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Supporting Information

Tunable aggregation-induced circularly polarized luminescence of chiral AIEgens *via* the regulation of mono-/di-substituents of molecules or nanostructures of self-assemblies

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1. General information

Materials and Instruments

Unless otherwise stated, all the solvents and regents were analytical grade and directly used without further purification after gotten from the commercial suppliers. Tetrahydrofuran (THF) was distilled from sodium in the presence of benzophenone.. NMR spectra were measured on an Agilent 400-MR DD2 NMR spectrometer and reported as parts per million (ppm) from the internal standard TMS. HRMS data were taken on a Bruker Dalton maXis mass spectrometer. Mass spectra (MS) were obtained by using Bruker AutoFlex Matrix Assisted Laser Desorption/Ionisation (MALDI) Time of Flight (TOF)-Mass Spectrometer (MALDI-TOF-MS). UV-*vis* spectra were measured from UV-2550 ultraviolet spectrophotometer. Fluorescence spectra were obtained on an F-4500 spectrofluorometer. SEM images were collected on a Zeiss-Spura55 instrument with an accelerating voltage of 5 kV. Circular dichroism (CD) spectra were measured on a JASCO J-810 spectropolarimeter. Circularly polarized luminescence (CPL) spectra were performed on a JASCO CPL-300 spectrofluoropolarimeter.

Preparation of samples for optical measurement

Several stock solutions of the compounds were firstly prepared in THF (200 μM). Then 10 μL stock solutions were transferred to 2 mL THF/H_2O mixed solvents to afford sample solutions at the concentration of 10 μM, which water fractions of the mixed solvents were from 0 to 99%. Then the optical measurements were taken after 2 hours later.

Sample Preparation of samples for SEM

Different THF/water mixtures of TPE-*L*-Glu, TPE-*D*-Glu, *cis*-TPE-*L*-DGlu and *trans*-TPE-*L*-DGlu with concentration of 10 μM were first prepared, after 2 hours later, 10 μL of the solution was then dropped onto the surface of silicon water, after vacuum drying for one hour, the samples were characterized by SEM.

2. Optical data

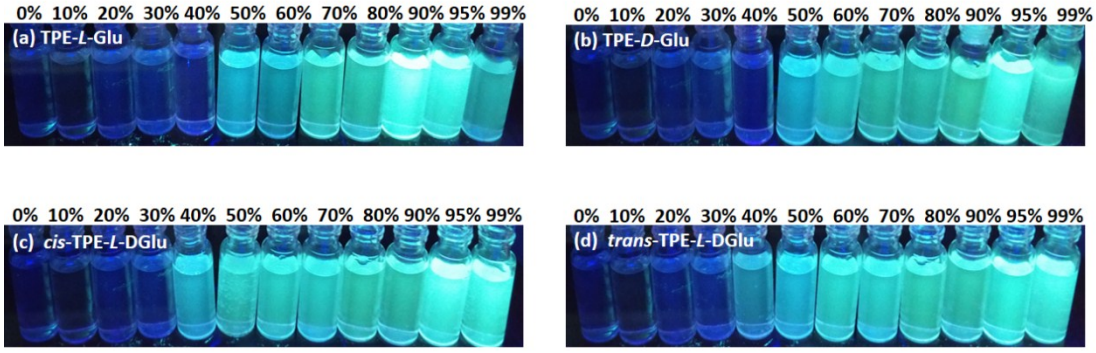


Figure S1. Photograph of A) **TPE-*L*-Glu**, B) **TPE-*D*-Glu**, C) ***cis*-TPE-*L*-DGlu** and D) ***trans*-TPE-*L*-DGlu** in THF/water mixed solvents with different f_w under 365 nm UV lamp. Concentration: 10 μM.

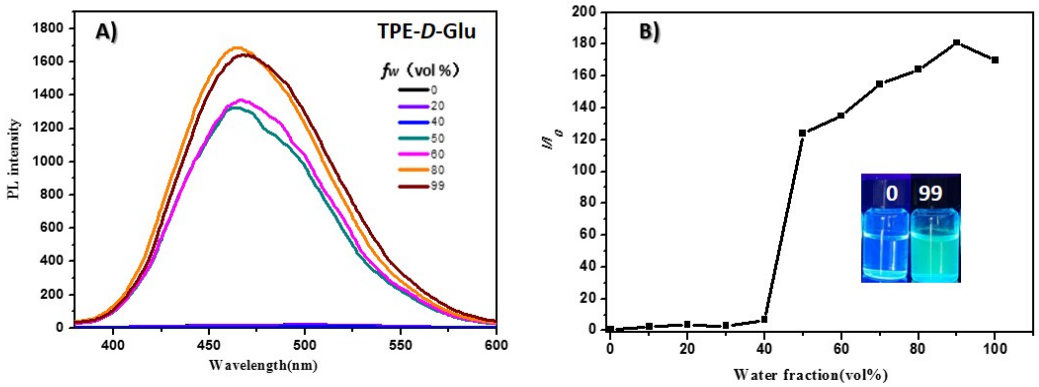


Figure S2. Fluorescent spectra of **TPE-*D*-Glu** and Plot of I/I_0 values versus f_w, where I0 represents the emission intensity in pure THF. Inset: photographs of **TPE-*D*-Glu** in THF/water mixed solvents with 0 and 99% f_w under 365 nm UV lamp. Concentration: 10 μM.

