Electronic Supplementary Information for

Trans-Cis configuration regulated Supramolecular Polymer Gels and Chirality Transfer based on a Bolaamphiphilic Histidine and Dicarboxylic Acids

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1. Experimental section

Materials:

The bolaamphiphile containing L-histidine (BolaHis) and D-histidine (D-BolaHis) derivatives and alkyl spacer were synthesized by following the method previously reported.[10] *Cis*-cyclohexane-1,4-dicarboxylic acid and *trans*-cyclohexane-1,4-dicarboxylic acid and maleic acid were purchased from *Alfa Aesar* and used as received. Fumaric acid was purchased from TCI and also used as received. Milli-Q water (18.2 MΩ·cm) was used in all cases.

Characterization:

Scanning electron microscopy (SEM) was performed on a Hitachi S-4800 FE-SEM with an accelerating voltage of 10KV. Before measurements, the samples on silicon wafers were coated with a thin layer of Pt to increase the contrast. FT-IR spectra were recorded on a JASCO FT/IR-660 plus spectrophotometer with the resolution of 4 cm^{-1} at room temperature. Samples were first vacuum-dried and made into plates with KBr for FT-IR spectral measurements. X-ray diffraction (XRD) analysis was performed on a Rigaku D/Max-2500 X-ray diffractometer (Japan) with Cu Kα radiation (λ = 1.5406 Å), which was operated at a voltage of 40 kV and a current of 200 mA. Samples were cast on glass substrates and vacuum-dried for XRD measurements. The rheological measurements were carried out on the Discovery DHR-1 Rheometer (TA Instruments) using parallel plate geometry in a Peltier plate. The diameter of the plate is 40 mm, and the plate gap was set as 1000μm.

Self-Assembly Experiments:

The typical supramolecular self-assembly were performed in water. For example, for the *cis*-1,4-cyclohexane dicarboxylic acid/BolaHis co-assembly with of molar ratio equal to 2/1, 1.1mg *cis*-1,4-cyclohexane dicarboxylic acid and 2mg BolaHis were added into 1mL of Milli-Q water, and the corresponding mixtures were heated to form a transparent solution. When the solution was slowly cooled down to room temperature, different assemblies formed, which could be different supramolecular assemblies depending on molar ratios between the dicarboxylic acids and BolaHis.

2. Supplemental Tables and Figures

Table S1: Gelation properties of different dicarboxylic acid/L-BolaHis co-assemblies.

Bola	MA	FA	TA	CA
1:1	Suspension	Suspension	Suspension	Suspension
2:1	Gel	Suspension	gel	Partial gel
3:1	Gel	Suspension	gel	Partial gel
4:1	Gel	Suspension	gel	Partial gel

Table S2: The CGC (critical gelation concentration) of different dicarboxylic acid/BolaHis co-assemblies.

Bola	MA	FA	TA	CA
1:1	Suspension	Suspension	Suspension	Suspension
2:1	2.53mg/mL	Suspension	1.67mg/mL	Partial gel
3:1	2.32mg/mL	Suspension	1.43mg/mL	Partial gel
4:1	2.32mg/mL	Suspension	0.91mg/mL	Partial gel

