Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Electronic Supplementary Information

Interfacial Organization of Achiral Porphyrins *via* a Unidirectional Compression: a General Method for Chiroptical Porphyrin Assemblies of Selected Chirality

Xiao Zhang,[a] Yanping Wang,[a] Penglei Chen,[a]* Yunlong Rong[a] and Minghua Liu[a]*

*Beijing National Laboratory for Molecular Science (BNLMS), CAS Key Laboratory of Colloid, Interface and Chemical Thermodynamics, Institute of Chemistry, Chinese Academy of Sciences, Beijing, 100190, People's Republic of China. *E-mail: chenpl@iccas.ac.cn (P. Chen); liumh@iccas.ac.cn (M. Liu)*

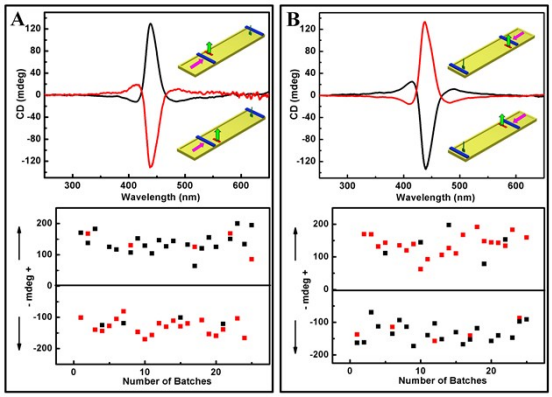

Fig. S1 The typical CD spectra (top panels) of the interfacial assemblies of TPPMe formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the assemblies is shown in the bottom panel of the corresponding figures. The respective assembly configurations are inserted in the corresponding panels for clarity. An extremely high compression speed of 2 mm/second and a surface pressure of 30 mN/m were used for the construction of the assemblies.

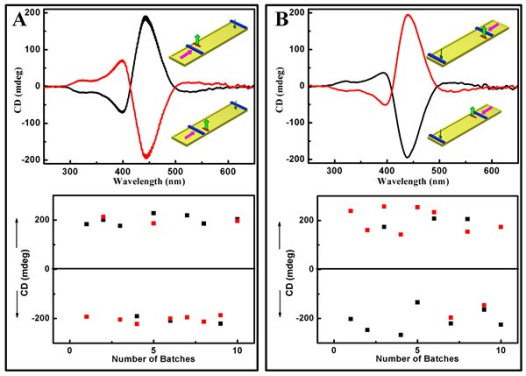

Fig. S2 The typical CD spectra (top panels) of the interfacial assemblies of TPPDOMe formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the assemblies is shown in the bottom panel of the corresponding figures. The respective assembly configurations are inserted in the corresponding panels for clarity. A moderate compression speed of 0.2 mm/second and a surface pressure of 30 mN/m were used for the construction of the assemblies.

