Supplementary Information for

Cross-Linked Conjugated Polymer Assemblies at Air-Water Interface through Supramolecular Bundling

Rie Wakabayashi,[a] Hiroshi Endo,[b] Seiji Shinkai,[c,d] Katsuhiko Ariga[b] and Masayuki Takeuchi*[e]

[a]*Department of Applied Chemistry, Graduate School of Engineering, Kyushu University, Motooka 744, Nishi-ku, Fukuoka 819-0395, Japan.*

[b]*Supramolecules Group, National Institute for Materials Science (NIMS), 1-1 Namiki, Tsukuba 305-0044, Japan.*

[c]*Institute for Advanced Study, Kyushu University, Fukuoka 819-0395, Japan.*

[d]*Institute of Systems, Information Technologies and Nanotechnologies (ISIT), Fukuoka 819-0385, Japan.*

[e]*Organic Materials Group, National Institute for Materials Science (NIMS), 1-2-1 Sengen, Tsukuba 305-0047, Japan.*

E-mail: Takeuchi.Masayuki@nims.go.jp

Experimantal

Materials.

All starting materials and solvents were purchased from Tokyo Kasei Chemicals or Wako Chemicals and used as received. **CP** (M_w = 48 kDa, average number of repeating units n = 73) and compound **1** were synthesized with the reported procedure.[1] **CP–1** complex was formed by adding a chloroform solution of **1** (7.3 μM) to a chloroform solution of **CP** (75.1 μM/repeating unit). Water used for the subphase was distilled and deionized using an ELGA PURELAB Life Science (resistivity > 18.0 MΩ•cm). Spectroscopic grade chloroform was used as the spreading solvent.

Other measurements.

Pressure-area (π-A) isotherms were measured at 20.0 °C using an USI system FSD-300 Langmuir trough equipped with a Wilhelmy type surface pressure sensor. Compression was commenced at a rate of 0.2 mm/s 10 min after spreading chloroform solutions of samples. Temperature of the sub-phase was controlled within 20.0 ± 0.2 °C. *In situ* UV-Vis spectra were measured with an Otsuka intensified multichannel photodetector MCPD-7000 equipped with an optical fiber. LB films were prepared using a vertical dipping method with up-stroke and down-stroke motions of 10 mm/min on a quartz substrate or a silicon wafer. AFM measurements of transferred films on silicon wafers were conducted with SII SPA-400 (tapping mode) using SII SF-D20 (16 N/m, 137 kHz).

Molecular models of adjacent polymer packing of CPs.

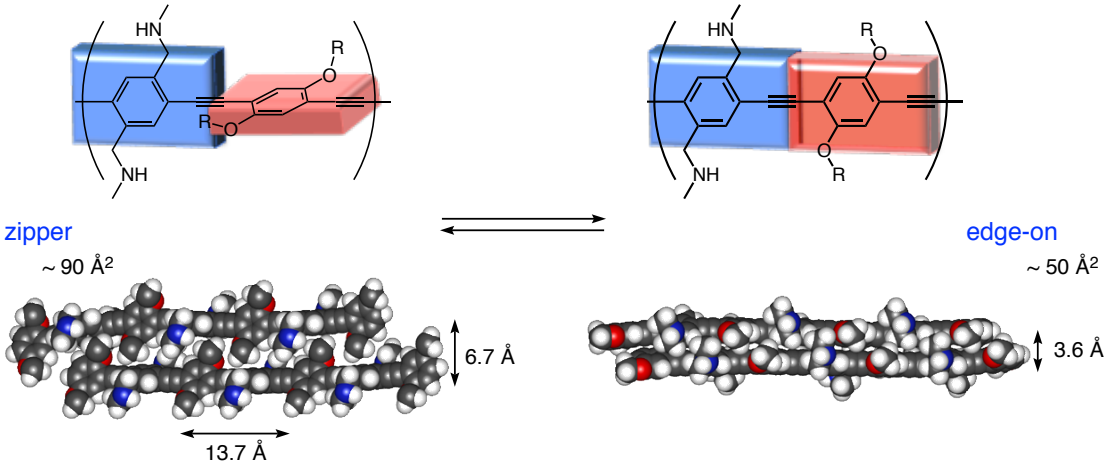

Fig. S1 Molecular models of adjacent polymer packing of **CP**.

In situ UV-Vis. spectra of CP and CP–1 under compression.