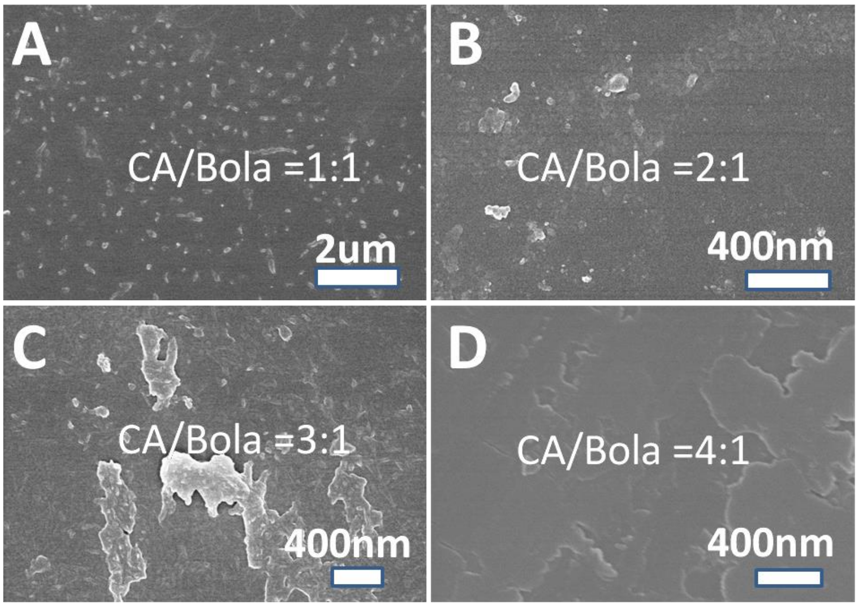

Figure S1. The SEM images of CA/BolaHis assemblies with molar ratios equal to 1:1, 2:1, 3:1 and 4:1, respectively.

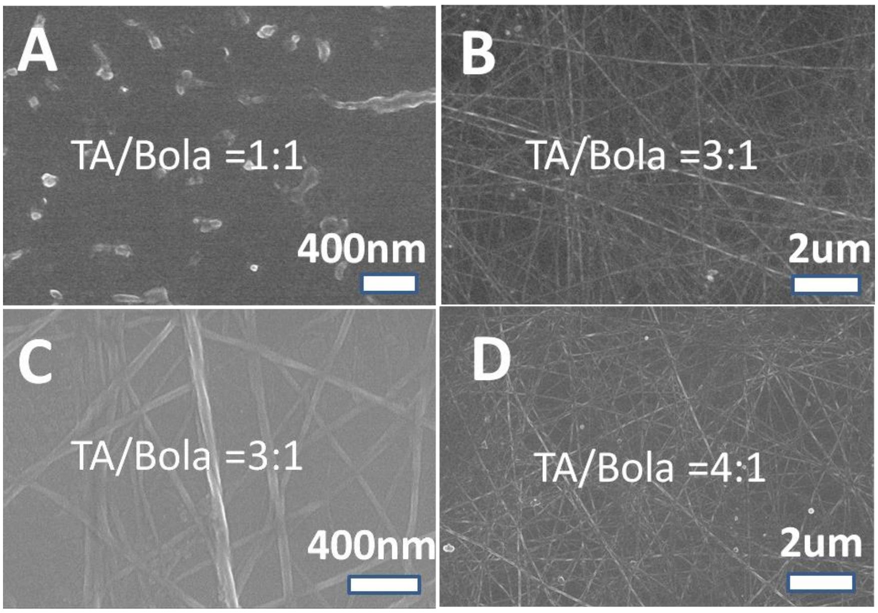

Figure S2. The SEM images of TA/BolaHis assemblies with molar ratios equal to 1:1, 3:1 and 4:1, respectively.