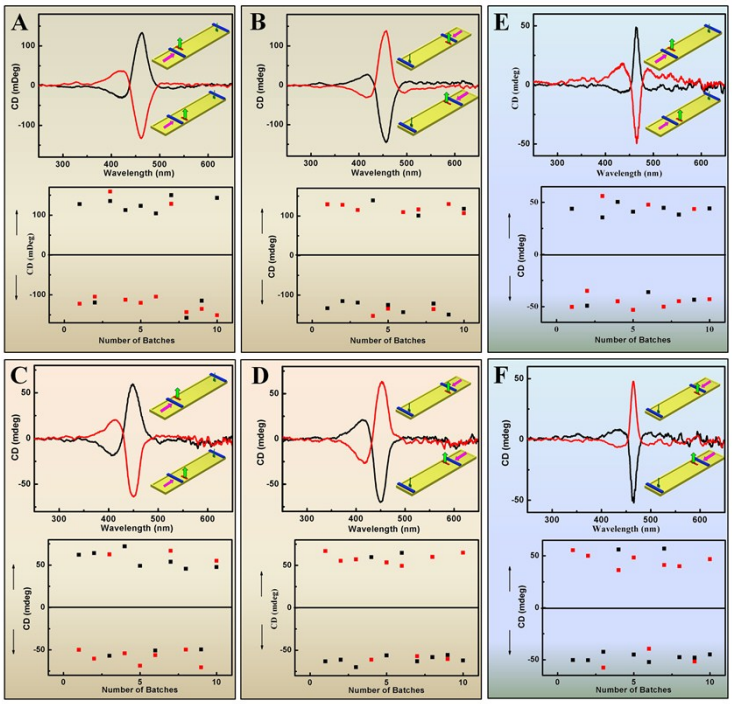

Fig. S3 A) and B): The typical CD spectra (top panels) of the interfacial assemblies of TPPOMe formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the assemblies is shown in the bottom panel of the corresponding figures. The respective assembly configurations are inserted in the corresponding panels for clarity. Panel C-F show the corresponding results obtained from the interfacial assemblies of TPPOA (C and D), and TPP (E and F). A moderate compression speed of 0.2 mm/second and a surface pressure of 30 mN/m were used for the construction of the assemblies.

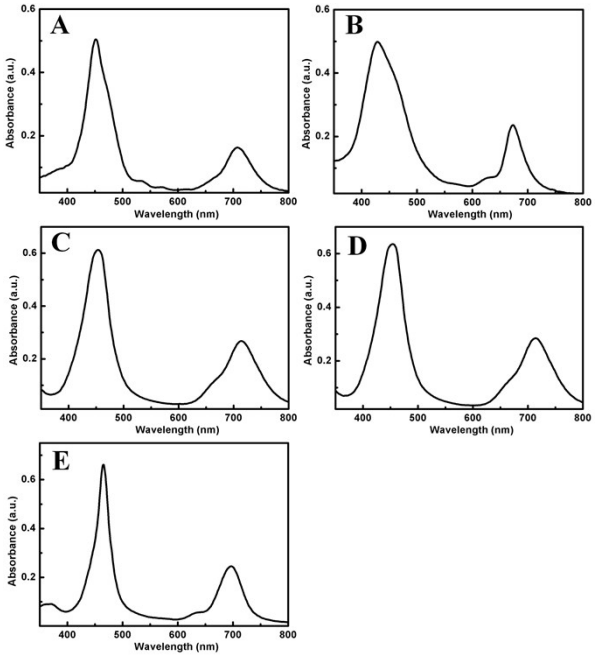

Fig. S4 UV-Vis spectra of the assemblies of TPPMe (A), TPPDOMe (B), TPPOMe (C), TPPOA (D) and TPP (E) formulated at the front side of the trough at a surface pressure of 30 mN/m by compression from the left-hand side. A moderate compression speed of 0.2 mm/second was used for the construction of the assemblies. Similar spectral patterns are observed from those of the corresponding samples formulated at the back side of the trough by compression from the left-hand side, or at the front (back) side of the trough by compression from the right-hand side. These spectra are omitted for clarity.

