

Electronic Supplementary Information

**Chiral ionic liquid-mediated photochirogenesis. Enantiodifferentiating
photocyclodimerization of 2-anthracenecarboxylic acid**

**Gaku Fukuhara,*^a Takahiro Okazaki,^a Marco Lessi,^b Masaki Nishijima,^c Cheng
Yang,^a Tadashi Mori,^a Andrea Mele,^{d,e} Fabio Bellina,^b Cinzia Chiappe*^b and
Yoshihisa Inoue*^a**

^a *Department of Applied Chemistry, Osaka University, 2-1 Yamada-oka, Suita 565-0871, Japan.
Fax: +81 6 6879 7923, Tel: +81 6 6879 7922, E-mail: gaku@chem.eng.osaka-u.ac.jp;
inoue@chem.eng.osaka-u.ac.jp*

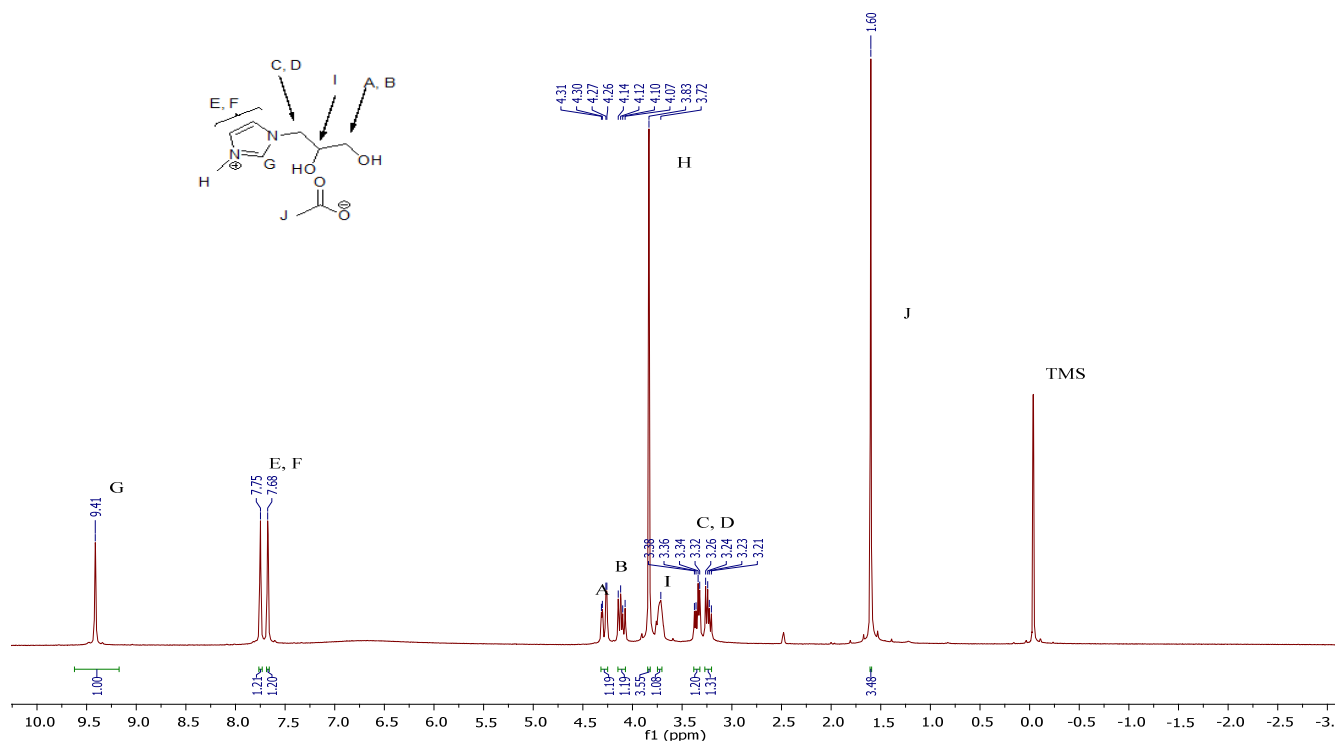
^b *Dipartimento di Chimica e Chimica Industriale, Università di Pisa, via Bonanno 33, 56126 Pisa,
Italy. Fax: (+39) 050 2219669, Tel: (+39) 050 2219660, E-mail: cinziac@farm.unipi.it*

