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SUPPORTING INFORMATION FOR

Self-Assembly of an asparagine/trypthophane gelator: morphology and rheological and fluorescence properties

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General methods

Melting points were obtained on a Reichert-Jung Kofler apparatus and are uncorrected. Microanalyses were obtained with a Heraeus CHN-O-RAPID instrument. Electrospray mass spectra were measured on a quadrupole mass spectrometer equipped with an electrospray source (Hewlett-Packard, LC/MS HP 1100). ^{1}H and ^{13}C NMR spectra were recorded on a Bruker Avance 300 operating at 299 MHz (^{1}H) and 75 MHz (^{13}C), respectively. Analytical TLC was performed on silica gel 60 F_{254} (Merck) precoated plates (0.2 mm). Spots were detected under UV light (254 nm) and/or by charring with ninhydrine. Flash column chromatography was performed with silica gel 60 (230-400 mesh) (Merck). Microwave reactions were performed using the Biotage Initiator 2.0 single-mode cavity instrument from Biotage (Uppsala).

Synthesis of 3

H-Trp(O*t*Bu)HCl (297 mg, 1.0 mmol) was dropwise added to a solution containing cyanuric chloride (185 mg, 1.0 mmol) and DIPEA (0.52 mL, 3.0 mmol) in THF (20 mL) at 0 °C, and the reaction was kept at 0 °C for 8 h. Volatiles were removed and the residue was dissolved in ethyl acetate (20 mL) and washed with a saturated solution of NH_4Cl (10 mL). The organic phase was dried on anhydrous $MgSO_4$, filtered and evaporated. The residue thus obtained was purified by flash column chromatography using hexane:ethyl acetate (3:1) as eluent to yield 338 mg (83%) of a white solid identified as **3.** Mp 58-60 °C. MS (ES, positive mode): *m/z* 408 $(M + 1)^+$ with a 2Cl isotopic distribution. ^{1}H NMR ($CDCl_3$, 400 MHz, ppm) δ: 1.41 (s, 9H, CH_3), 3.31 (dd, *J* = 14.9, 6.5 Hz, 1H, β-CH_2Trp), 3.40 (dd, *J* = 14.9, 5.6 Hz, 1H, β-CH_2Trp), 4.89 (ddd, *J* = 7.5, 6.5, 5.7 Hz, 1H, α-CHTrp), 6.36 (d, *J* = 7.5 Hz, 1H, NH), 7.01 (s, 1H, Ar), 7.13

(dd, *J* = 8.0, 7.1 Hz, 1H, Ar), 7.21 (dd, *J* = 8.2, 7.1 Hz, 1H, Ar), 7.35 (d, *J* = 8.2 Hz, 1H, Ar), 7.58 (d, *J* = 7.9 Hz, 1H, Ar), 8.16 (br s, 1H, NH-Trp).

Synthesis of 4

Compound **3** (330 mg, 0.80 mmol) was dissolved in a mixture containing THF (16 mL) and DIPEA (0.80 mL, 4.81 mmol). H-Asn(O*t*Bu)HCl (218 mg, 0.97 mmol) was added, and the reaction was stirred at rt overnight. Volatiles were removed and the residue was dissolved in ethyl acetate (20 mL) and washed with a saturated solution of NH_4Cl (10 mL). The organic phase was dried on anhydrous $MgSO_4$, filtered and evaporated. The residue obtained was purified by flash column chromatography using CH_2Cl_2:MeOH (12:1) as eluent to yield 380 mg (84%) of a white solid identified as **4.** Mp 102-104 °C MS (ES, positive mode): *m/z* 560 $(M + 1)^+$ with a Cl isotopic distribution. ^{1}H NMR ($CDCl_3$, 400 MHz, ppm) δ: 1.38 (s, 9H, CH_3), 1.45 (s, 9H, CH_3), 2.68-2.95 (m, β-CH_2Asn, 2H), 3.18-3.38 (m, β-CH_2Trp, 2H), 4.56-4.61 (m,1H, α-CHAsn), 4.77-4.82 (m, 1H, α-CHTrp), 5.68-5.81 (m, 2H, $CONH_2$), 6.10-6.12 (m, 1H, NH), 6.76-6.78 (m, 1H, NH), 7.01-7.19 (m, 3H, Ar), 7.36-7.32 (m, 1H, Ar), 7.56-7.61 (m, 1H, Ar), 8.20 (br s, 1H, NH-Trp).