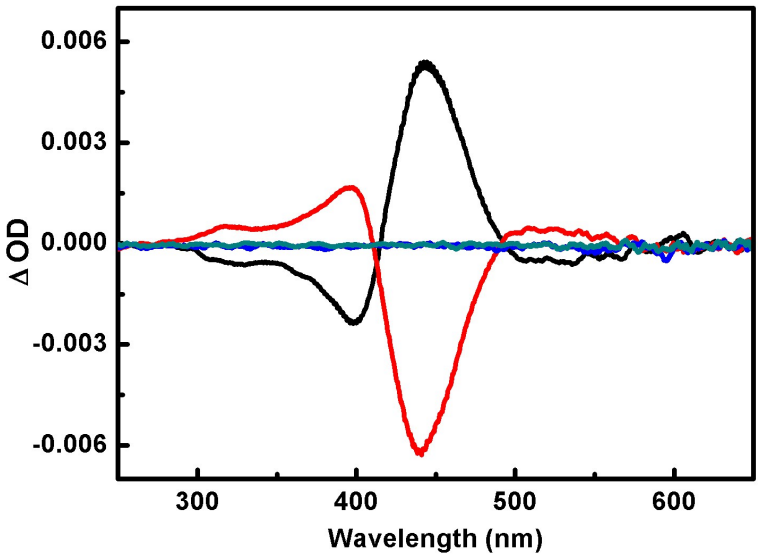

Fig. S5 Typical CD (black and red curves) and LD (blue and dark cyan curves) spectra of the interfacial assemblies of TPPDOMe, which are unified as the same unit (Δ OD). The black and blue curves are the CD and LD spectra of a sample formulated by unidirectional compression from right-hand side, respectively. The red and dark cyan curves are the CD and LD spectra of a sample fabricated by unidirectional compression from left-hand side, respectively. A moderate compression speed of 0.2 mm/second and a surface pressure of 30 mN/m were employed for the construction of the assemblies. The interfacial assemblies are transferred onto solid supports from the front side of the Langmuir trough.

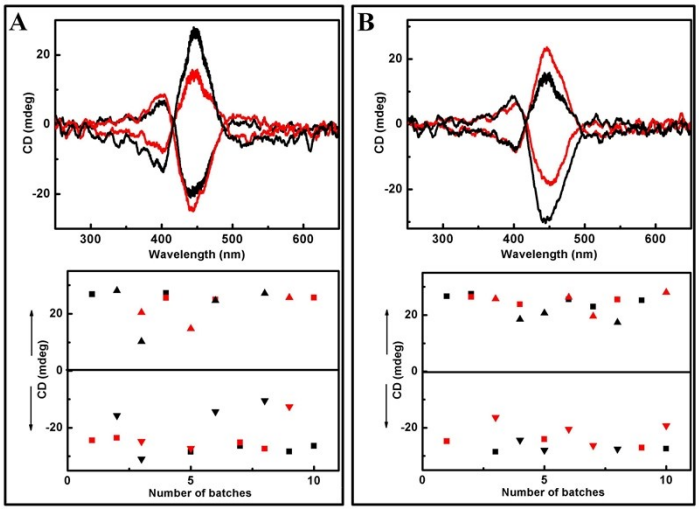

Fig. S6 The typical CD spectra (top panels) of the interfacial assemblies of TPPDOMe formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the samples (at ≈ 443 nm) is shown in the bottom panel of the corresponding figures. The symbols ■ and ■ indicate that the samples formulated in different batches show either positive or negative chirality signs. The symbols ▲, ▼, ▲, ▼ indicate that both positive (▲, ▲) and negative (▼, ▼) chirality signs could be detected from the different regions of the same sample fabricated in the same batch. A compression speed of 0.2 mm/second and a lower surface pressure of 2 mN/m were used for the construction of the assemblies.

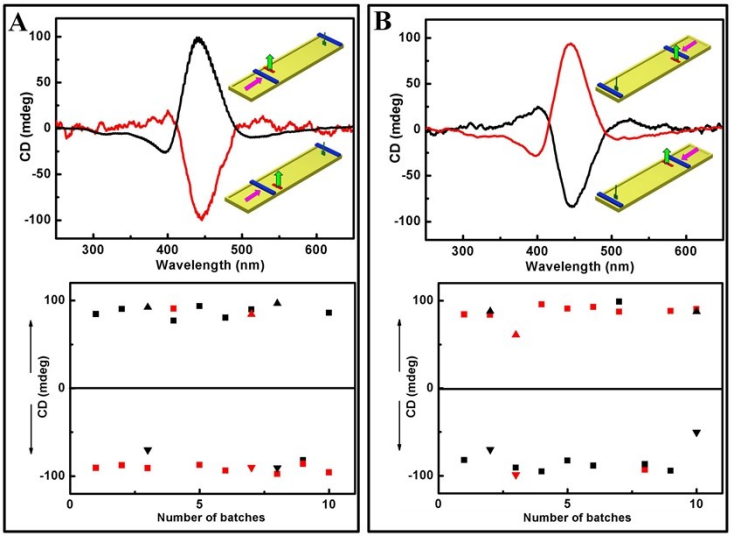

Fig. S7 The typical CD spectra (top panels) of the interfacial assemblies of TPPDOMe formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the samples (at ≈ 443 nm) is shown in the bottom panel of the corresponding figures. The respective formulation configurations are inserted in the corresponding panels for clarity. The symbols are the same as those denoted in Fig. S6. A compression speed of 0.2 mm/second and a moderate surface pressure of 10 mN/m were used for the construction of the assemblies.