3. CPL spectra and g_{lum} values of chiral AIEgens

3.1 CPL and PL spectra of chiral AIEgens

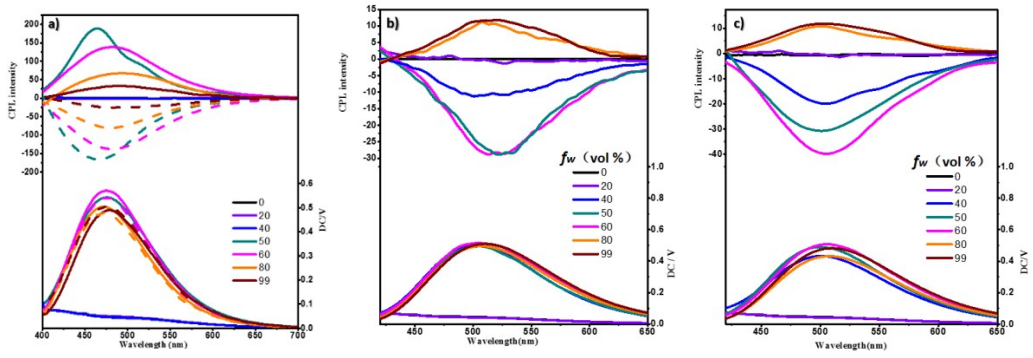


Figure S3. CPL and PL values for a) **TPE-*L*-Glu** and **TPE-*D*-Glu**, b) ***cis*-TPE-*L*-DGlu** and c) ***trans*-TPE-*L*-DGlu** in THF/water mixed solvents with different f_w. Concentration: 10 μM; excitation wavelength: 340 nm.

3.2 g_{lum} values of chiral AIEgens

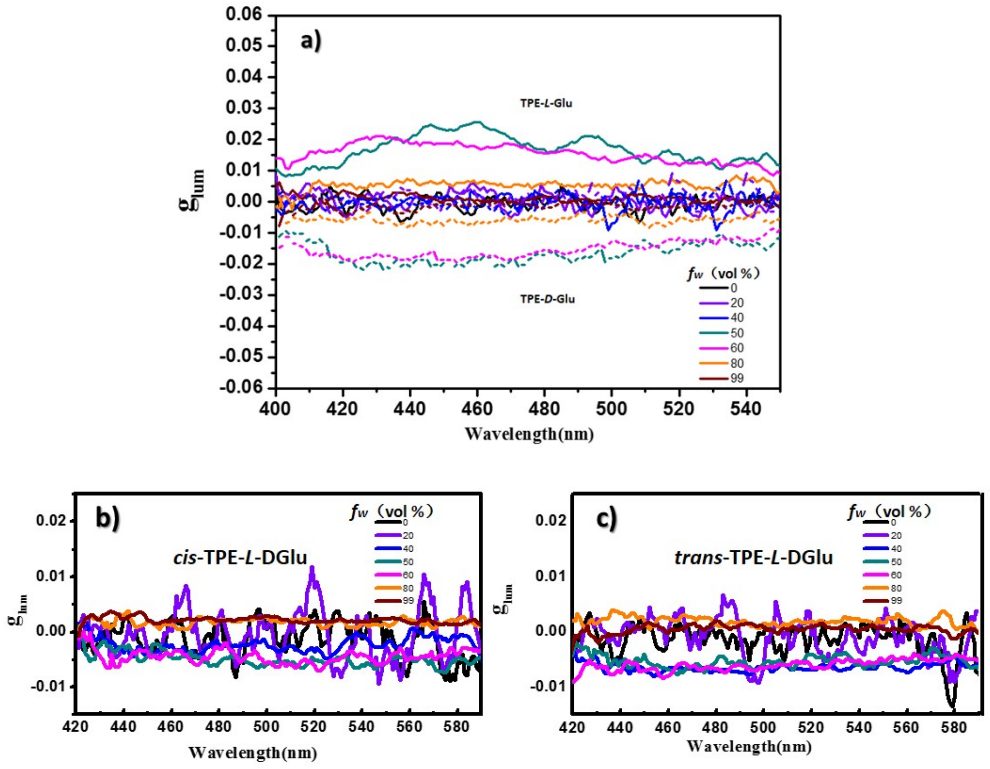


Figure S4. g_{lum} values versus wavelengths for a) **TPE-*L*-Glu** and **TPE-*D*-Glu**, b) ***cis*-TPE-*L*-DGlu** and ***trans*-TPE-*L*-DGlu** in THF/water mixed solvents with different f_w. Concentration: 10 μM; excitation wavelength: 340 nm.

4. Morphologies of the aggregates

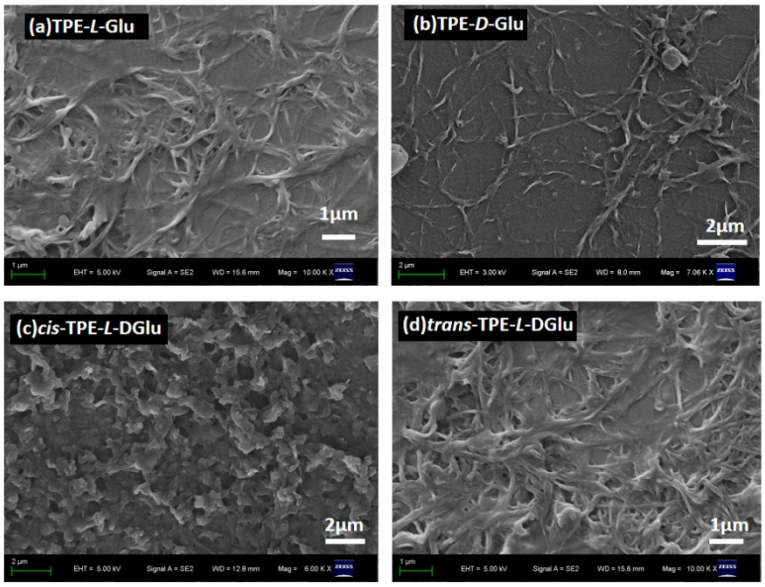


Figure S5. SEM images of aggregates of (a) **TPE-*L*-Glu**, (b) **TPE-*D*-Glu**, (c) ***cis*-TPE-*L*-DGlu** and (d) ***trans*-TPE-*L*-DGlu** formed in **20%** f_w mixed THF/water mixed solvents. Concentration: 10 μM.

