

Supporting Information

Compound Nap-FVY: $^1\text{H NMR}$ (400 MHz, DMSO) δ 8.34 (d, $J = 8.3$ Hz, 1H), 8.12 (t, $J = 8.5$ Hz, 2H), 7.92 – 7.72 (m, 5H), 7.66 – 7.52 (m, 4H), 7.50 – 7.39 (m, 3H), 7.28 – 7.19 (m, 5H), 7.15 (d, $J = 5.3$ Hz, 3H), 7.01 (d, $J = 8.2$ Hz, 3H), 6.94 (d, $J = 5.3$ Hz, 2H), 6.80 (d, $J = 8.3$ Hz, 1H), 6.65 (d, $J = 8.2$ Hz, 2H), 6.43 (d, $J = 8.4$ Hz, 1H), 4.64 – 4.57 (m, 1H), 4.42 – 4.32 (m, 2H), 4.24 – 4.12 (m, 2H), 4.00 (t, 1H), 3.61 – 3.50 (m, 3H), 3.10 (s, 12H), 3.01 – 2.89 (m, 3H), 2.83 – 2.53 (m, 6H), 2.29 (s, 4H), 1.95 – 1.86 (m, 1H), 0.79 (d, $J = 6.7$ Hz, 3H), 0.74 (d, $J = 6.7$ Hz, 3H), 0.58 (d, $J = 6.7$ Hz, 2H), 0.53 (d, $J = 6.7$ Hz, 2H). The calculated m/z value = 595.27.