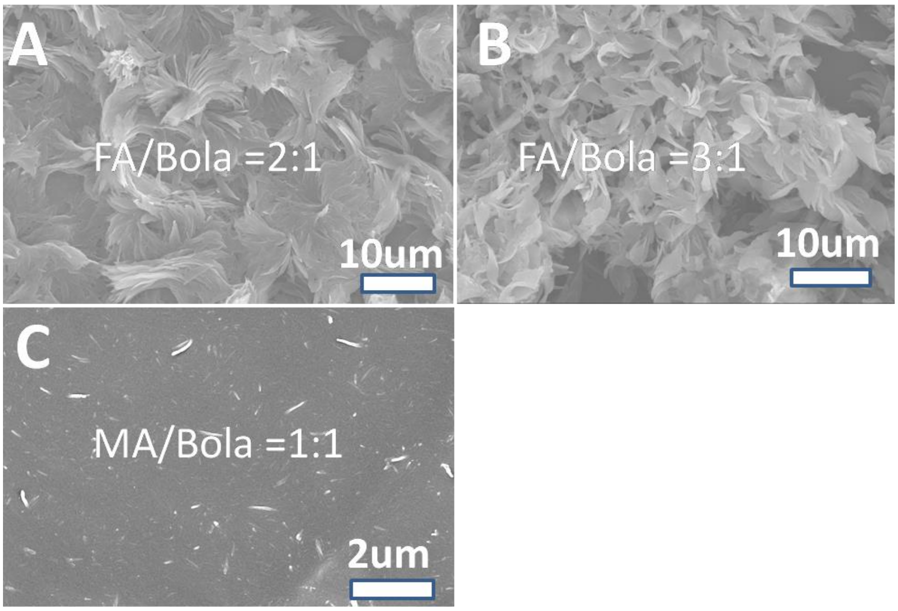

Figure S3. The SEM images of FA/BolaHis assemblies with molar ratios equal to 2:1, 3:1, respectively; and MA/BolaHis assemblies with molar ratios equal to 1:1.

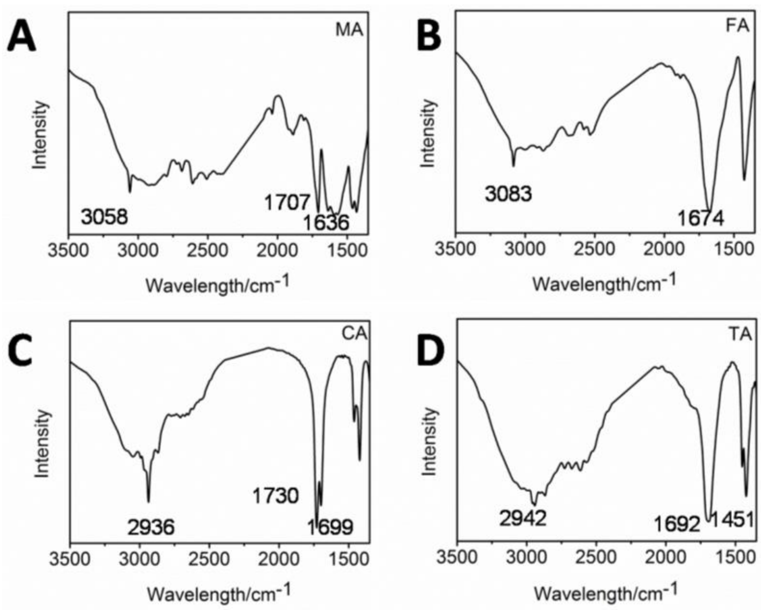

Figure S4. FT-IR spectra of different pure dicarboxylic acid: (A) MA, (B) FA, (C) CA, (D) TA.

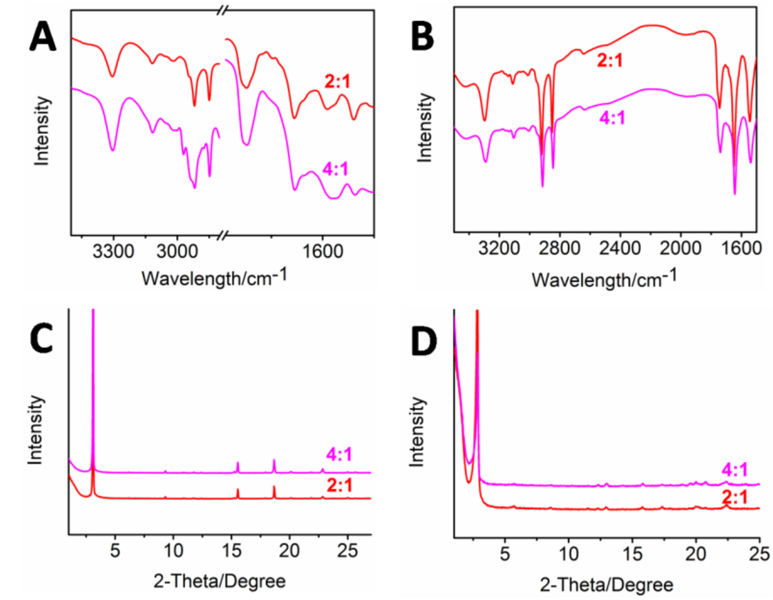

Figure S5. FT-IR spectra of MA/BolaHis (A), FA/BolaHis (B); XRD spectra of MA/BolaHis (C) FA/BolaHis (D).