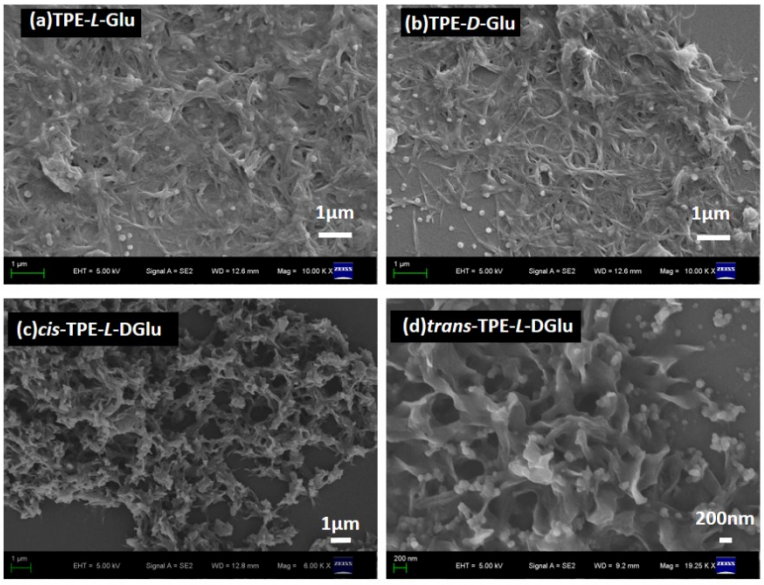


Figure S6. SEM images of aggregates of (a) **TPE-*L*-Glu**, (b) **TPE-*D*-Glu**, (c) ***cis*-TPE-*L*-DGlu** and (d) ***trans*-TPE-*L*-DGlu** formed in **60%** f_w mixed THF/water mixed solvents. Concentration: 10 μM.

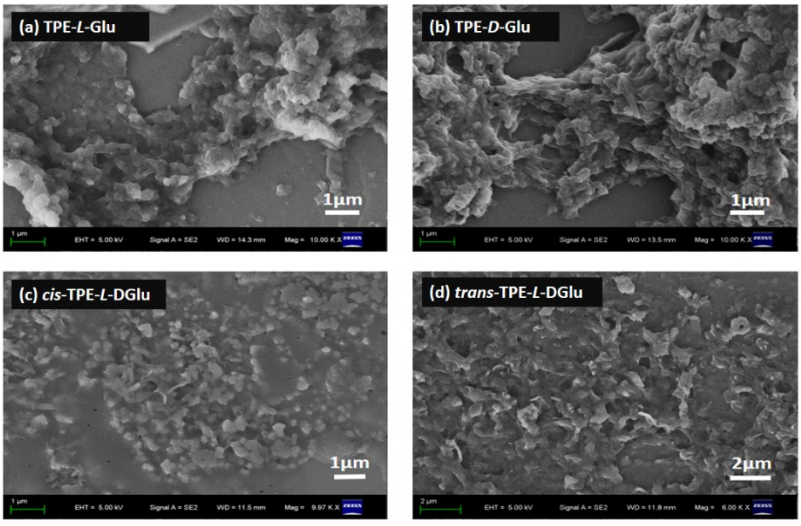
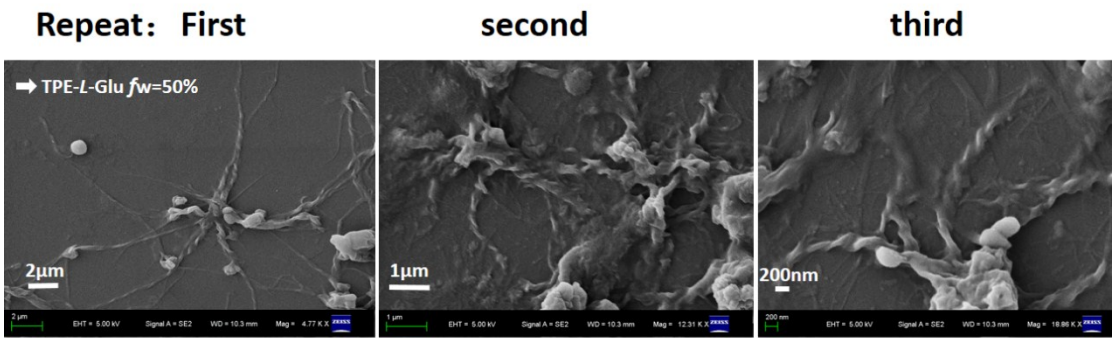


Figure S7. SEM images of aggregates of (a) **TPE-*L*-Glu**, (b) **TPE-*D*-Glu**, (c) ***cis*-TPE-*L*-DGlu** and (d) ***trans*-TPE-*L*-DGlu** formed in **99%** f_w mixed THF/water mixed solvents. Concentration: 10 μM.