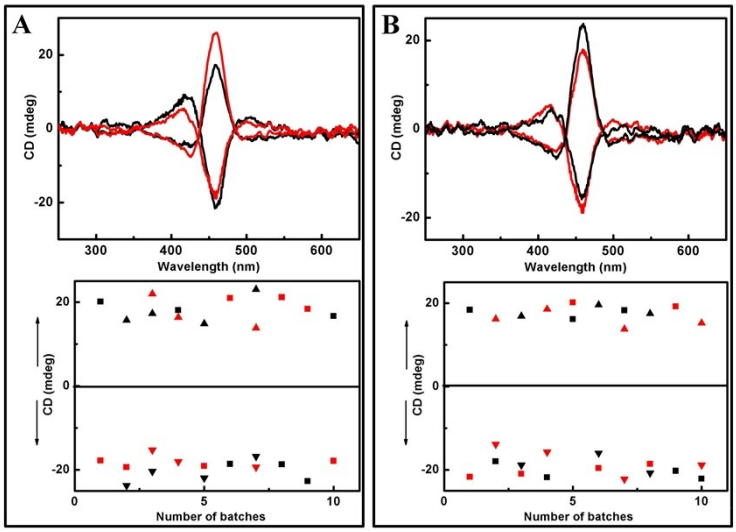

Fig. S8 The typical CD spectra (top panels) of the interfacial assemblies of TPPOMe formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the samples (at ≈ 459 nm) is shown in the bottom panel of the corresponding figures. The symbols are the same as those denoted in Fig. S6. A compression speed of 0.2 mm/second and a lower surface pressure of 2 mN/m were used for the construction of the assemblies.

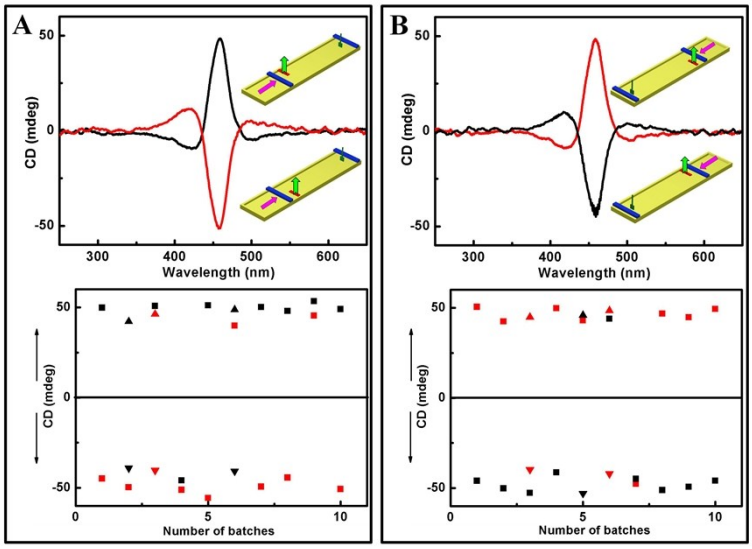

Fig. S9 The typical CD spectra (top panels) of the interfacial assemblies of TPPOMe formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the samples (at ≈ 459 nm) is shown in the bottom panel of the corresponding figures. The respective formulation configurations are inserted in the corresponding panels for clarity. The symbols are the same as those denoted in Fig. S6. A compression speed of 0.2 mm/second and a moderate surface pressure of 10 mN/m were used for the construction of the assemblies.