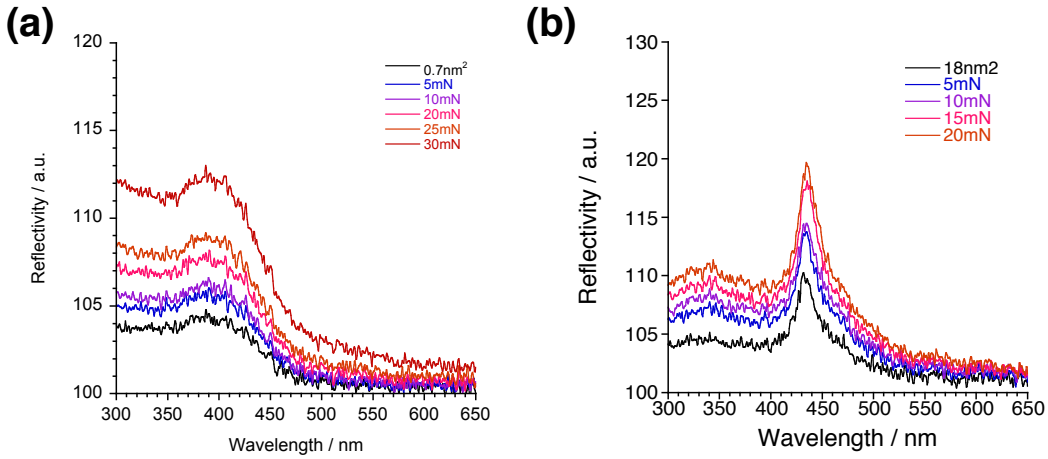

Fig. S2 In situ UV-Vis. spectra of (a) **CP** and (b) **CP–1** under compression.

Pressure–area isotherms of 1.

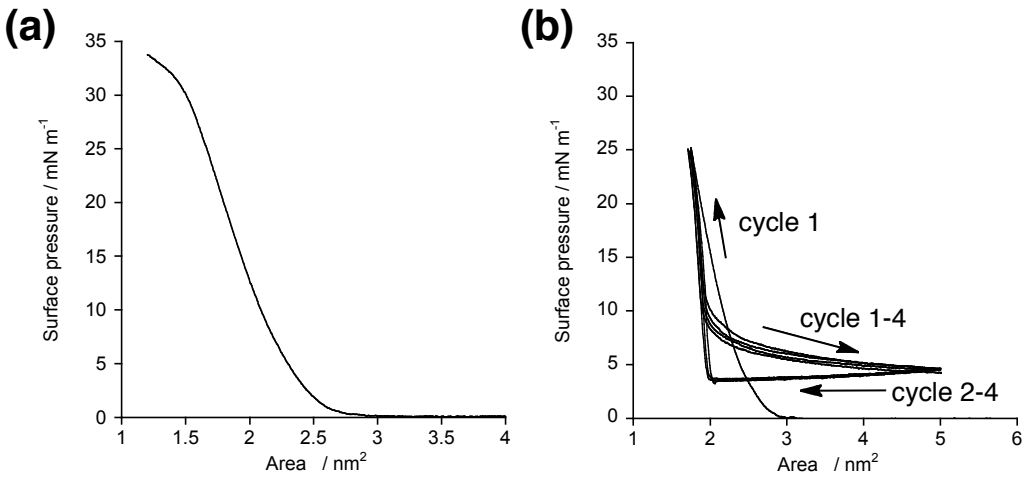

Fig. S3 Pressure–area isotherms of **1** (left: first compression, right: cyclic measurements).

Comparison of UV-Vis. spectra of CP–1 at air-water interface and in a chloroform solution.