^c *Center for Advanced Science and Innovation, Osaka University, 2-1 Yamada-oka, Suita, 565-0871,
Japan*

^d *Dipartimento di Chimica, Materiali e Ingegneria Chimica "G. Natta", Politecnico di Milano, via
Mancinelli 7, 20131 Milano, Italy*

^e *CNR – Istituto di Chimica del Riconoscimento Molecolare, via L. Mancinelli 7, 20131 Milano, Italy.*

a)



b)

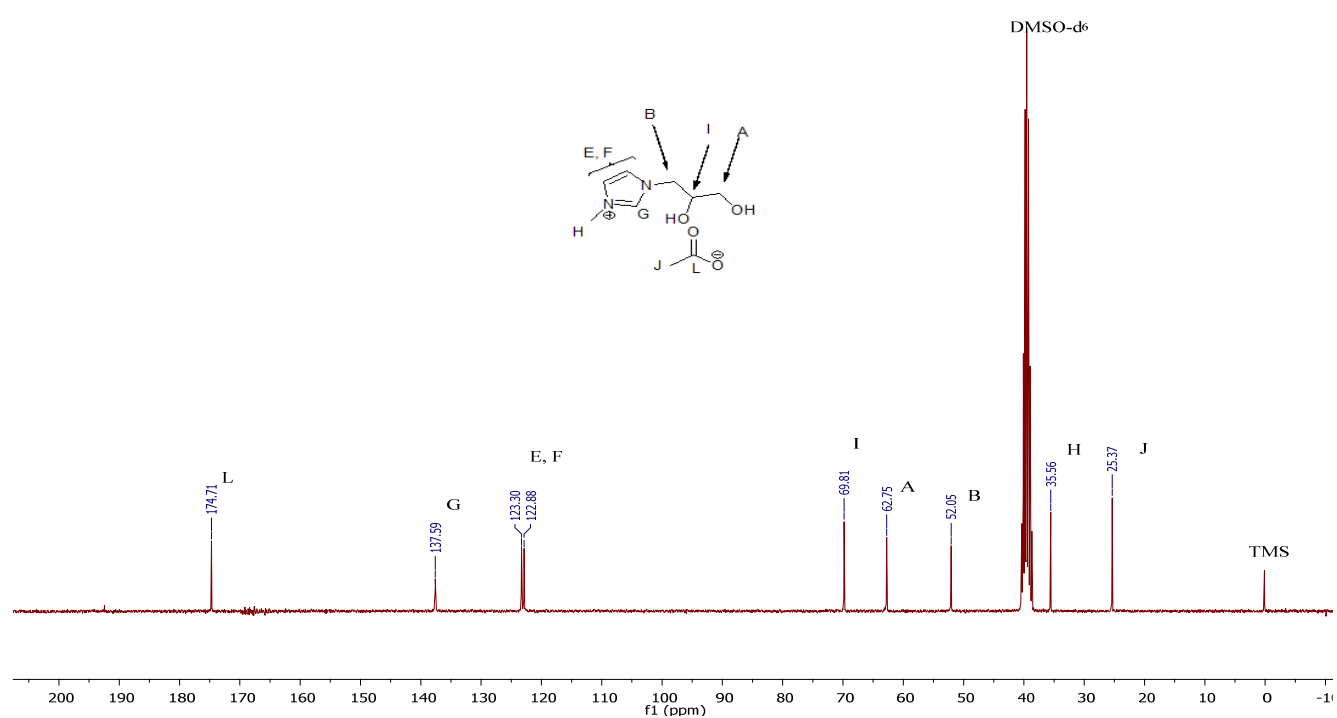


Fig. S1 (a) ¹H and (b) ¹³C NMR spectra of [(R)-GLYMI][AcO] in DMSO-d₆ at room temperature.