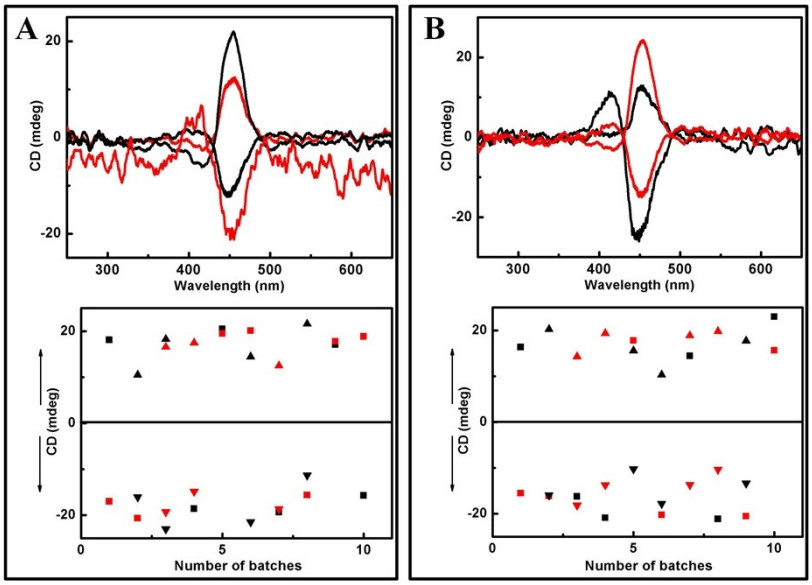

Fig. S10 The typical CD spectra (top panels) of the interfacial assemblies of TPPOA formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the samples (at ≈ 451 nm) is shown in the bottom panel of the corresponding figures. The symbols are the same as those denoted in Fig. S6. A compression speed of 0.2 mm/second and a lower surface pressure of 2 mN/m were used for the construction of the assemblies.

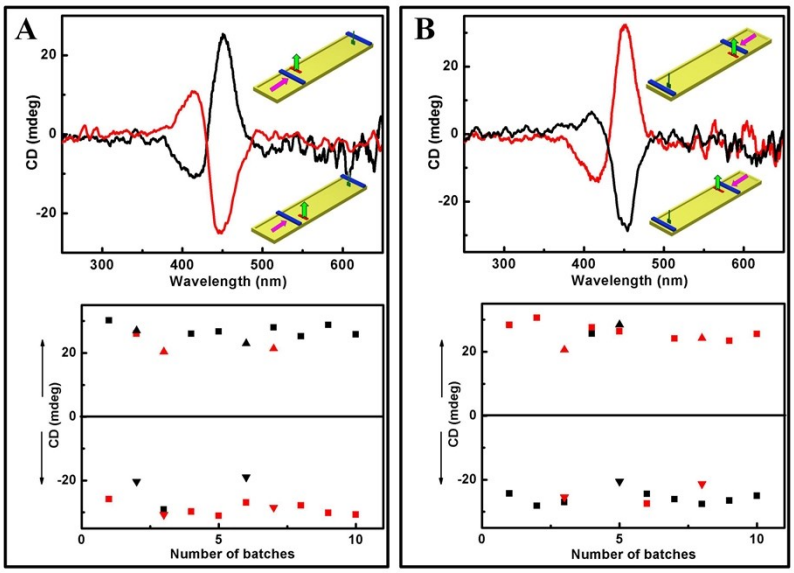

Fig. S11 The typical CD spectra (top panels) of the interfacial assemblies of TPPOA formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the samples (at ≈ 451 nm) is shown in the bottom panel of the corresponding figures. The respective formulation configurations are inserted in the corresponding panels for clarity. The symbols are the same as those denoted in Fig. S6. A compression speed of 0.2 mm/second and a moderate surface pressure of 10 mN/m were used for the construction of the assemblies.

