Electronic Supporting Information

Achiral flexible liquid crystal trimers exhibiting gyroid-like surfaces in chiral conglomerate phases

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8. Fig. S-6 SEM image of the surface pattern of trimer **I–(9,9)** in the thinnest part of the LC droplet. The sample on an untreated glass substrate without a top cover was cooled to the DC phase. It was coated with platinum before being analyzed on a JEOL JSM-7000 FE-SEM using accelerating voltages of 10 keV.

9. Fig. S-7 (a) Polarized optical texture of **I–(7,7)** on a glass plate without a cover glass in the N phase. (b) Polarized optical texture in the N phase just above the DC phase. The circle indicates the appearance of the transient state.

Characterization of trimer **I–(9,11)**.

2-{4-[9-(4-(4-Octyloxyphenyl)phenyloxy)undecyloxy]phenyl}-5-{7-[4-(5-octyloxypyrimidin-2-yl)phenyloxy]nonyloxy}pyrimidine (I–(9,11)).

^{1}H NMR (500 MHz, $CDCl_3$, TMS): δ=8.40 (s, 4H, Ar-**H**), 8.25 (d, 4H, Ar-**H**, *J* = 9.2 Hz), 7.45 (d, 4H, Ar-**H**, *J* = 8.6 Hz), 6.96 (d, 4H, Ar-**H**, *J* = 8.6 Hz), 6.93 (d, 4H, Ar-**H**, *J* = 8.6 Hz), 4.07 (t, 4H, -OC**H$_2$**-, *J* = 6.6 Hz), 4.02 (t, 2H, -OC**H$_2$**-, *J* = 6.6 Hz), 4.01 (t, 2H, -OC**H$_2$**-, *J* = 6.6 Hz), 3.97 (t, 4H, -OC**H$_2$**-, *J* = 6.6 Hz), 1.82 (quin, 6H, aliphatic-**H,** *J* = 6.9 Hz), 1.79 (quin, 6H, aliphatic-**H,** *J* = 7.0 Hz), 1.47–1.29 (m, 44H, aliphatic-**H**), 0.89 (t, 6H, -C**H$_3$**, *J* = 7.2 Hz) ; IR(KBr): ν= 2923, 2851 cm^{-1} (C-H), 1608 (Ar-H), 1274 (C-O). Elemental analysis (%): C, 76.8; H, 8.91; N, 5.27 calc. for $C_{72}H_{102}O_6N_4$:. Found C, 76.9; H, 8.98; N, 5.15.

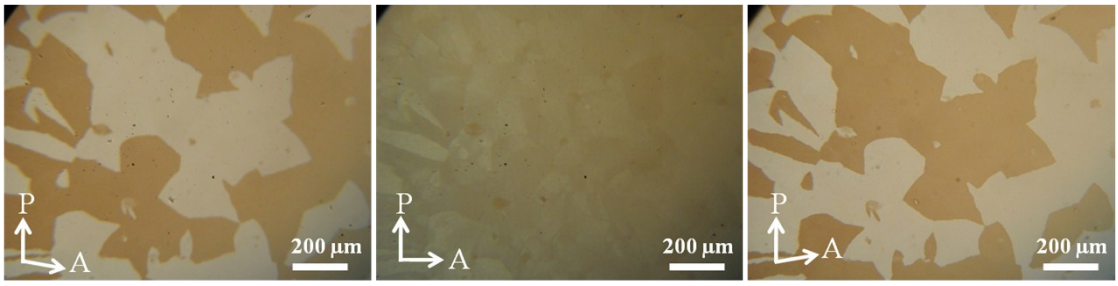

Fig. S-1 Polarized optical texture of trimer **I–(9,9)** on a glass slide with a cover glass in the DC phase at 120 °C under crossed and uncrossed polarizers.

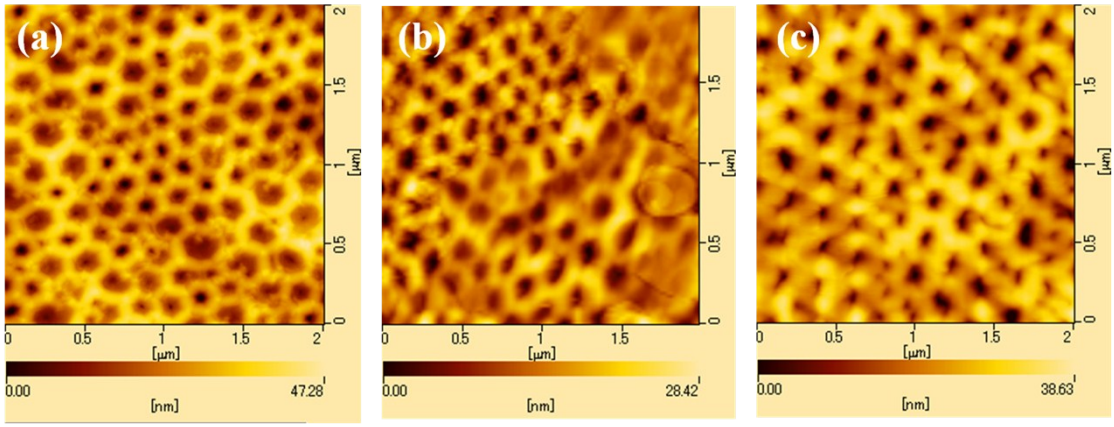

Fig. S-2 AFM images of the surface structures of **I–(9,9)** without a top cover on (a) silicon wafer, (b) glass coated with a homeotropically aligning agent, or (c) glass coated with a unidirectionally buffed polyimide aligning agent at room temperature.

