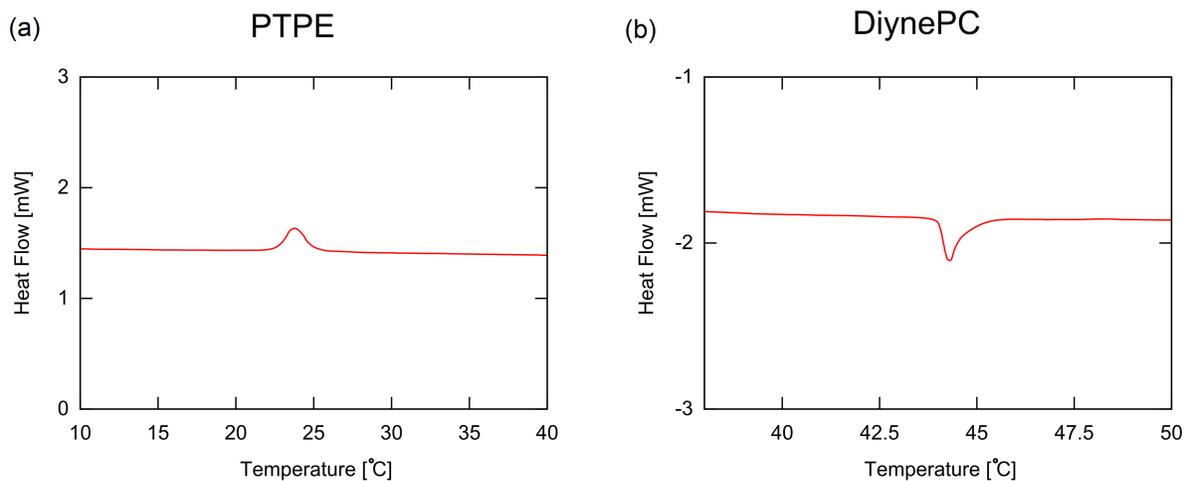


Figure S 1: Phase transition temperature (T_c) was determined by differential scanning calorimetry (DSC). (a) T_c of 23 °C was measured for PTPE while cooling the sample down at 1 K/min (b) T_c of 44 °C was measured for DiynePC while heating the sample up at 1 K/min.

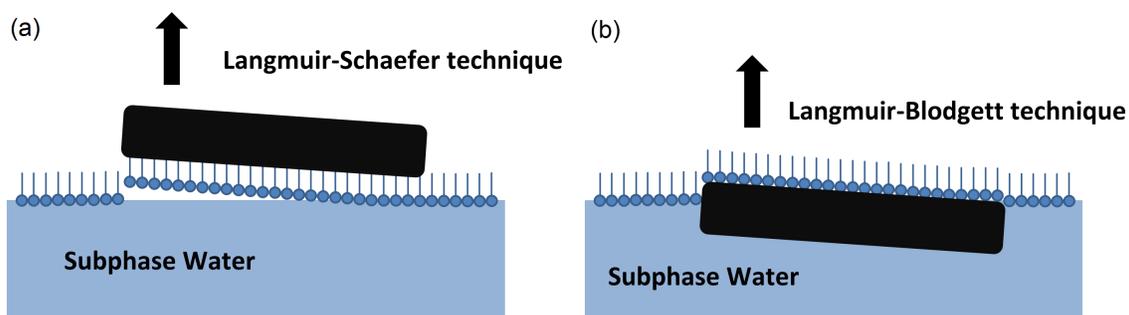


Figure S 2: (a) Monolayers of lipids were deposited onto hydrophobic samples (HOPG, germanium) from the air-water interface by Langmuir-Schaefer (LS) technique. There, the hydrophobic sample was approached and withdrawn parallel, thus horizontally orientated, to the interface (LS technique). The sample was slightly tilted by 5°, to drain the water while withdrawing the sample. (b) During Langmuir-Blodgett (LB) technique, the horizontally orientated sample is risen through the air-water interface, also slightly tilted by 5°.

