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

Supporting Information

Anisotropic energy transfer in the clay-porphyrin layered system with environment-responsiveness

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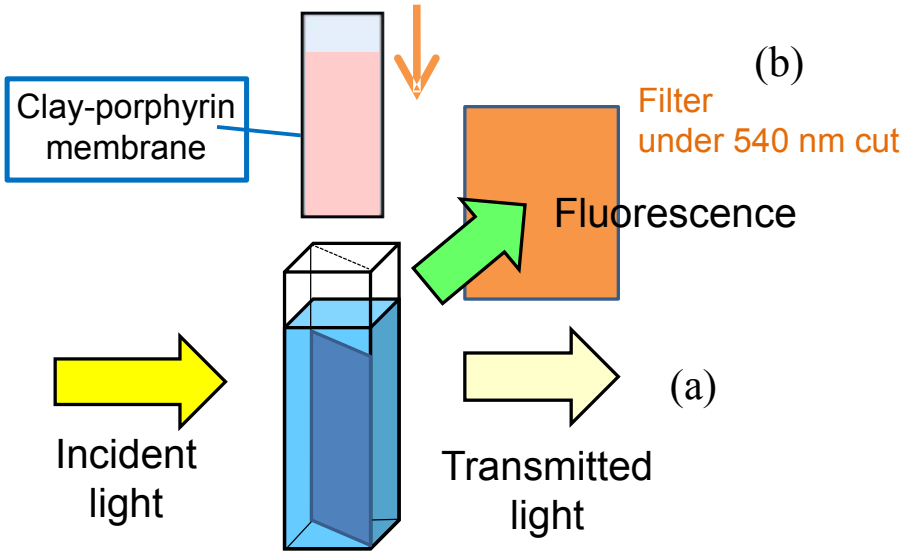


Fig. S1. Setup for measuring absorption spectra and fluorescence spectra of *m*-TMPyP and *p*-TMPyP on the clay monolayer and in the laminated system. (a) For absorption measurements. (b) For fluorescence measurements.

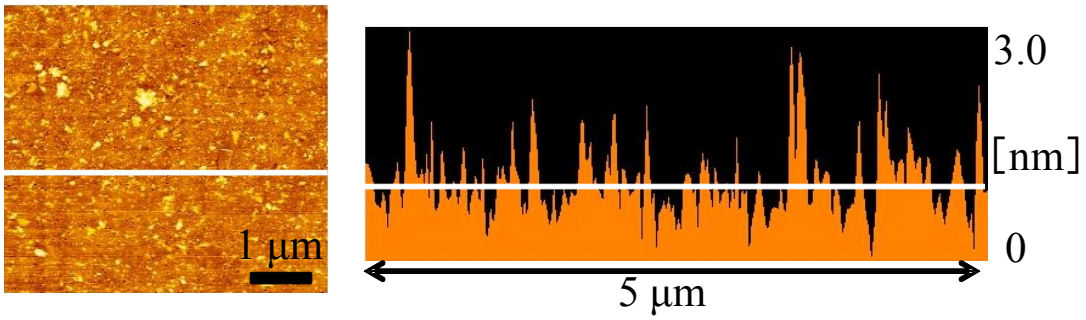


Fig. S2. AFM image of LB membrane composed of SSA on a glass plate.

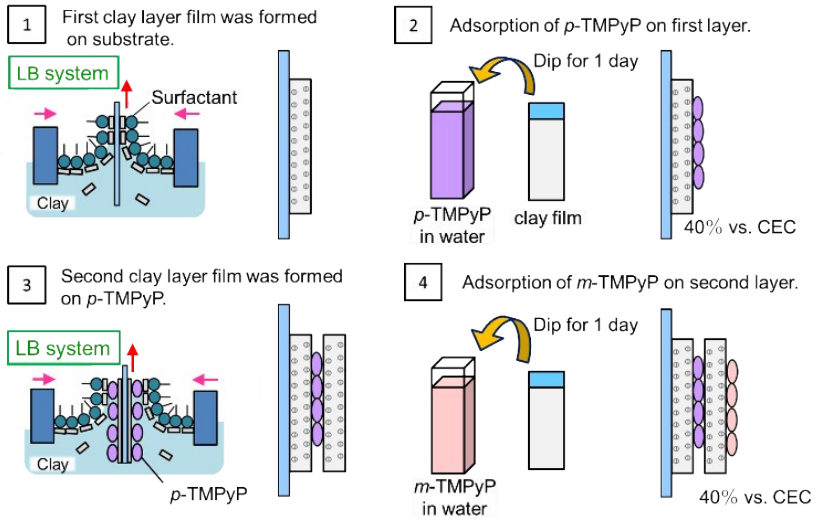
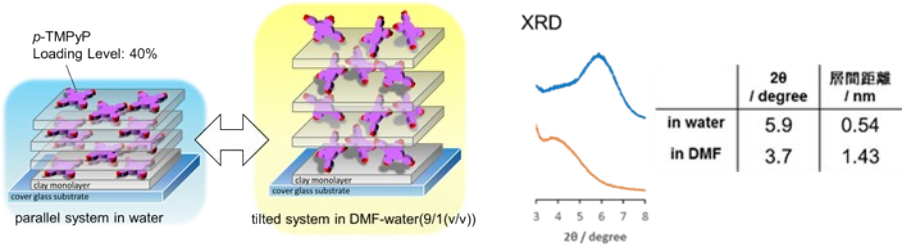


Fig. S3. LB technique to construct laminated system composed of clay sheets, *m*-TMPyP and *p*-TMPyP.



	2θ / degree	層間距離 / nm
in water	5.9	0.54
in DMF	3.7	1.43

Fig. S4. The interlayer distance of the clay-*p*-TMPyP laminated system (4 layers) in water and DMF-water (9/1(v/v)) by XRD.

Determination of η_{ET}

The luminescence quantum yield φ_D and lifetime τ_D of *m*-TMPyP as a donor were measured by *m*-TMPyP at a loading level of 1% on the clay monolayer. Using these values, the energy transfer efficiency η_{ET} was calculated.

$$F_{D+A} = \alpha F_D + \beta F_A \quad (1)$$

$$\alpha = 1 - \eta_{ET} - q_D \quad (2)$$

$$\beta = 1 + \frac{1 - 10^{A_D}}{1 - 10^{A_A}} \eta_{ET} \quad (3)$$

where, F is fluorescence spectra (D: an energy donor, A: an energy acceptor), A_D is absorbance of a donor at excitation wavelength, A_A is absorbance of an acceptor at excitation wavelength and these are used by Fitting. Then, the observed energy transfer efficiency (η_{ET}) and loss efficiency (q_D) is calculated.

Table S1. Energy Transfer Parameters in Water and DMF-Water (9/1(v/v))

	α	β	$\eta_{ET}^{observed}$	q_D
In water	0.275	4.50	60%	12%
In DMF / water (9/1(v/v))	0.780	0.606	11%	11%