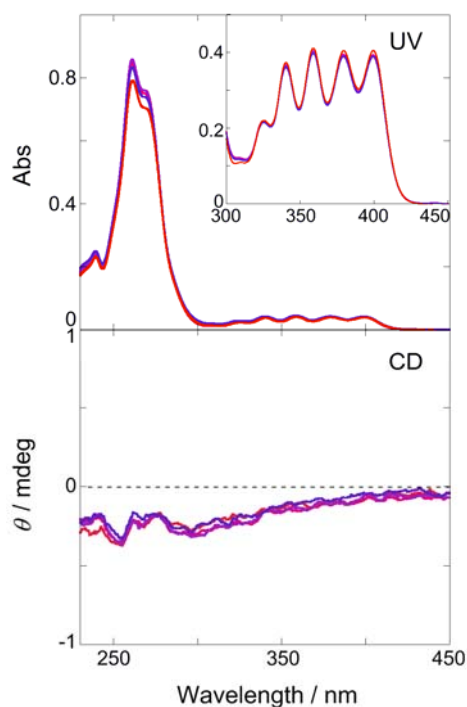


Fig. S2 UV/vis (top) and CD (bottom) spectra of a dichloromethane solution of 0.1 mM AC-H upon addition of (*R*)-(-)-1,2-propanediol (0, 0.05, 0.10, 0.20, 0.80 mM; from red to blue) at 25 °C, measured in a 1-mm cell. Inset: magnification of the 1L_a and 1L_b band region measured in a 10-mm cell.

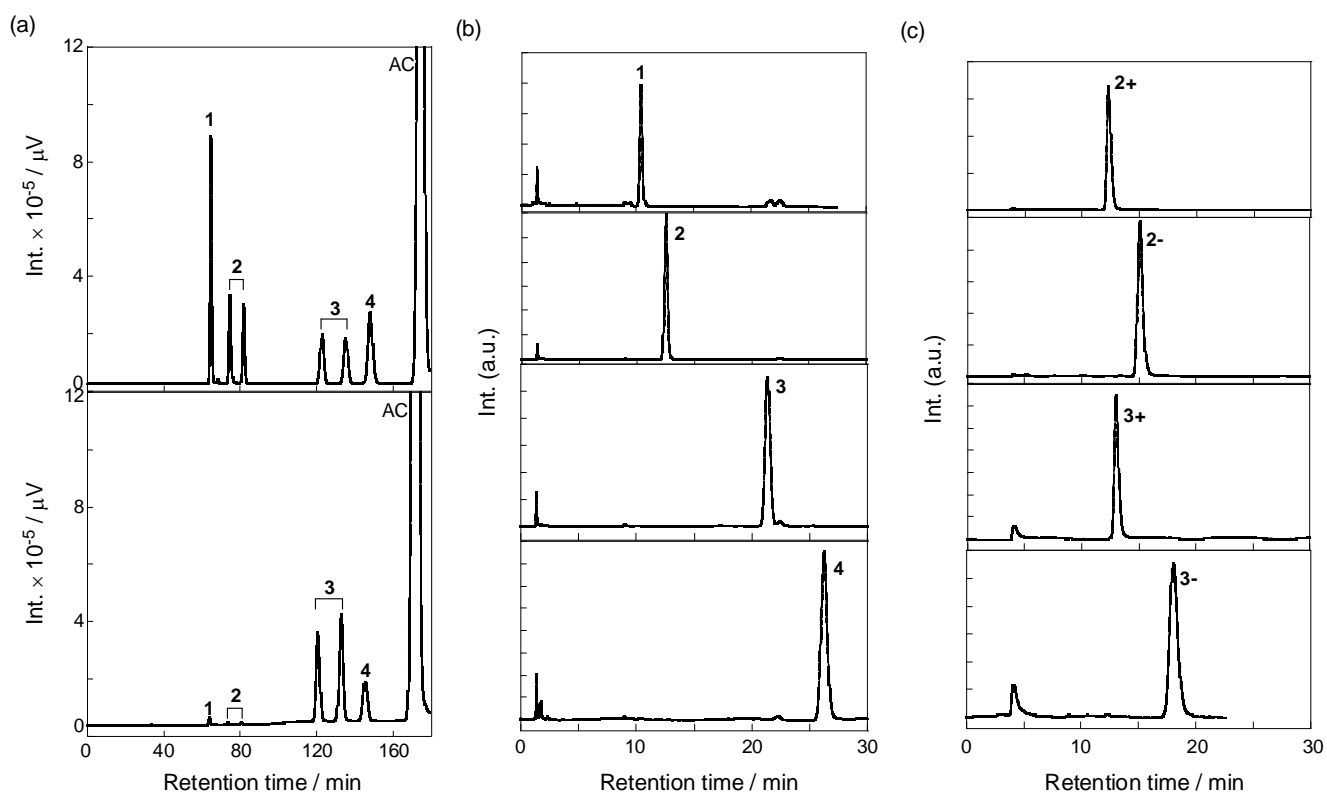


Fig. S3 (a) Typical chiral HPLC (the tandem column system: see Instruments section) chromatogram of the dichloromethane solutions of AC-H photoirradiated in the absence (top) and presence (bottom) of [(*R*)-GLYMI][AcO] at -90 °C. (b) HPLC chromatogram (column: ODS) of the separated cyclodimers **1-4**. (c) HPLC chromatogram (column: OJ-RH) of the separated enantiomerically pure cyclodimers **2** and **3**.