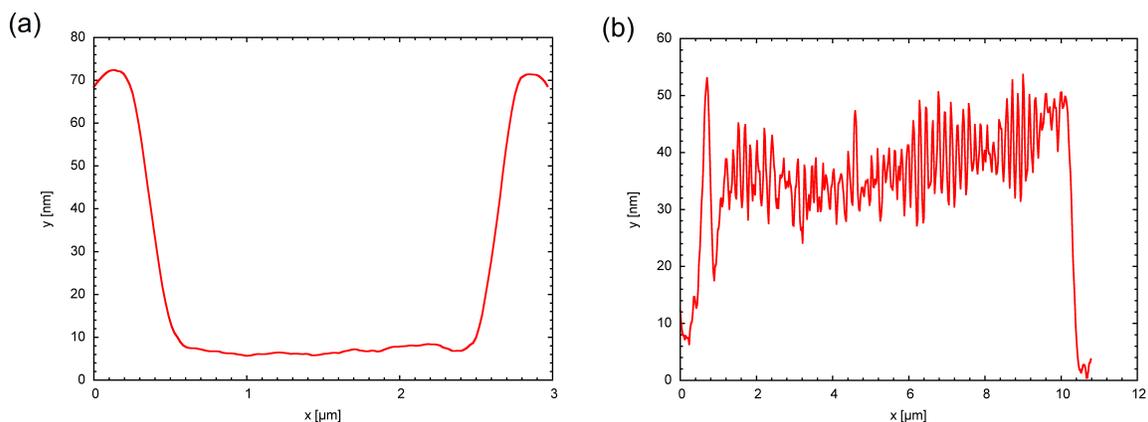


Figure S 3: (a) The line profile taken from Figure 2b revealed the downward bending of the membrane during AFM scanning. The polymerized PTPE membrane exhibited a somewhat constant height level with tip oscillation effect. (b) Whereas in the case of a DiynePC pore-spanning membrane, the line profile in Figure 2d revealed an entirely different behavior: the membrane was almost in plane with the supporting matrix around.

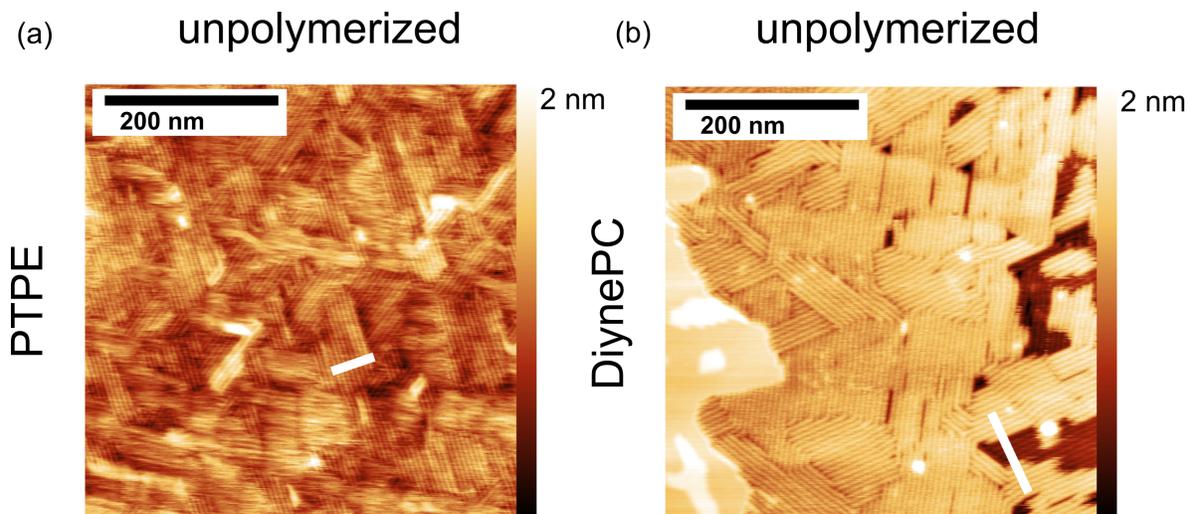


Figure S 4: (a) Unpolymerized PTPE layer coated onto HOPG. A triangular pattern of lipid domains can be observed, showing well-ordered lamellae. (b) Polymerized PTPE layer on HOPG. (b) AFM image of an unpolymerized DiynePC layer, where molecular steps are visible. The step height along the white line profile amounts to 0.9 nm.

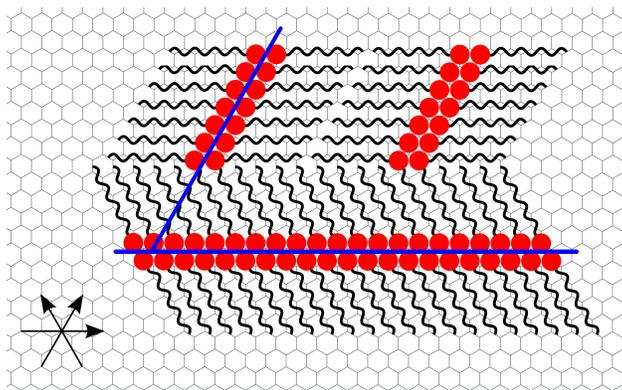


Figure S 5: Scheme of a monolayer of lipids on HOPG. Red circles label headgroups and curved lines represent hydrocarbon chains. The arrows denote the crystallographically equivalent graphite axes with 3-fold symmetry. The hydrocarbon chains orient horizontally along the substrate axes parallel to each other, while the head groups organize into straight lamellae.