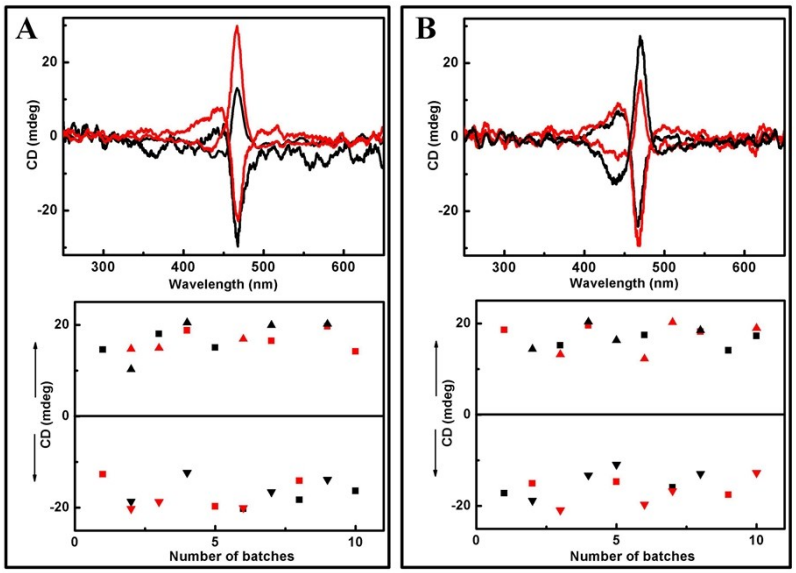

Fig. S12 The typical CD spectra (top panels) of the interfacial assemblies of TPP formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the samples (at ≈ 465 nm) is shown in the bottom panel of the corresponding figures. The symbols are the same as those denoted in Fig. S6. A compression speed of 0.2 mm/second and a lower surface pressure of 2 mN/m were used for the construction of the assemblies.

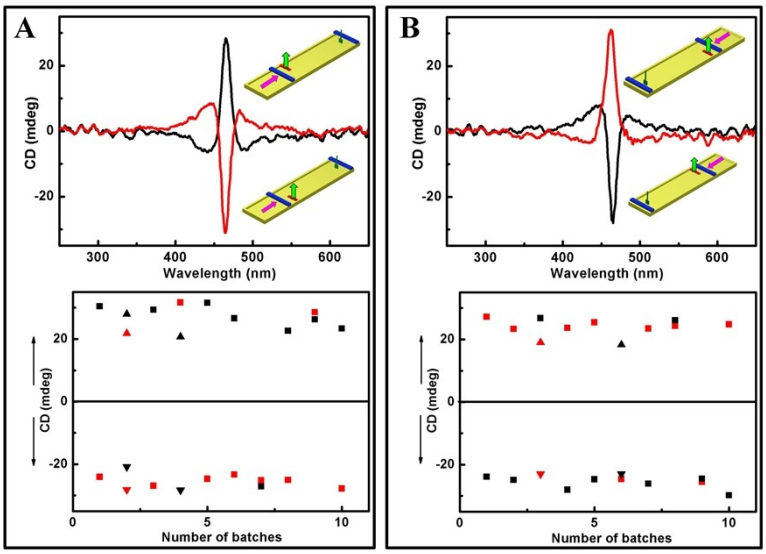

Fig. S13 The typical CD spectra (top panels) of the interfacial assemblies of TPP formed at the back (black) and front (red) side of the Langmuir trough by compression from the left-hand (A) and right-hand (B) side. The statistical distribution of the chirality signs of the samples (at ≈ 465 nm) is shown in the bottom panel of the corresponding figures. The respective formulation configurations are inserted in the corresponding panels for clarity. The symbols are the same as those denoted in Fig. S6. A compression speed of 0.2 mm/second and a moderate surface pressure of 10 mN/m were used for the construction of the assemblies.