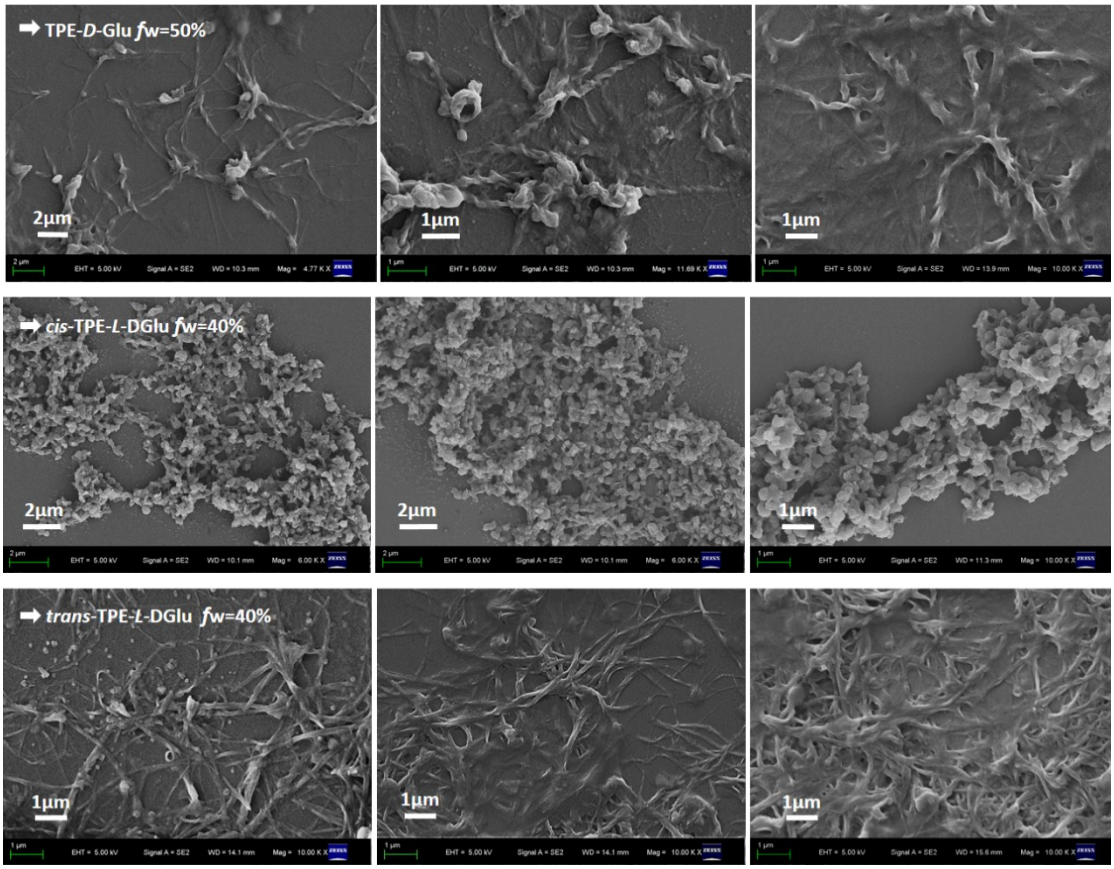


Figure S8. SEM images of aggregates of **TPE-*L*-Glu** and **TPE-*D*-Glu** formed in THF/water mixed solvents (5/5, v/v), ***cis*-TPE-*L*-DGlu** and ***trans*-TPE-*L*-DGlu** formed in THF/water mixed solvents (6/4, v/v). Concentration: 10 μM. The above experiments were repeated three times under the same conditions.