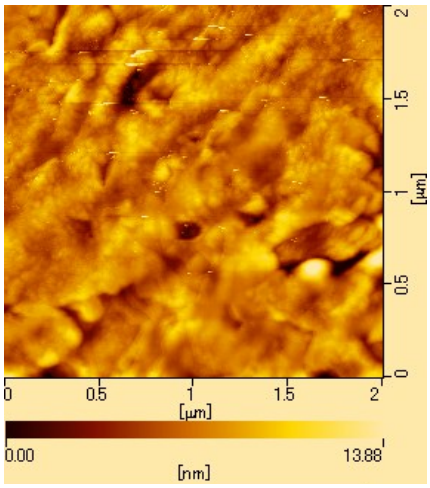

Fig. S-3 AFM image of the surface structure of **I–(9,9)** in the DC phase formed by cooling a sample with a cover glass at room temperature.

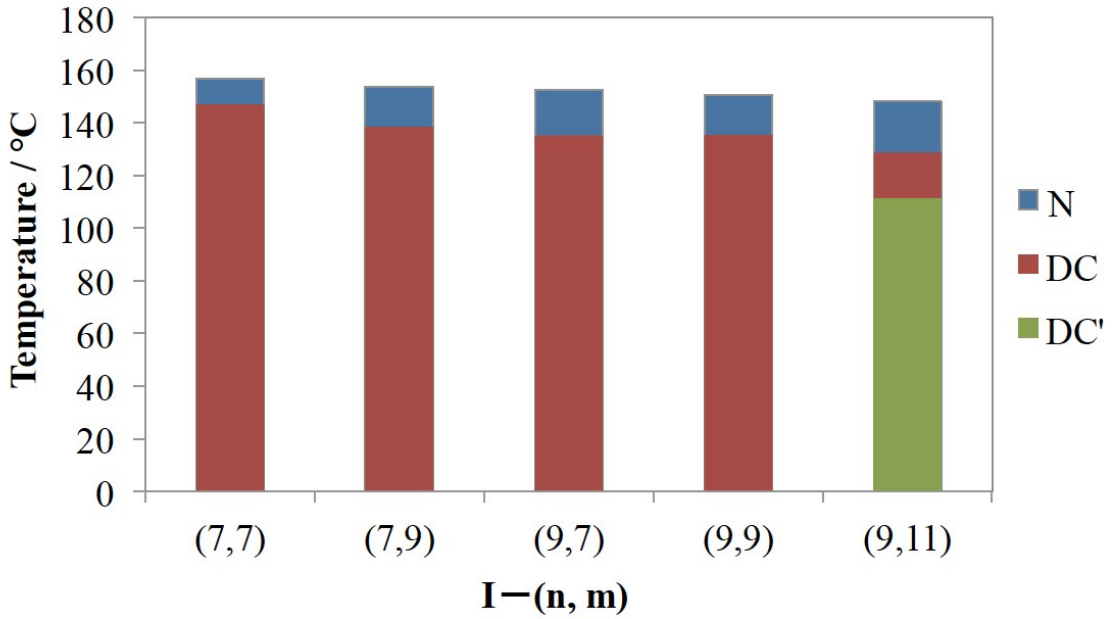

Fig. S-4 Phase transition temperatures on cooling of trimers **I–(7,7)**, **I–(7,9)**, **I–(9,9)**, and **I–(9,11)**.