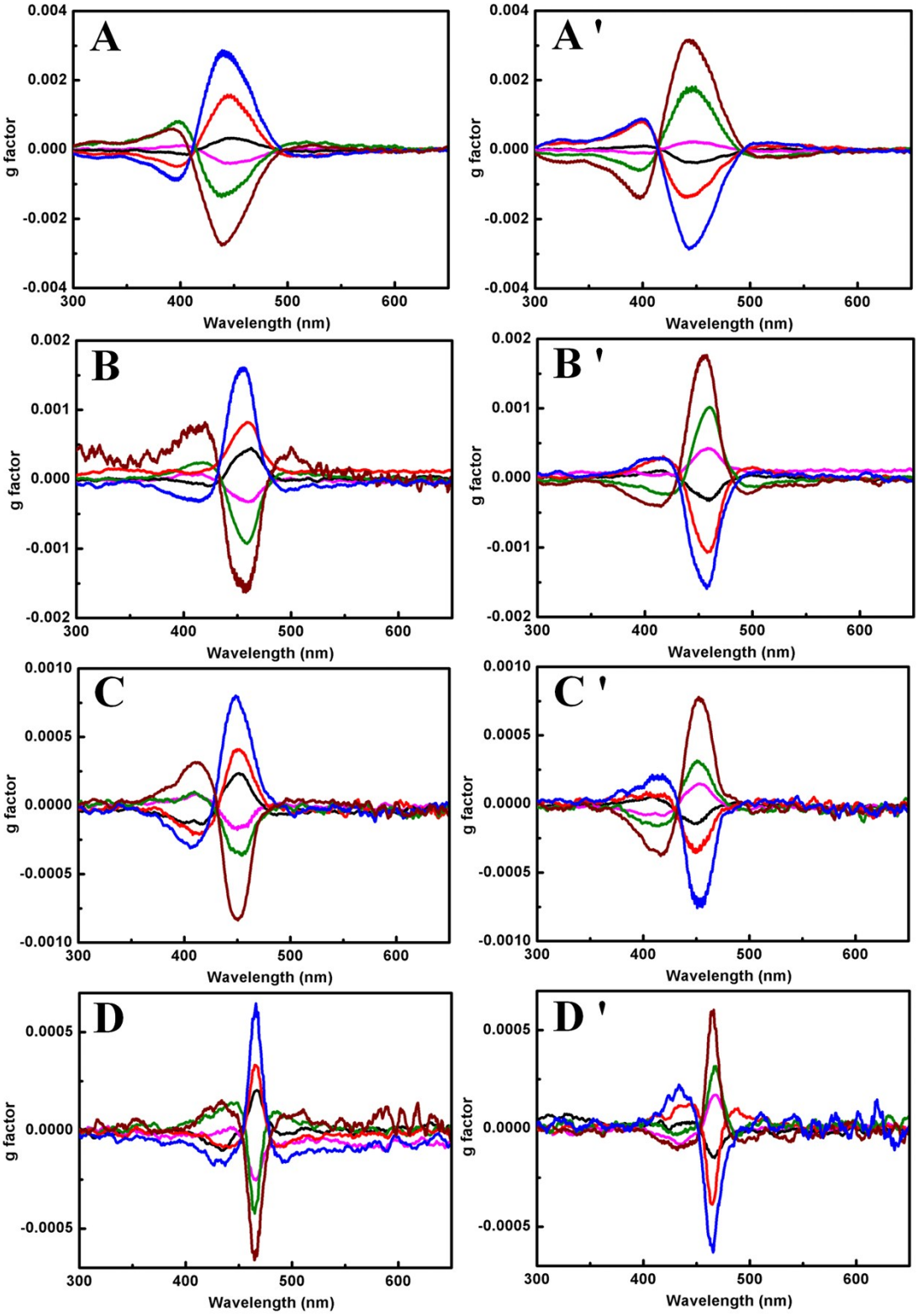

Fig. S14 The g factor spectra of the assemblies of TPPDOMe (A, A'), TPPOMe (B, B'), TPPOA (C, C') and TPP (D, D') formulated at the front (magenta, olive and wine curves) and back (black, red and blue curves) side of the trough by compression from the left-hand (A, B, C, D) and right-hand (A', B', C', D') side at the surface pressure of 2 (black and magenta curves), 10 (red and olive curves) and 30 (blue and wine curves) mNm^{-1}.