5. NMR spectra

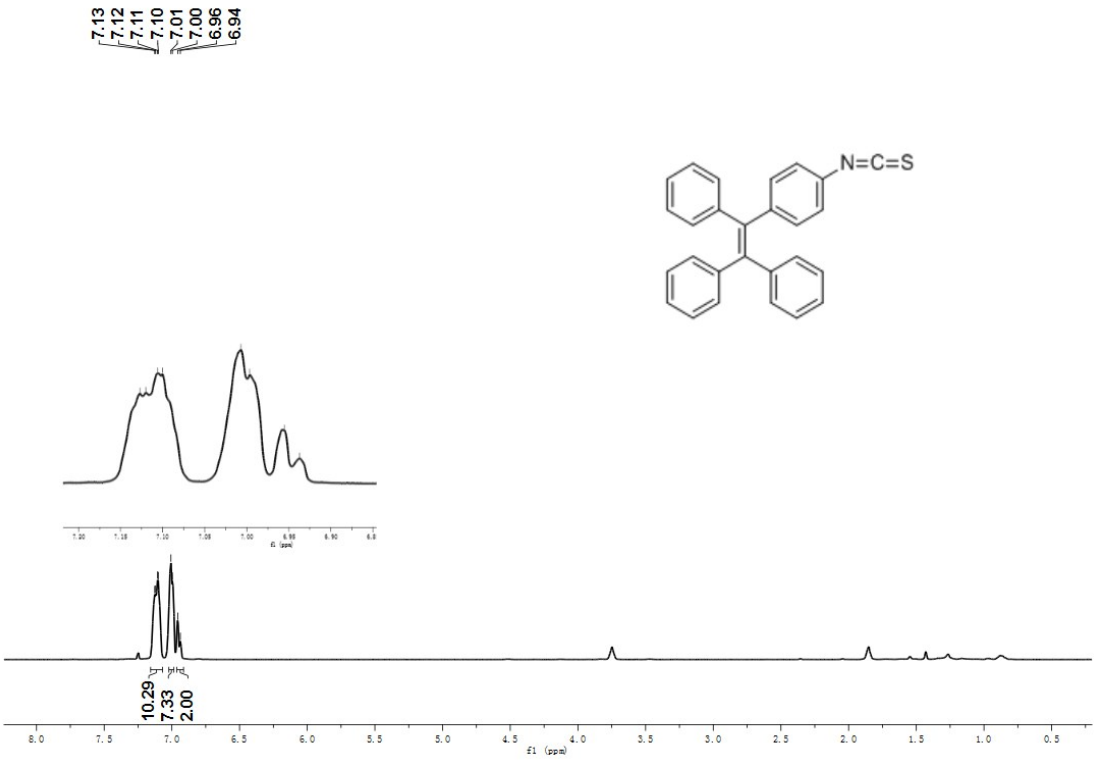


Figure S9. ^{1}H NMR of compound **3** in $CDCl_3$

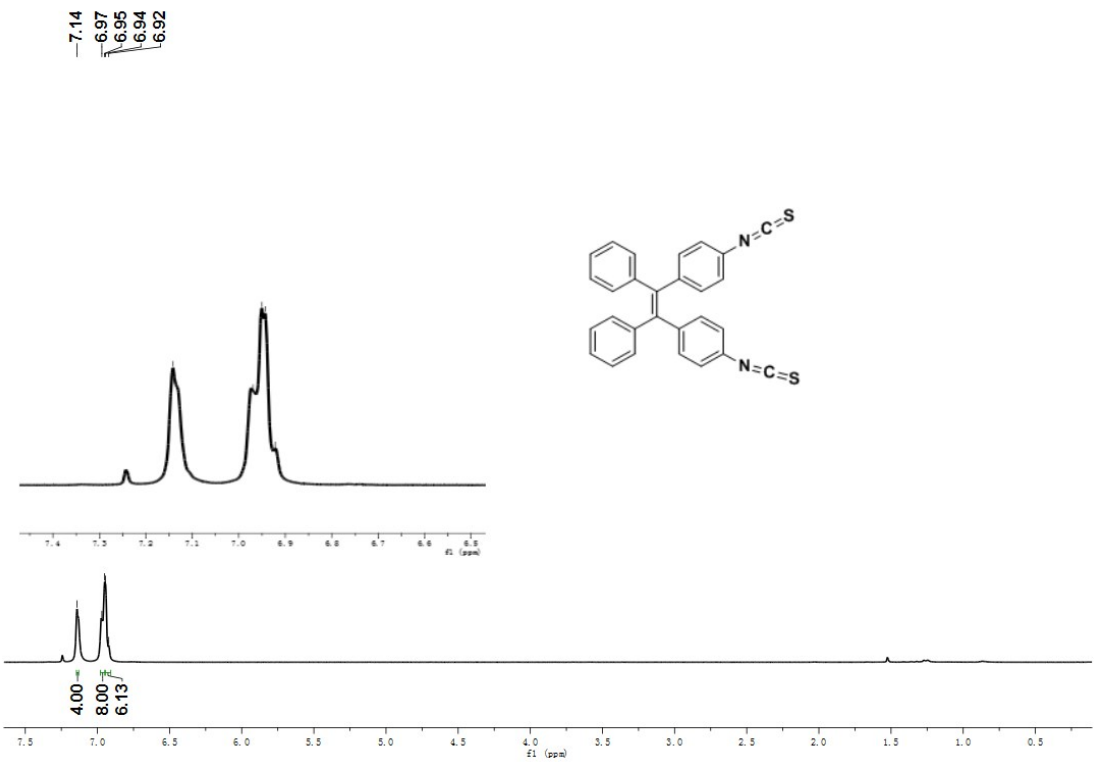


Figure S10. ^{1}H NMR of *cis*-**4** in $CDCl_3$