Synthesis of 2

In a Pyrex microwave process vial containing **4** (200 mg, 0.36 mmol) in 1,4-dioxane (10 mL), piperazine (18.5 mg, 0.21 mmol) and DIPEA (0.50 mL, 2.86 mmol) were added. The reaction vessel was sealed, stirred, and subsequently irradiated at 100 °C for 2.5 h in a monomode reactor. Then volatiles were removed and the residue was dissolved in ethyl acetate (20 mL) and washed with a saturated NH_4Cl solution (20 mL). The organic phase was dried on anhydrous $MgSO_4$, filtered and evaporated. The residue was purified by flash column chromatography using ethyl acetate:MeOH (8:1) as eluent to give 172 mg (84% yield) of **3** as a white solid. Mp 118-120 °C. MS (ES, positive mode): *m/z*

1133 $(M + 1)^+$. ^{1}H NMR (DMSO-d_6, 400 MHz, ppm) δ: 1.28-1.33 (s, 36H, CH_3), 2.51 (m, β-CH_2Asn, 4H), 3.12 (m, β-CH_2Trp, 4H), 3.50-3.64 (m, 8H, CH_2N), 4.38 (m, 2H, α-CHTrp), 4.56-4.70 (m, 2H, α-CHAsn), 6.56-6.88 (m, 8H, $CONH_2$, NH), 6.92-7.52 (m, 10H, Ar), 7.94 (br s, 2H, NH-Trp). ^{13}C NMR (DMSO-d_6, 100 MHz, ppm): 26.8 (β-CH_2Trp), 27.6 ($(CH_3)_3C$), 36.6 (β-CH_2Asn), 42.4 (CH_2N), 50.93 (α-CHAsn), 55.6 (α-CHTrp), 80.0 ($(CH_3)_3C$), 110.0, 111.4, 118.4, 120.9, 123.9, 127.1, 136.1, 162.3 (Ar), 164.1, 165.2 (C-2, C-4, C-6), 171.46 ($CO(CH_3)_3$), 172.4 ($CONH_2$). Anal Calc. for $C_{56}H_{76}N_{16}O_{10}$: C 59.35, H 6.76, N 19.77; found C 59.05, H 7.04, N 19.57.

Synthesis of 6

To a suspension of cyanuric chloride (92 mg, 0.50 mmol) in THF (6 ml), a solution containing H-Trp-OtBu·HCl (356 mg, 1.20 mmol) and DIPEA (0.5 ml, 3.00 mmol) was slowly added. The mixture was stirred at rt overnight. Volatiles were removed and the residue was dissolved in ethyl acetate (20 mL) and washed with brine (10 mL). The organic phase was dried on anhydrous $MgSO_4$, filtered and evaporated. The residue thus obtained was purified by flash column chromatography using hexane:ethyl acetate (1:1) as eluent to yield 301 mg (95%) of a white solid identified as **6.** Mp 122-124 ºC. MS (ES, positive mode): m/z 632 $(M+H)^+$ with a Cl isotopic pattern. ^{1}H NMR ($CDCl_3$, 300 MHz, ppm) δ: 1.38 (s, 18H, CH_3), 3.27-3.40 (m, 4H, β-CH_2Trp), 4.89 (m, 2H, α-CHTrp), 6.36 (m, 2H, NH), 6.98-7.59 (m, 10H, H-2^i Trp, Ar), 8.17 (br s, 2H, NH-1^i Trp).

Synthesis of 7

Following the procedure described for the synthesis of **2**, the chlorotriazine **6** (200 mg, 0.32 mmol), piperazine (16.3 mg, 0.19 mmol) in the presence of DIPEA (0.17 ml, 0.96 mmol) in dioxane (10 ml) reacted under microwave irradiation at 100 ºC for 2 h. The residue was purified by flash column chromatography using ethyl acetate:MeOH (20:1)

to yield 199 mg (97%) of a white solid identified as **7**. Mp 138-140 ºC. MS (ES, positive mode): m/z 1278 $(M+H)^+$. ^{1}H NMR ($CDCl_3$, 300 MHz) δ: 1.30 (s, 36H, CH_3), 3.18 (m, 8H, β-CH_2Trp), 3.55 (m, 8H, CH_2N), 4.60 (m, 4H, α-CHTrp), 5.60 (m, 4H, NH), 6.92-7.63 (m, 20H, H-2^i Trp, Ar), 8.02 (br s, 4H, NH-1^i Trp). Anal Calc. for $C_{70}H_{84}N_{16}O_8$: C, 65.81; H, 6.63; N, 17.54. Found: C, 66.19; H, 6.74; N, 17.18.