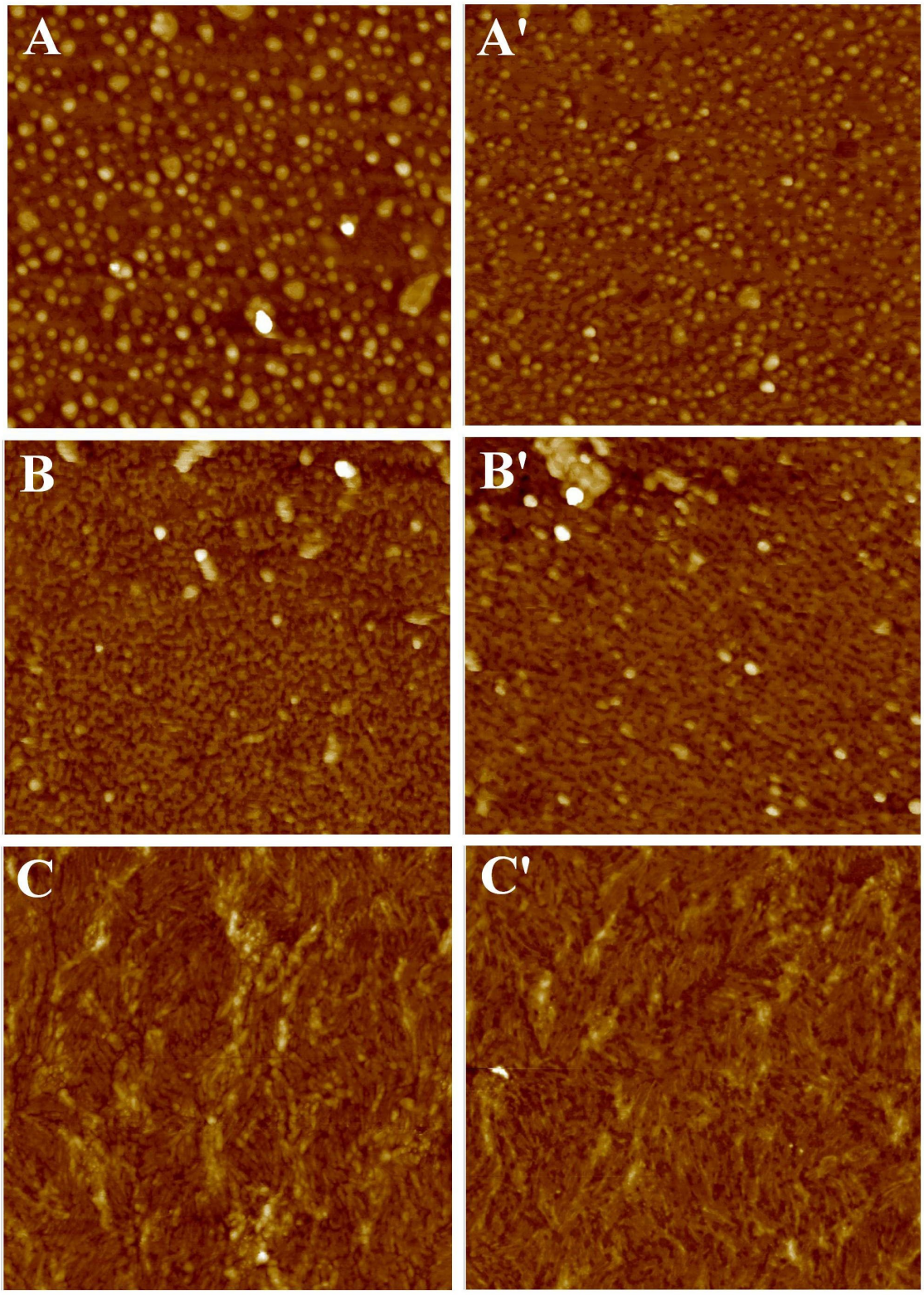

Fig. S15 AFM images of the assemblies of TPPOMe formulated at the back side of the trough at a surface pressure of 2 (A, A'), 10 (B, B'), and 30 mN/m (C, C') by compression from the left-hand (A, B, and C) and right-hand (A', B' and C') sides. Image size: 2 μm × 2 μm.