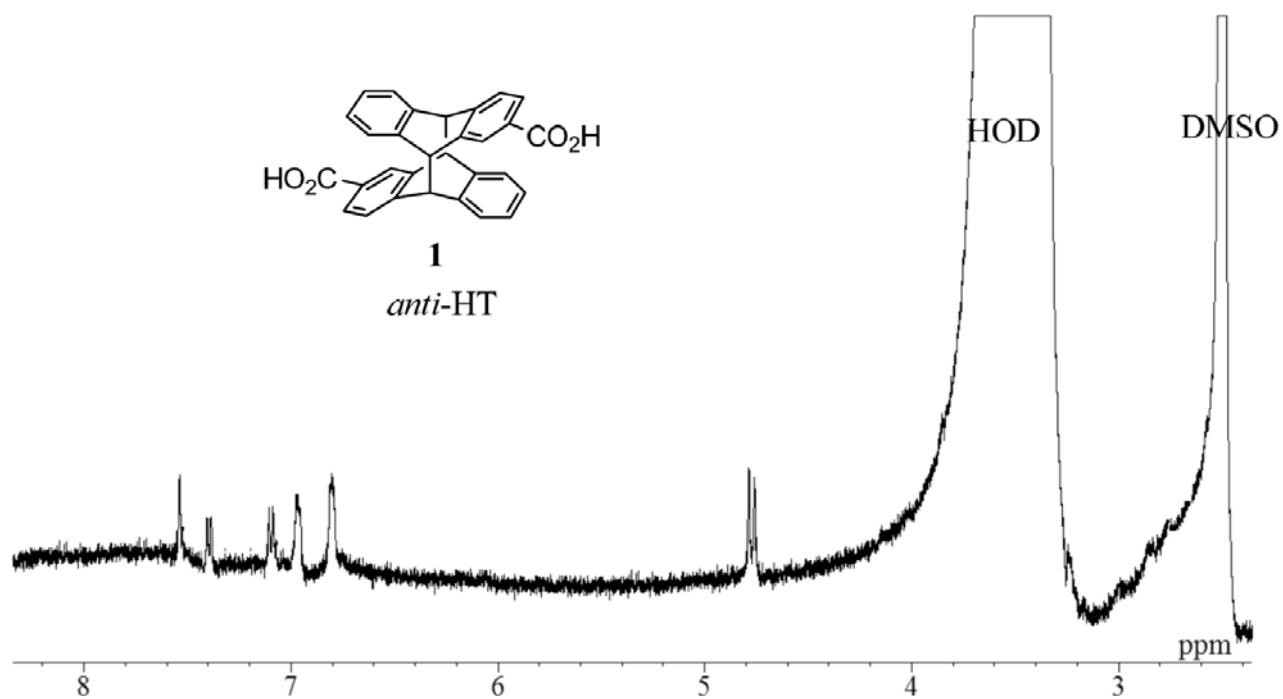


Fig. S4 ¹H NMR spectrum of cyclodimer **1** in a 1:1 mixture of D₂O and DMSO-*d*₆ at room temperature.