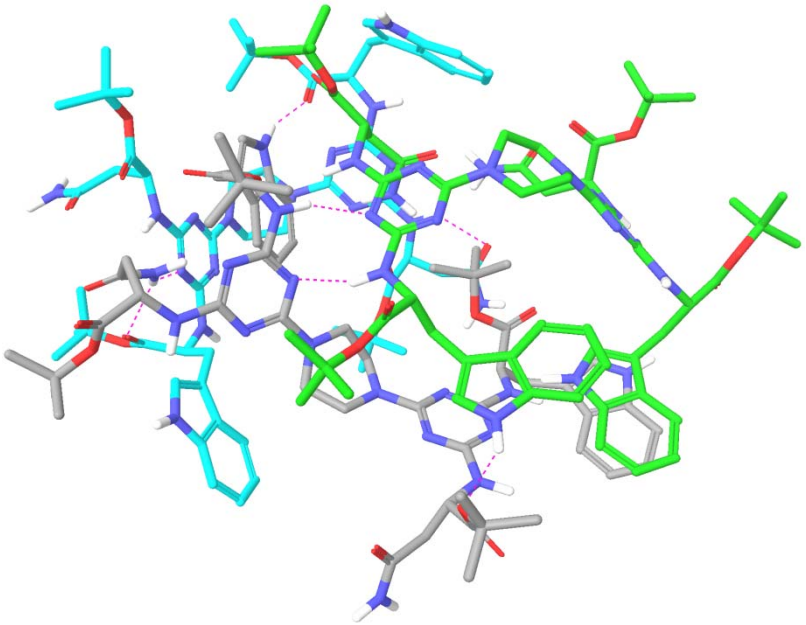

Figure S1. Minimun energy structure for a trimer of **2** as deduced from the Conformational Search protocol. Putative hydrogen bonds are depicted as dotted lines.