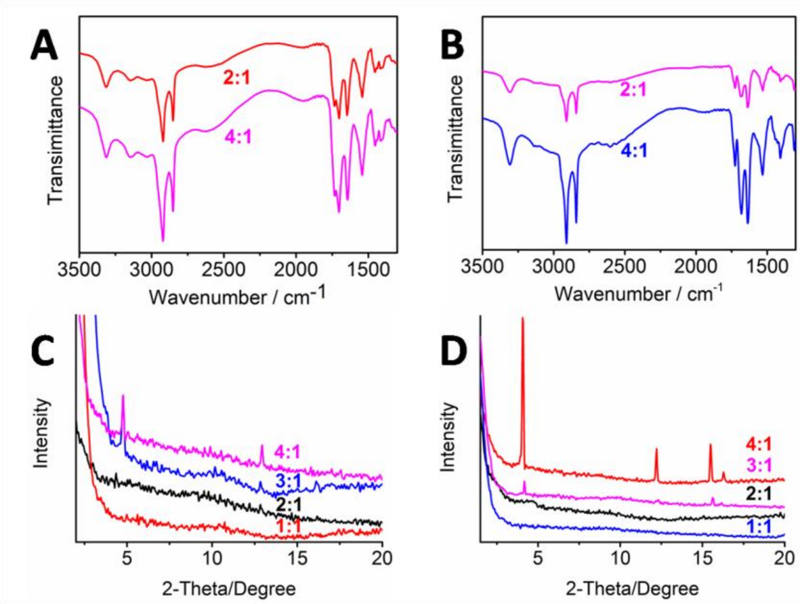

Figure S6. FT-IR spectra of CA/BolaHis (A), TA/BolaHis (B); XRD spectra of CA/BolaHis (C) TA/BolaHis (D).

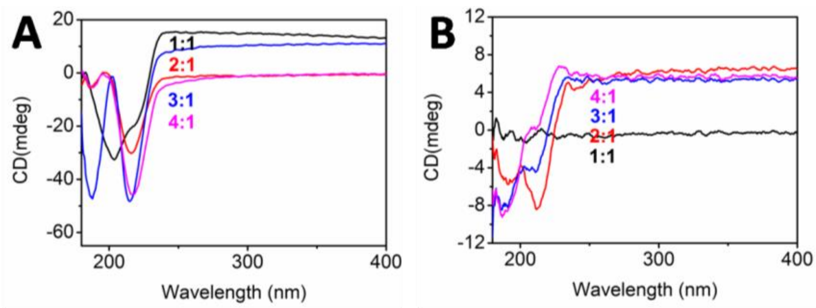

Figure S7. The CD spectra of TA/BolaHis (A), CA/BolaHis (B)

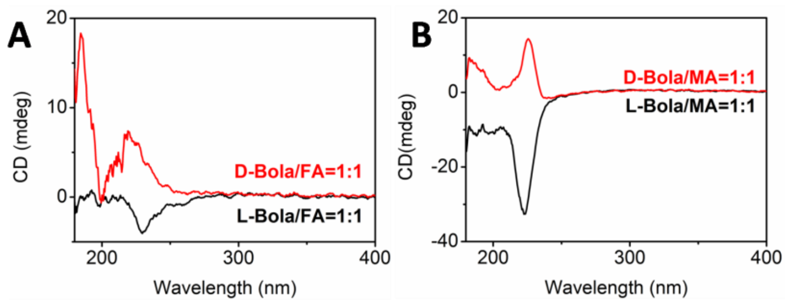

Figure S8. The CD spectra of FA / L-BolaHis=1/1 and FA / D-BolaHis=1/1 (A), MA /L- BolaHis=1/1 and MA /D- BolaHis=1/1 (B).

Table S3: Gelation properties of different dicarboxylic acid/D-BolaHis co-assemblies.