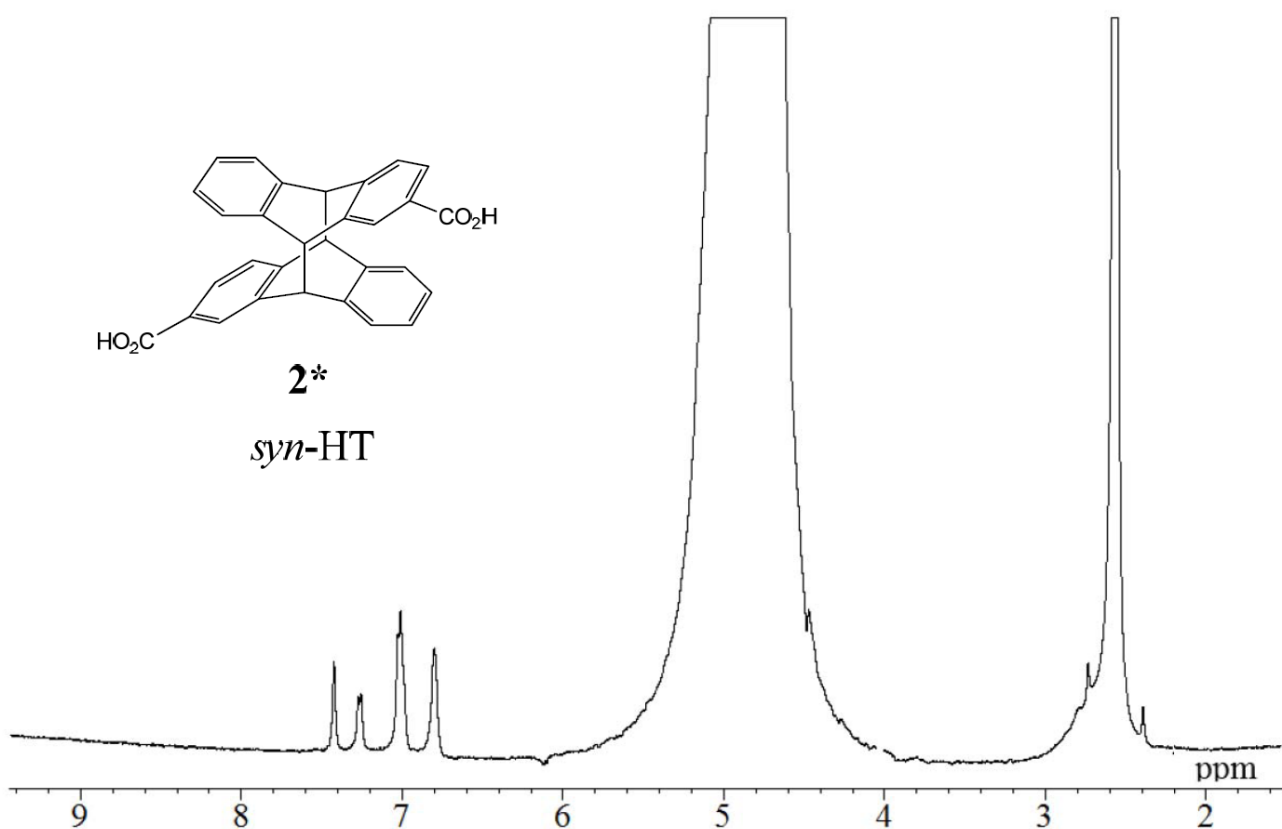


Fig. S5 ¹H NMR spectrum of cyclodimer **2** in a 1:1 mixture of D₂O and DMSO-*d*₆ at room temperature.