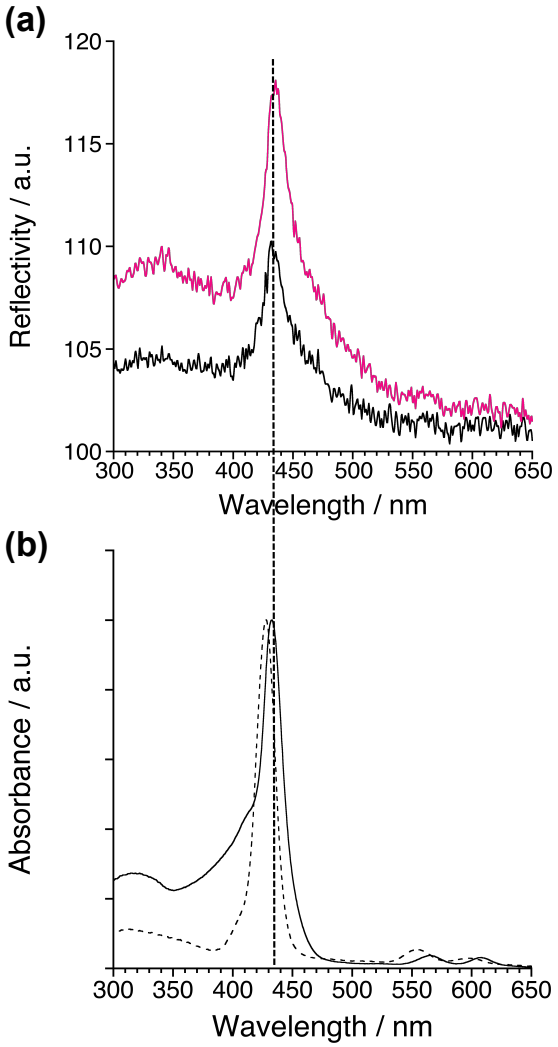

Fig. S4 (a) *in situ* UV-Vis. spectra of **CP–1** before (black) and after (pink) compression and (b) UV-Vis. spectra of **1** (dashed) and **CP–1** (solid) in chloroform. The absorption maximum wavelengths are 435 nm (a), 433 nm (b, solid) and 428 nm (b, dashed).

Polarized UV-Vis spectra of CP and CP–1.

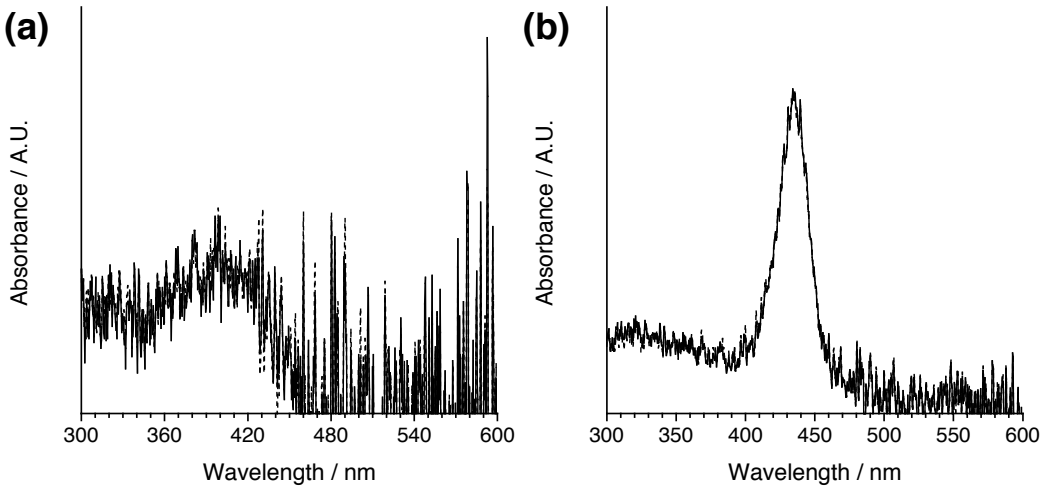

Fig. S5. Polarized UV-Vis spectra of (a) **CP** and (b) **CP–1** (dashed; perpendicular, solid; parallel to the dipped direction).

Fluorescence spectra of CP and CP–1.

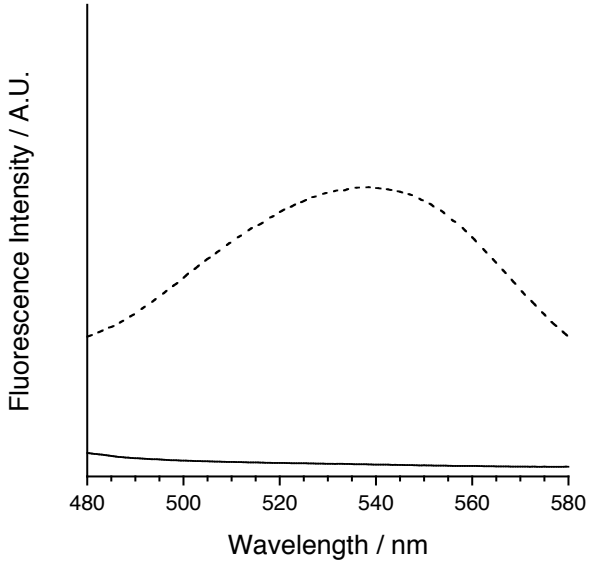

Figure S6. Fluorescent spectra on a quarts cell of **CP** (dashed) and **CP–1** (solid).

References.

1) Kubo, Y.; Kitada, Y.; Wakabayashi, R.; Kishida, T.; Ayabe, M.; Kenji, K.; Takeuchi, M.; Shinkai, S. *Angew. Chem. Int. Ed.* **2005**, *45*, 1548–1553.