Bola	MA	FA	TA	CA
1:1	Suspension	Suspension	Suspension	Suspension
2:1	Gel	Suspension	gel	Partial gel
3:1	Gel	Suspension	gel	Partial gel
4:1	Gel	Suspension	gel	Partial gel

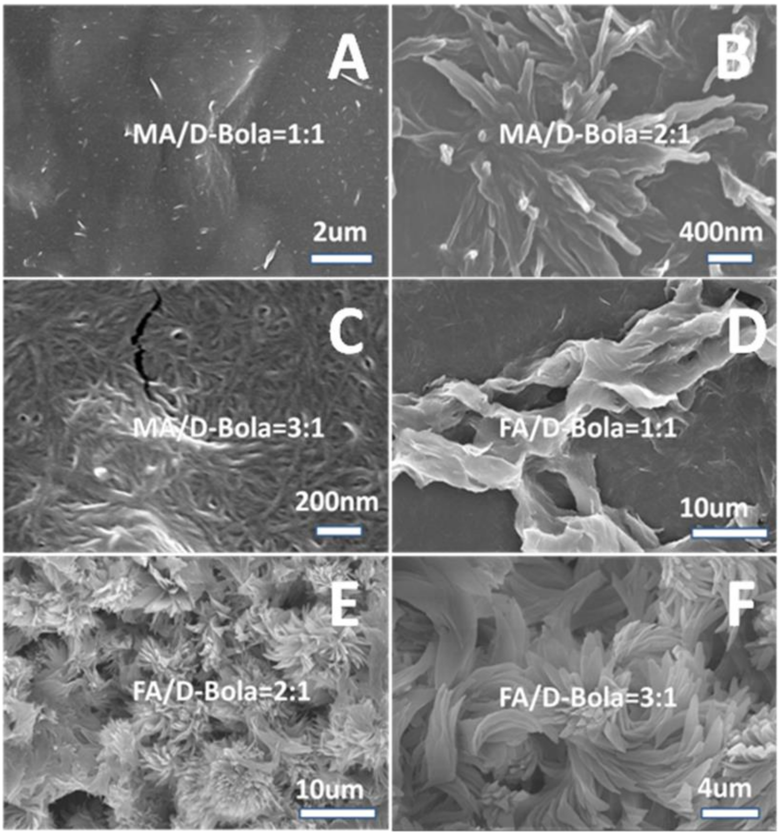

Figure S9. The SEM images of MA/BolaHis assemblies with molar ratios equal to1:1, 2:1, 3:1, respectively; and FA/BolaHis assemblies with molar ratios equal to 1:1, 2:1, 3:1.

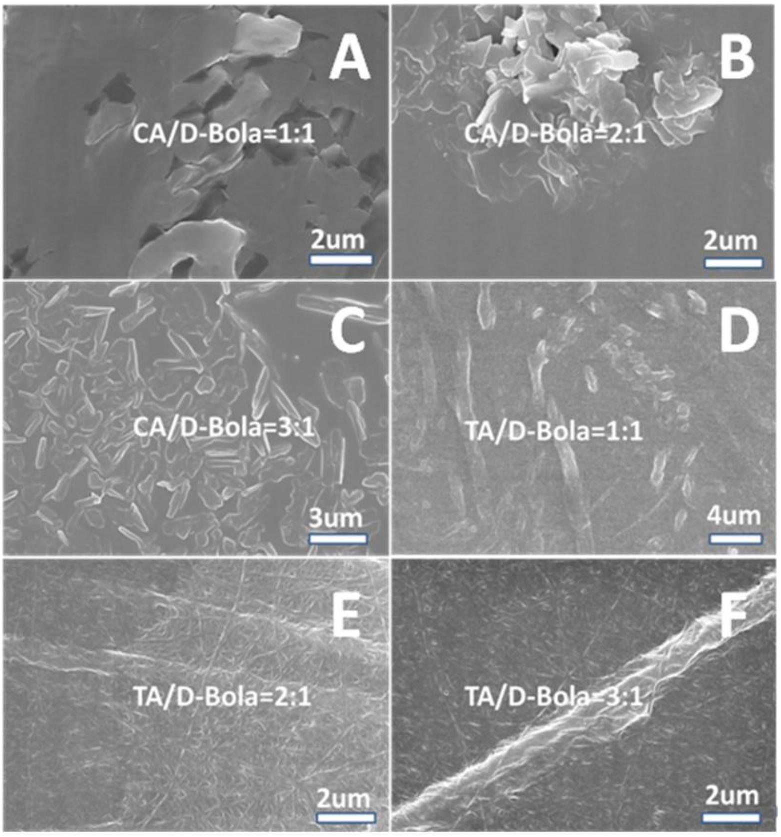

Figure S10. The SEM images of CA/BolaHis assemblies with molar ratios equal to1:1, 2:1, 3:1, respectively; and TA/BolaHis assemblies with molar ratios equal to 1:1, 2:1, 3:1.