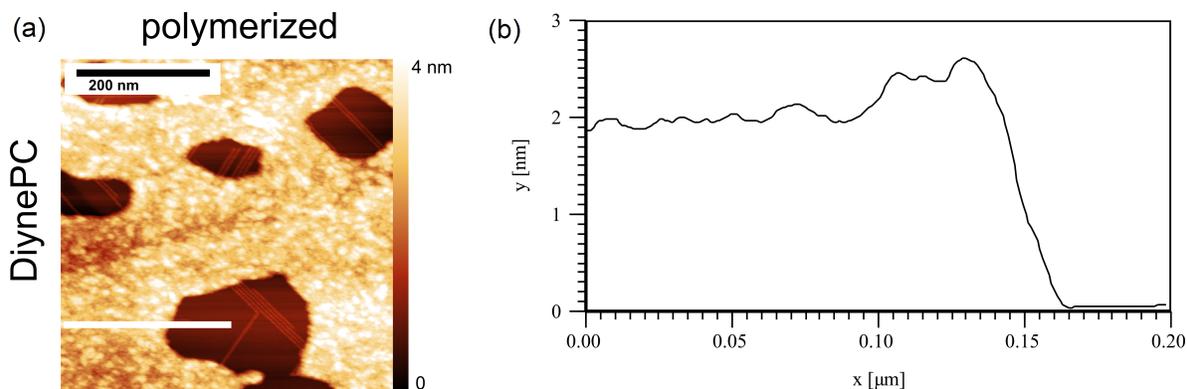


Figure S 6: (a) AFM image of a polymerized monolayer of DiynePC coated onto HOPG. In contrast to Supporting Fig. 4b no lamellae like alignment is visible in the transferred film, except for few structures of very low height, which are formed by unpolymerized lipids. (b) The line profile indicates a film of vertical orientated lipids with a size of 2 nm.

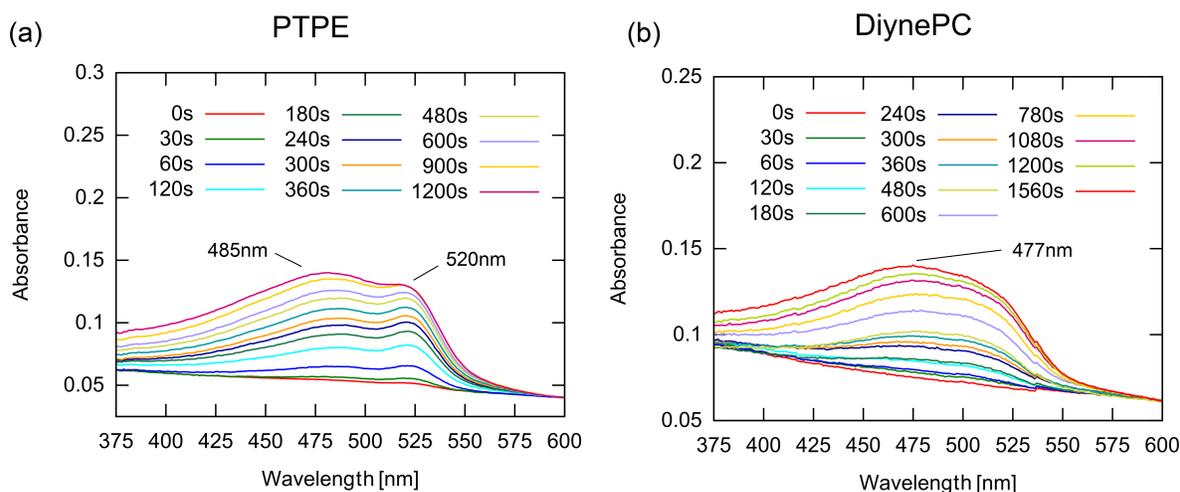


Figure S 7: UV-VIS experiments (Shimadzu 2450, Japan) were performed on dried droplets of lipids on Quartz glass, a cleaned glass was used as a reference. (a) Spectra of UV-polymerized PTPE lipids after varying UV-illumination periods showed two distinct peaks at 485 nm and 520 nm, which are formed by polymerization. Large conjugated systems, which are formed by the polymerization, gave rise to strong absorption. (b) Spectra of DiynePC of several UV-illumination times, forming a peak at 477 nm. As for PTPE, conjugated systems are formed by polymerization leading to absorption of visible light.