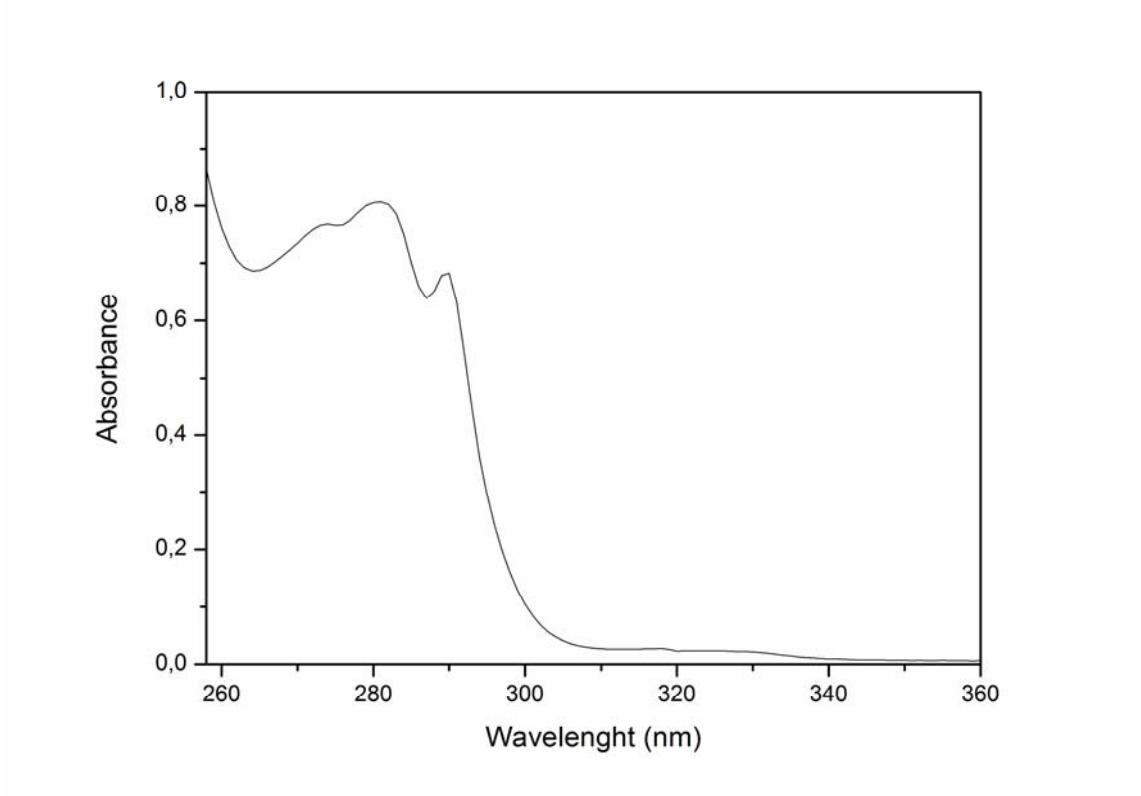

Figure S2. UV spectrum of compound **2** in acetonitrile at a concentration of 10^{-4} M.

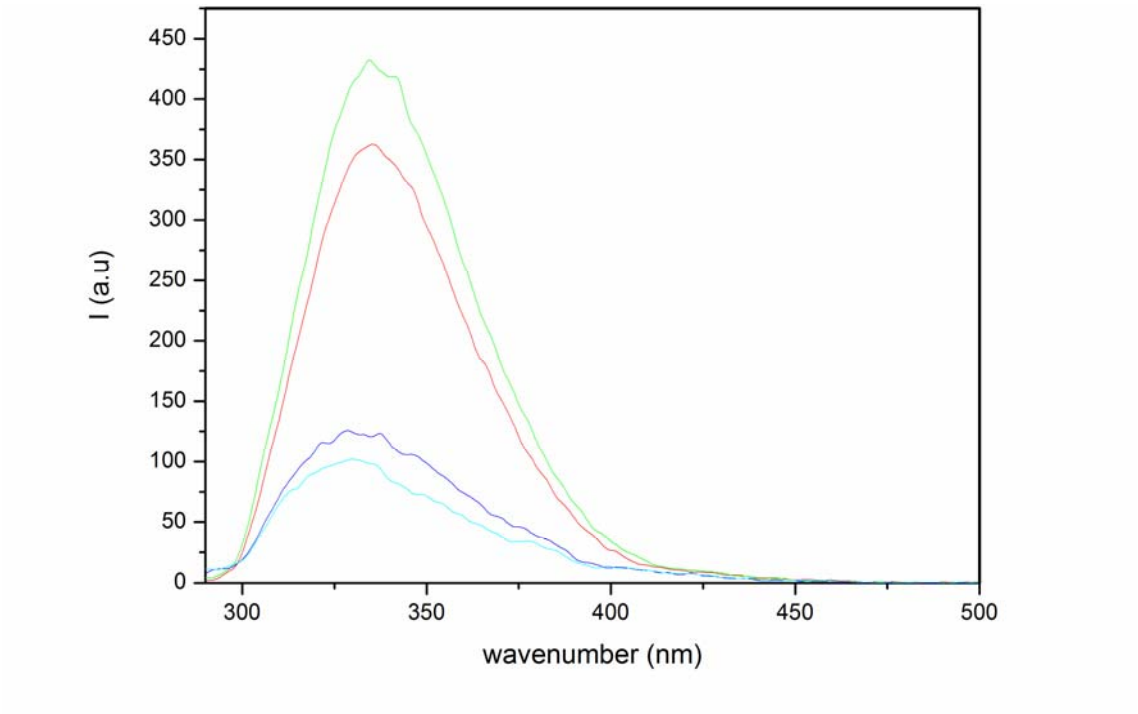

Figure S3. Fluorescence spectrum of organogelator **2** in dioxane at varying concentrations: 0.017M (red), 3.4*10-4M (green), 6.8*10-6M (navy), 13.6*10-8M (cyan) excited at 280 nm