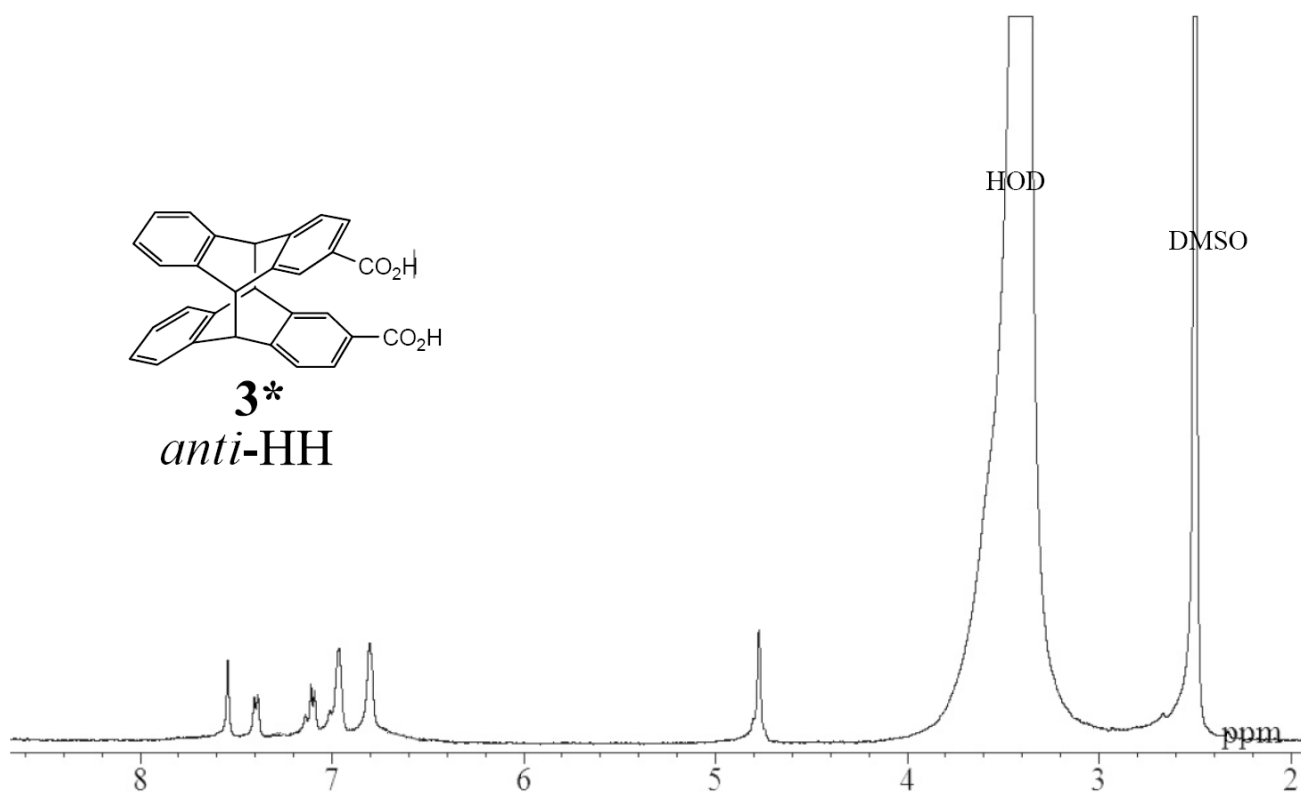


Fig. S6 ^1H NMR spectrum of cyclodimer **3** in a 1:1 mixture of D_2O and $\text{DMSO-}d_6$ at room temperature.