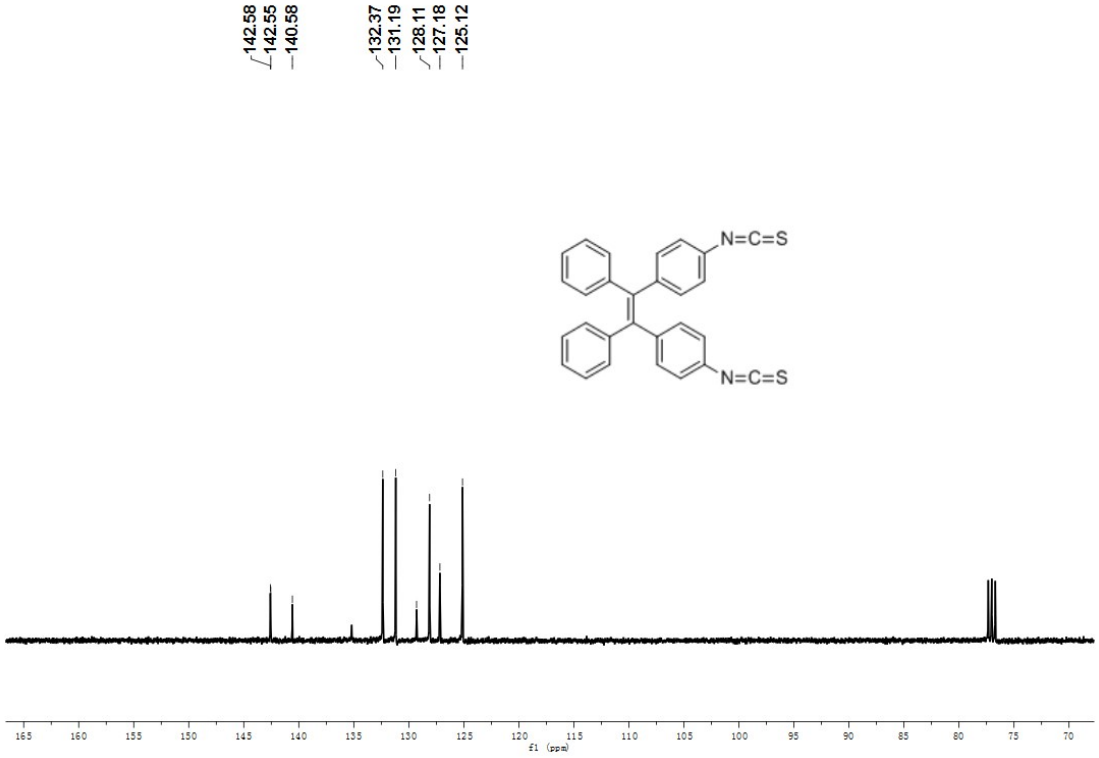


Figure S11. ^{13}C NMR of *cis*-4 in $CDCl_3$

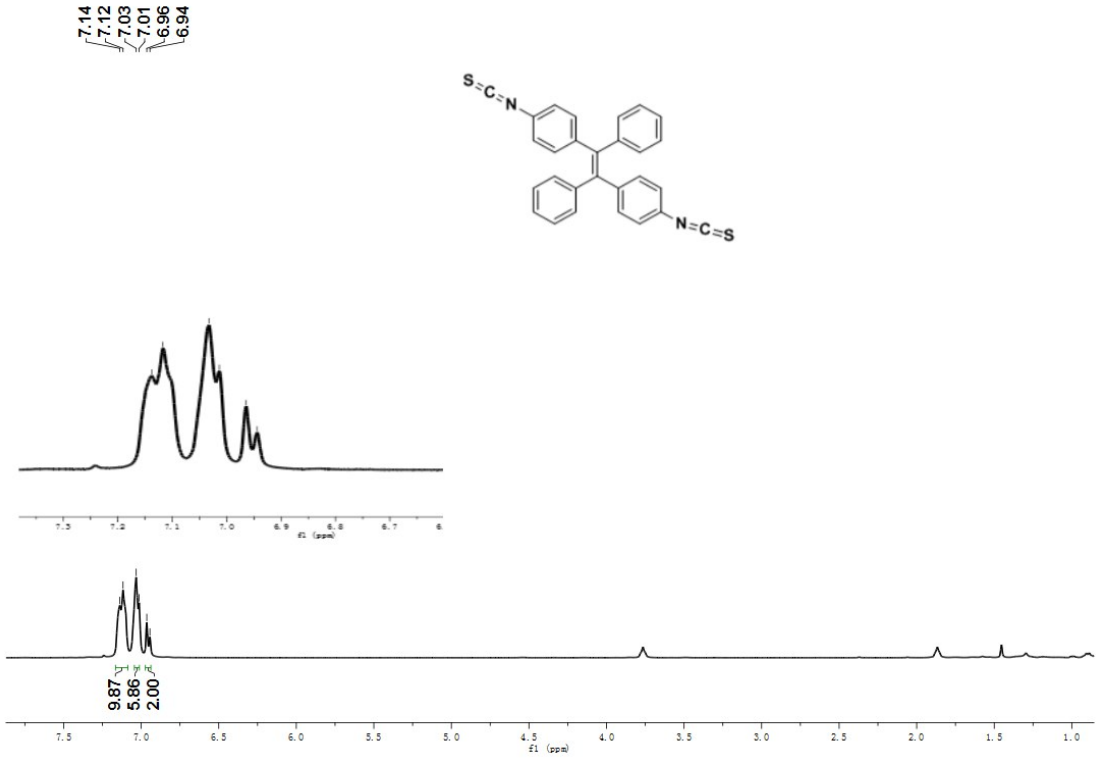


Figure S12. ^{1}H NMR of *trans*-**4** in $CDCl_3$

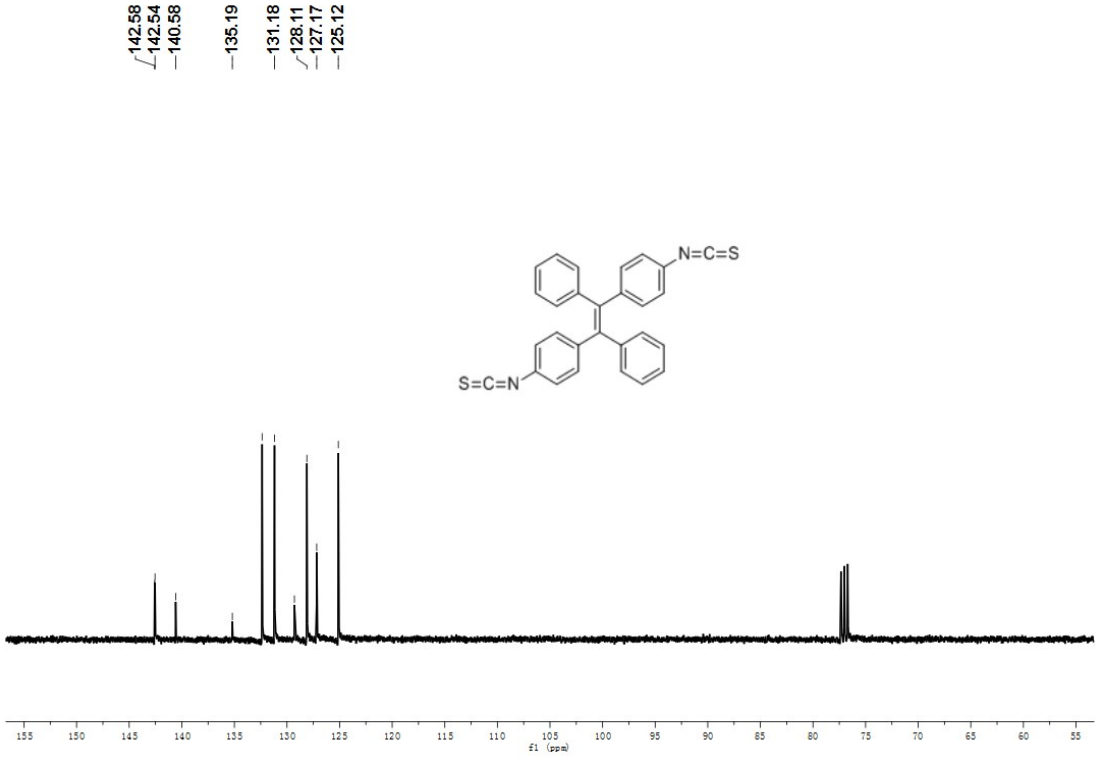