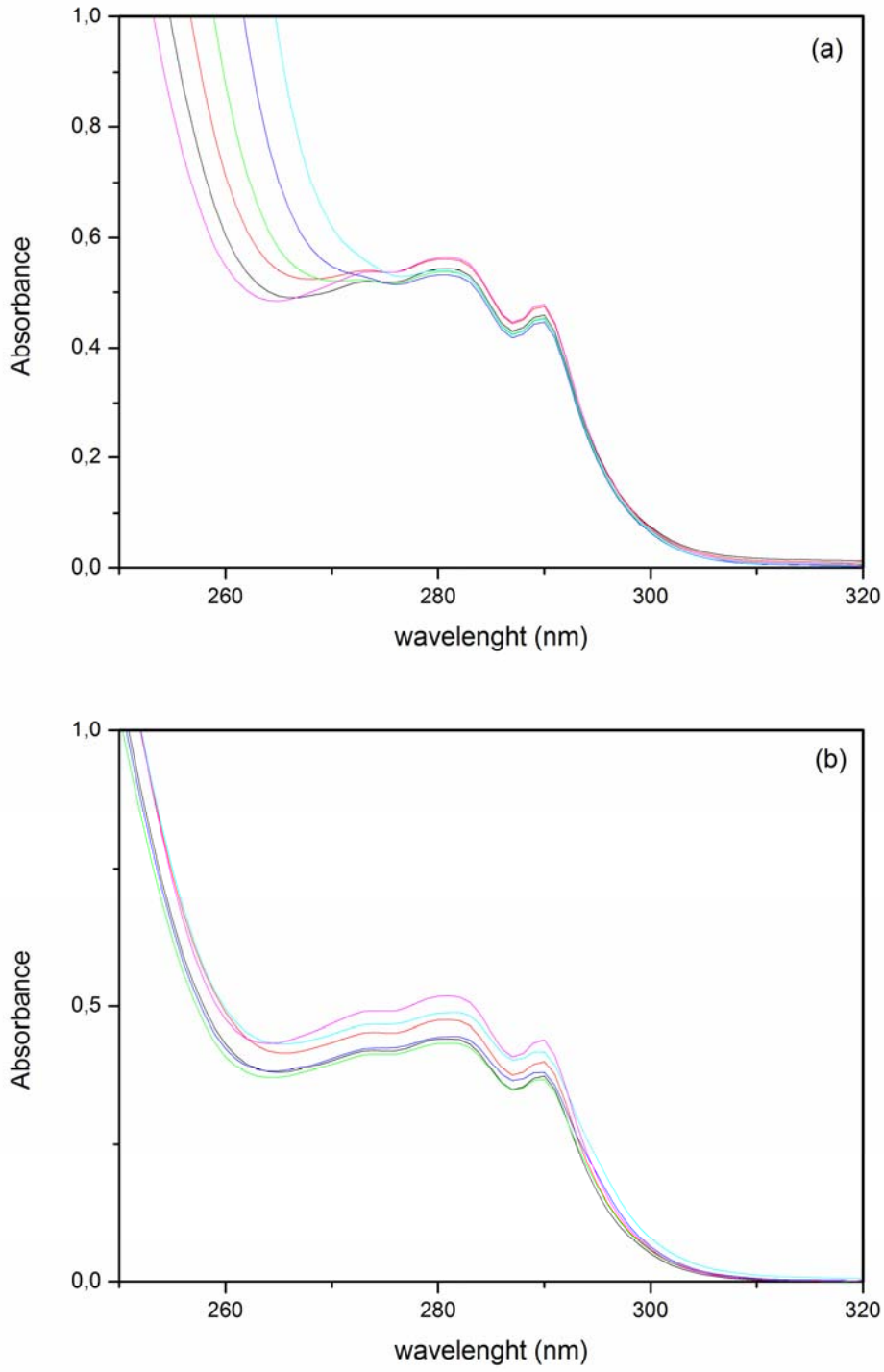

Figure S4. UV-Vis spectra of organogelator **2** in acetonitrile (0.044 mM) at varying concentrations of TBAI (a) and TBAF (b). Ratio (**2**:TBAX): black (1:0); red (1:0.62); green (1:1); navy (1:2.5); blue (1:6); pink (1:10)