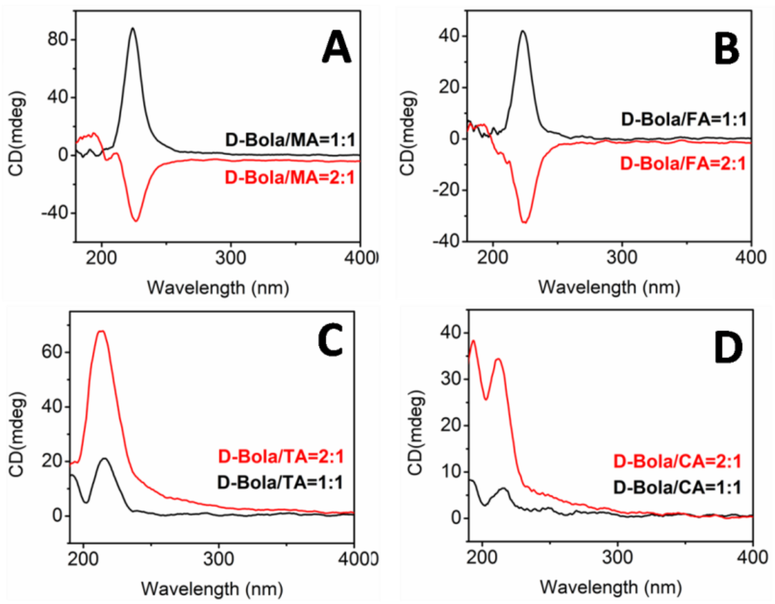

Figure S11: CD spectra of MA/D-BolaHis (A), FA / BolaHis (B). TA / D-BolaHis (C), CA / BolaHis (D).

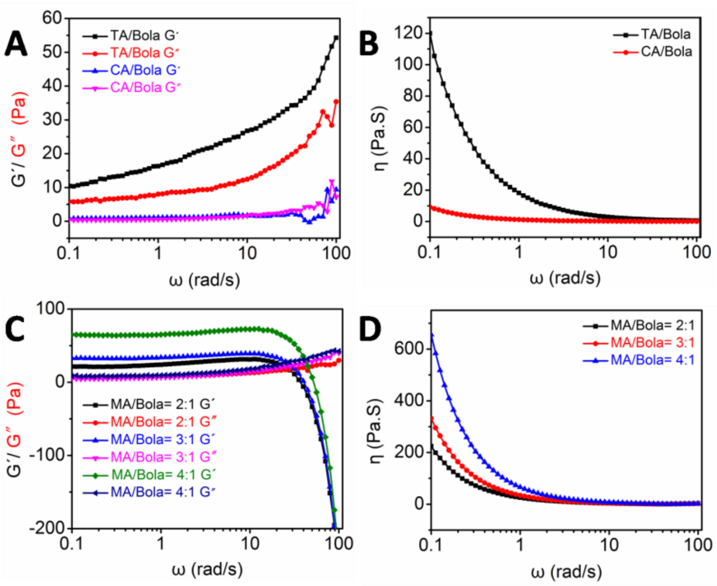

Figure S12: (A, C) Storage modulus G′and loss modulus G″ versus frequnency ω (from 1 to 100 rad s-1), measured at 0.1% strain; (B, D) Complex viscosity determined by frequency ω. (A, B) the molar ratio of TA (CA)/BolaHis is 4:1, (C, D) the molar ratio of MA/BolaHis is 2:1, 3:1, 4:1, respectively.