Figure S13. ^{1}H NMR of *trans*-**4** in $CDCl_3$

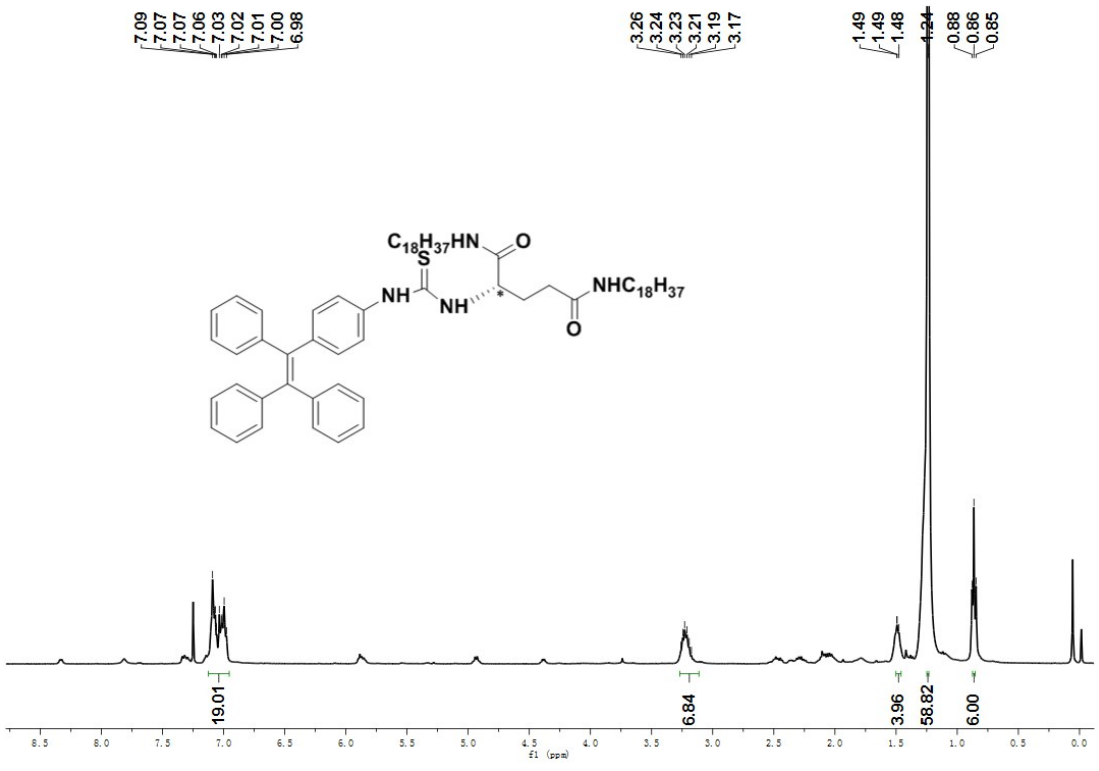


Figure S14. ^{1}H NMR of **TPE-*L*-Glu** in $CDCl_3$

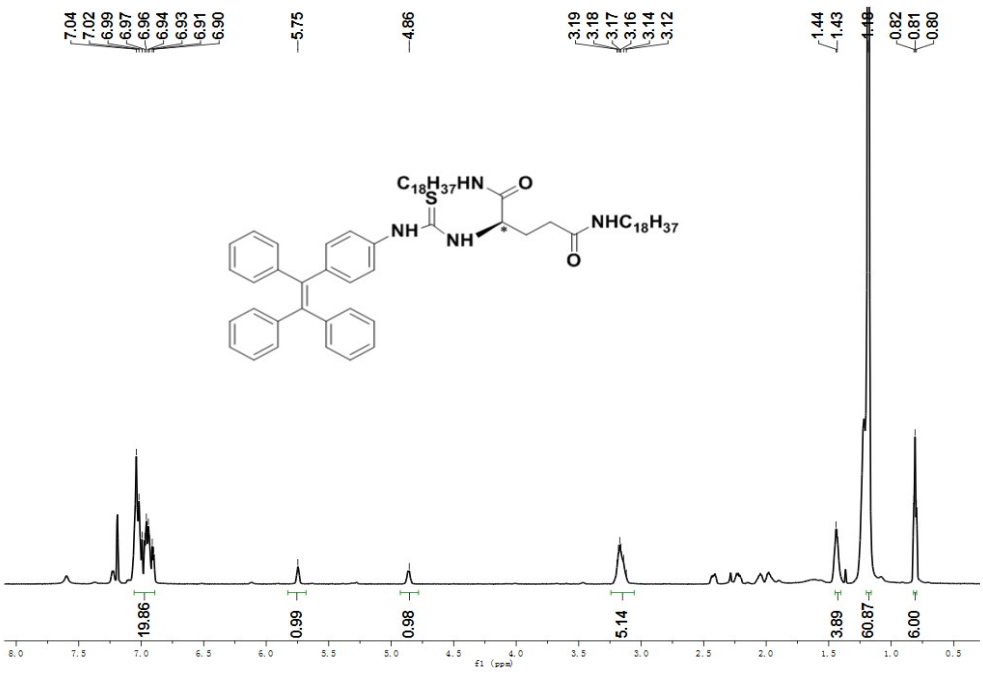


Figure S15. ^{1}H NMR of **TPE-*D*-Glu** in $CDCl_3$