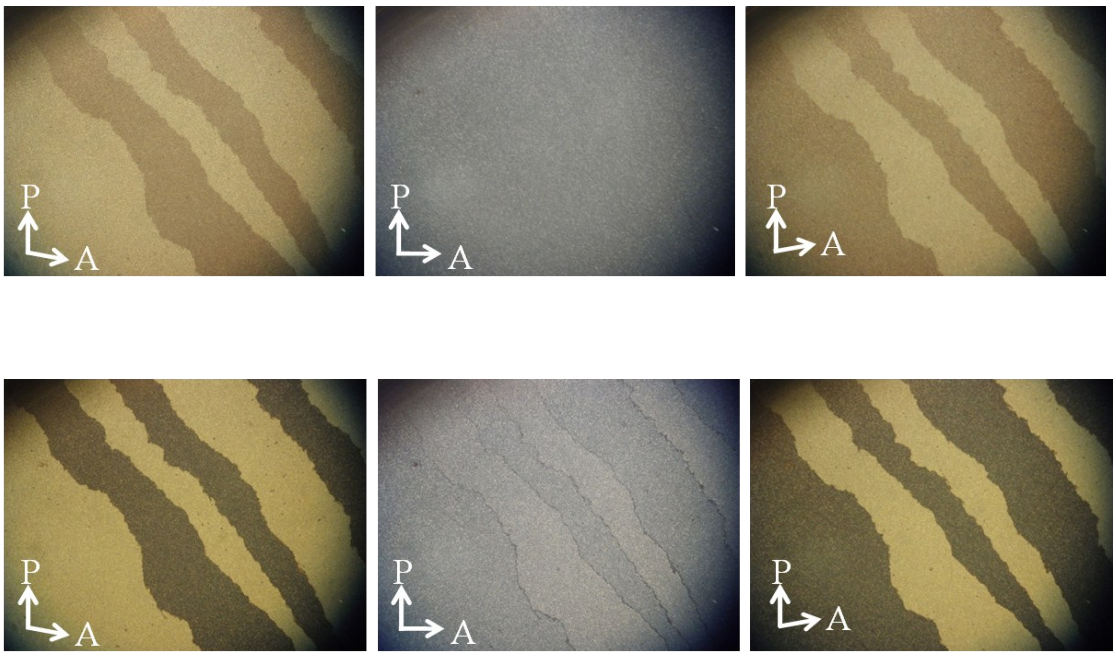

Fig. S-5 Polarized optical textures of trimer **I–(9,11)** in the DC phase at 124 °C and those in the DC' phase at 90 °C.

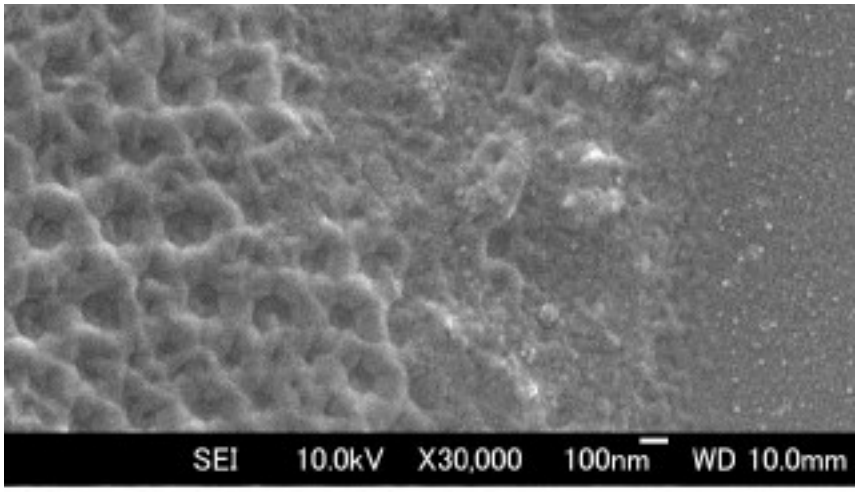

Fig. S-6 SEM image of the surface pattern of trimer **I–(9,9)** in the thinner part of the LC droplet. The sample on an untreated glass substrate without a top cover was cooled to the DC phase. It was coated with platinum before being analyzed on a JEOL JSM-7000 FE-SEM using accelerating voltages of 10 keV.

(a) (b)

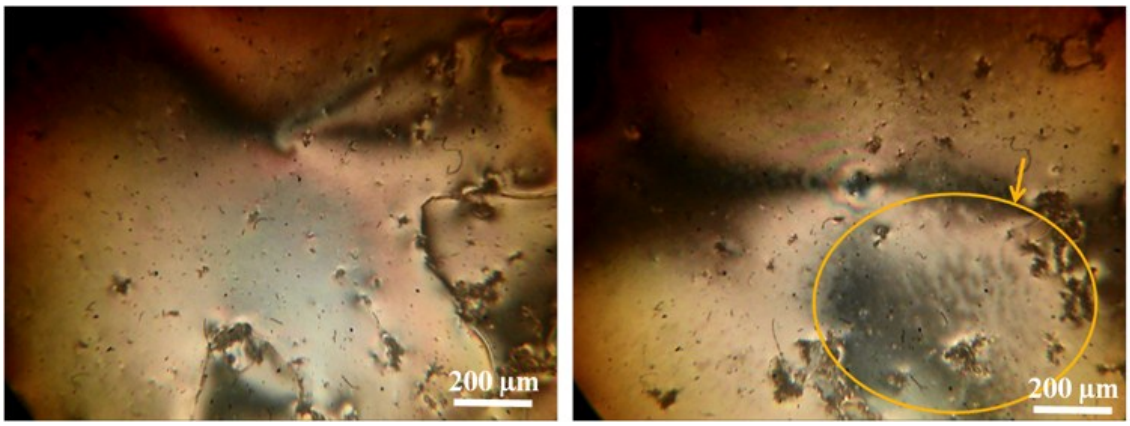

Fig. S-7 (a) Polarized optical texture of **I–(7,7)** on a glass plate without a cover glass in the N phase. (b) Polarized optical texture in the N phase just above the DC phase. The circle indicates the appearance of the transient state.