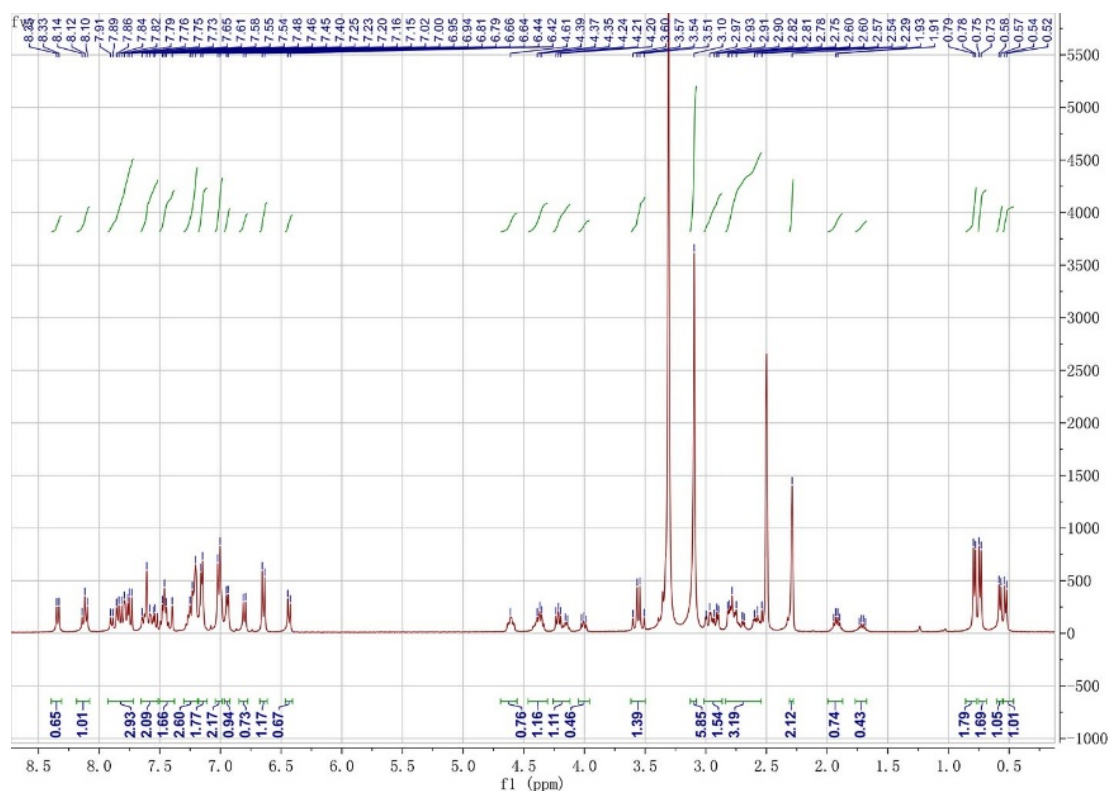


Fig. S1 $^1\text{H NMR}$ of Nap-FVY

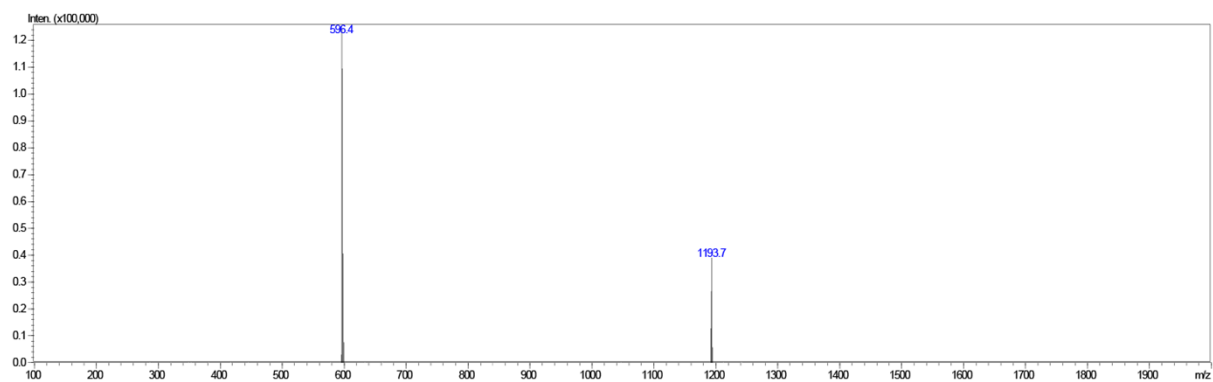


Fig. S2 Mass Spectrum of Nap-FVY

Compound Nap-YVF: ^1H NMR (300 MHz, DMSO) δ 8.32 (d, $J = 8.4$ Hz, 1H), 8.22 (d, $J = 7.7$ Hz, 1H), 7.87 – 7.76 (m, 4H), 7.73 (s, 1H), 7.59 (s, 1H), 7.49 – 7.42 (m, 2H), 7.28 – 7.16 (m, 6H), 7.01 (d, $J = 8.4$ Hz, 2H), 6.60 (d, $J = 8.4$ Hz, 2H), 4.55 – 4.40 (m, 2H), 4.23 – 4.16 (m, 1H), 3.55 (d, $J = 7.7$ Hz, 2H), 3.10 – 3.01 (m, 1H), 2.95 – 2.88 (m, 1H), 2.87 – 2.80 (m, 1H), 2.69 – 2.58 (m, 2H), 1.95 – 1.84 (m, 1H), 0.77 (d, $J = 6.7$ Hz, 3H), 0.72 (d, $J = 6.7$ Hz, 3H). The calculated m/z value = 595.27.