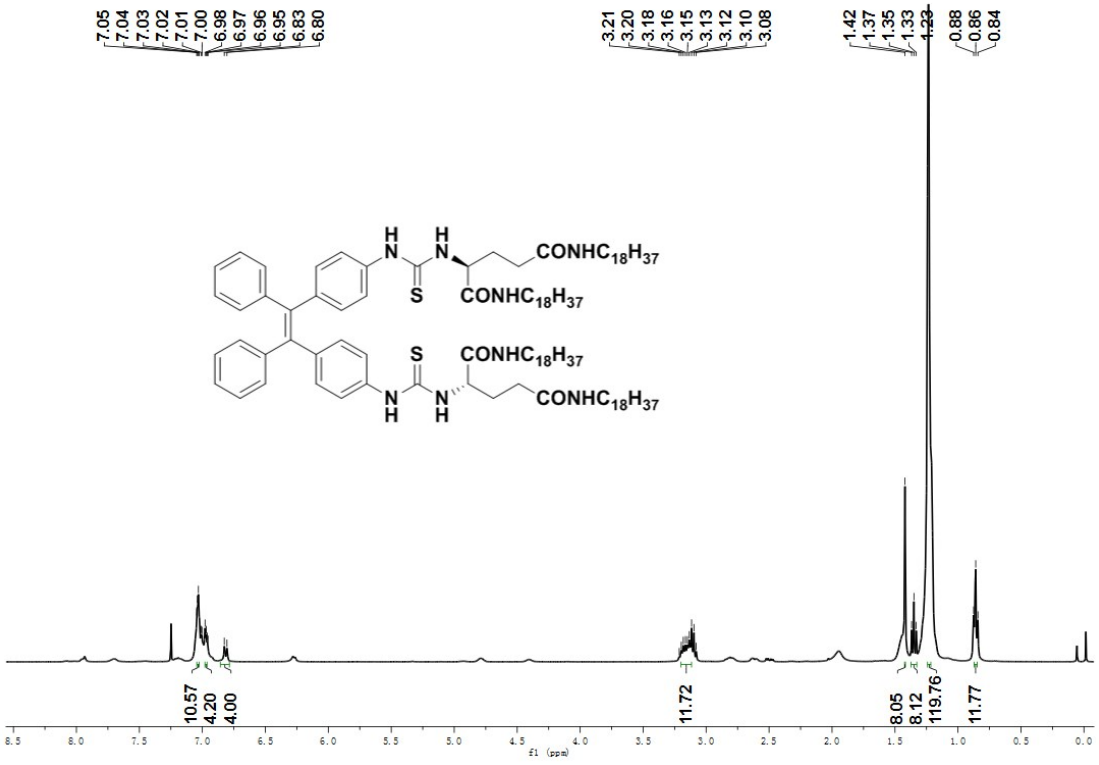


Figure S16. ^{1}H NMR of ***cis*-TPE-*L*-DGlu** in $CDCl_3$

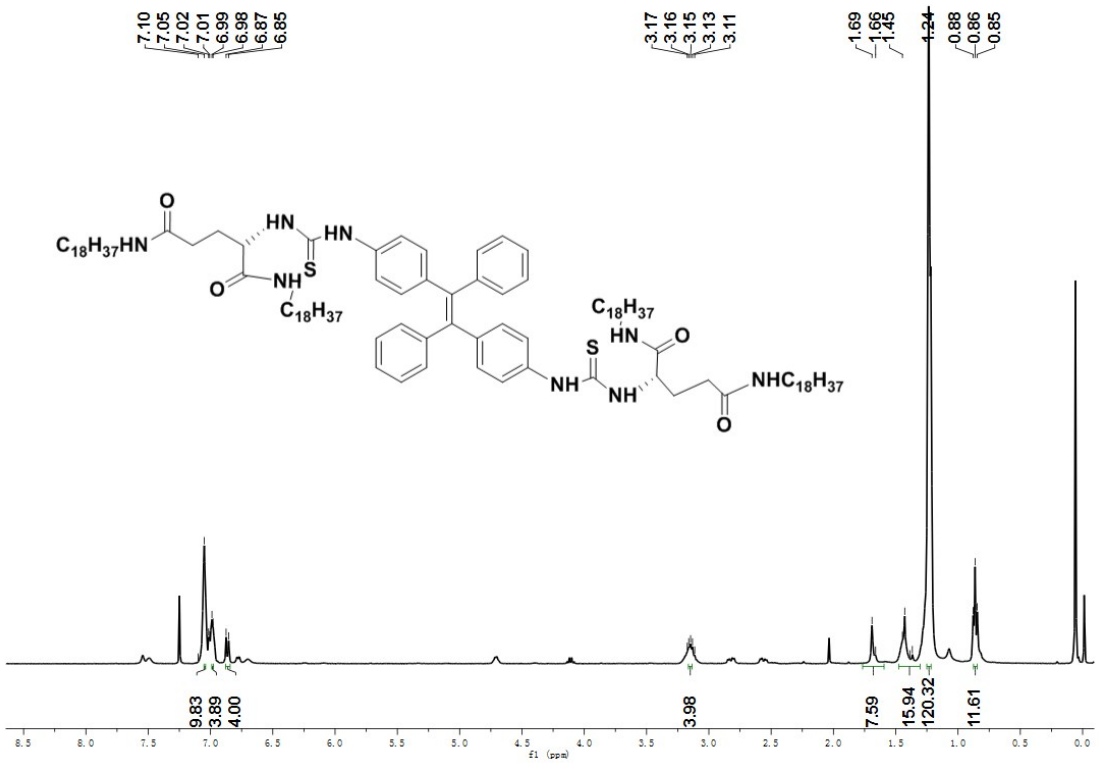


Figure S17. ^{1}H NMR spectrum of ***trans*-TPE-*L*-DGlu** in $CDCl_3$