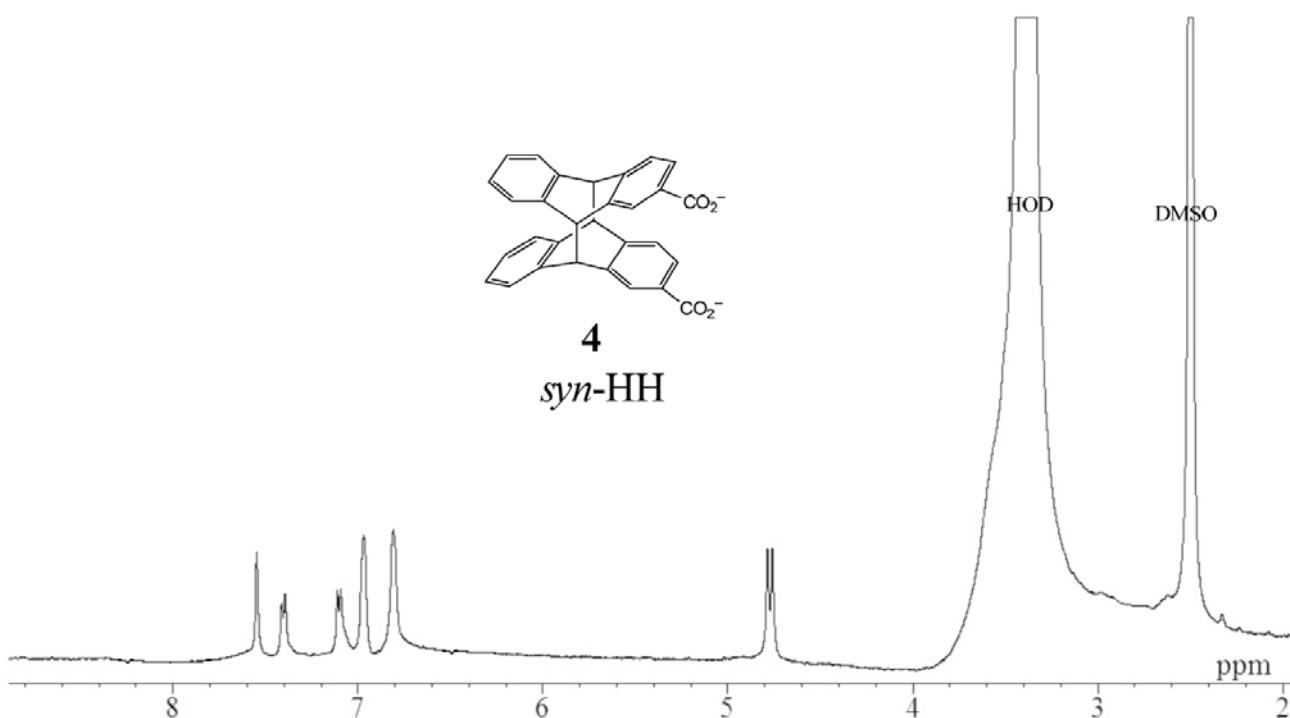


Fig. S7 ^1H NMR spectrum of cyclodimer **4** in a 1:1 mixture of D_2O and $\text{DMSO-}d_6$ at room temperature.

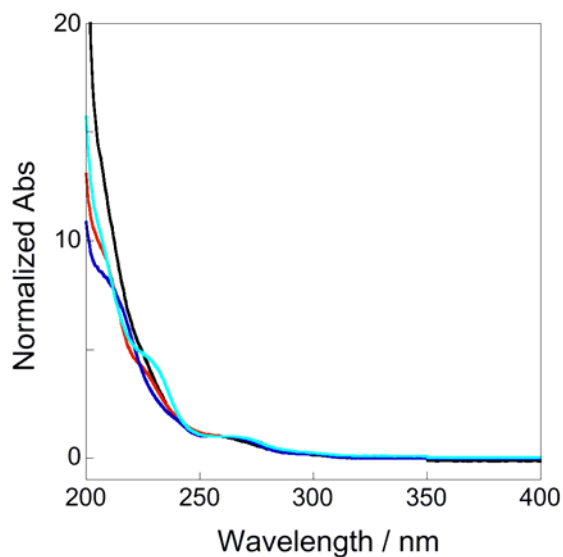


Fig. S8 UV spectra of cyclodimer **1** (black), **2** (red), **3** (blue) and **4** (light blue), normalized at 260 nm, in MeOH.

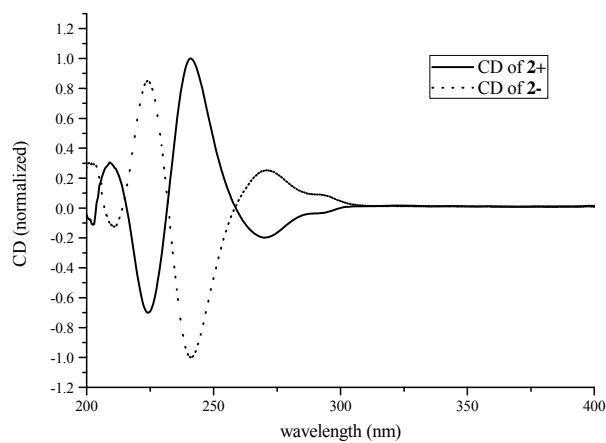


Fig. S9 CD spectra for **2+** (solid line), **2-** (dotted line) in MeOH.

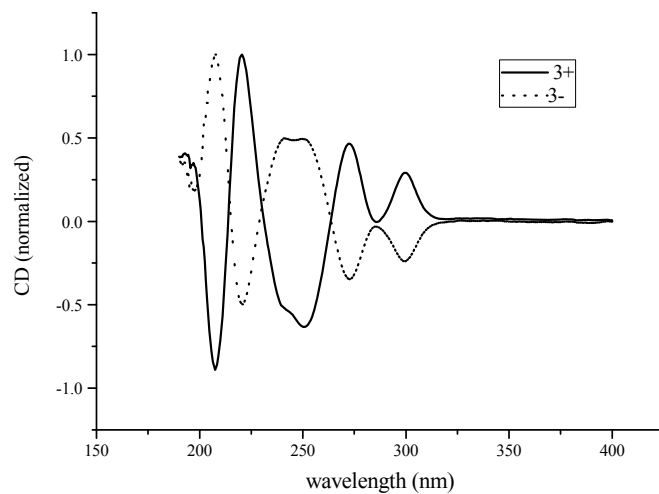


Fig. S10 CD spectra for **3+** (solid line), **3-** (dotted line) in MeOH.