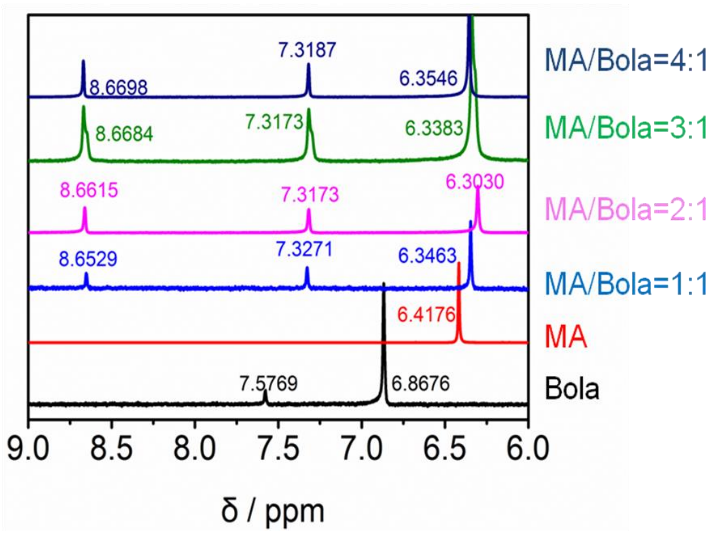

Figure S13. ^{1}H NMR spectra of MA/BolaHis assemblies, MA and BolaHis.

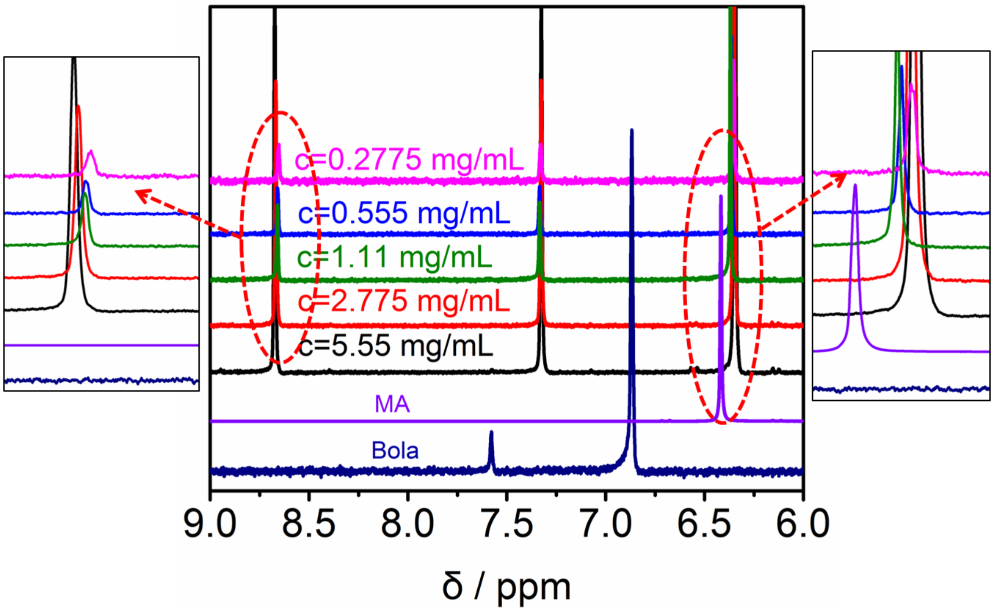

Figure S14. Concentration-dependent ^{1}H NMR spectra of MA/BolaHis assemblies (MA/BolaHis=3:1), MA and BolaHis.

Table S4 : Dicarboxylic acid/BolaHis co-assemblies in organic solvents.

D-Bola	FA	MA	CA	TA
methanol	Solution	Solution	Solution	Solution
ethanol	Solution	Solution	Solution	Solution
acetonitrile	Precipitate	Precipitate	Precipitate	Precipitate
dichloromethane	Precipitate	Precipitate	Precipitate	Precipitate
cyclohexane	Precipitate	Precipitate	Precipitate	Precipitate
Petroleum ether	Precipitate	Precipitate	Precipitate	Precipitate