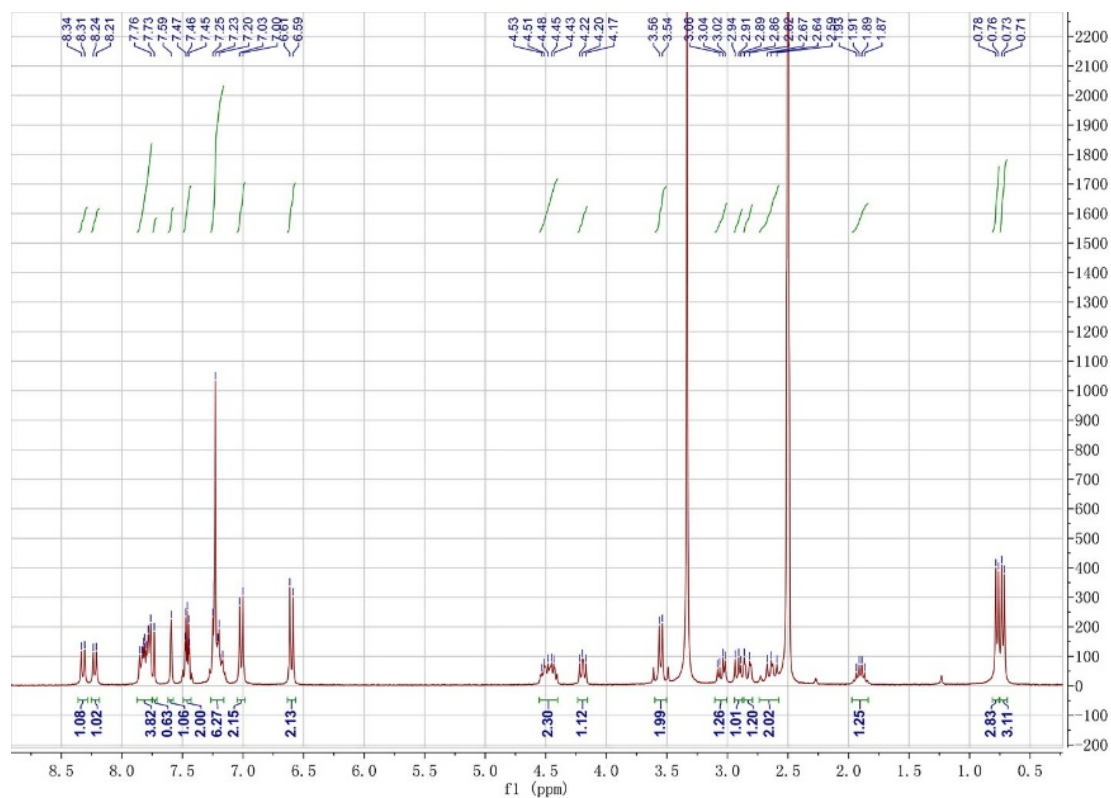


Fig S3 ^1H NMR of Nap-YVF

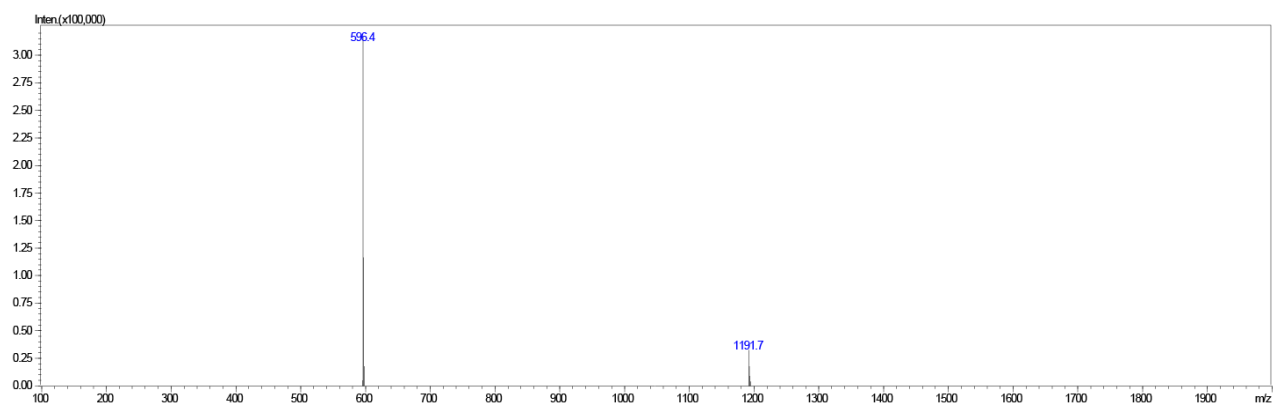


Fig. S4 Mass Spectrum of Nap-YVF

Compound Nap-VYF: ^1H NMR (400 MHz, DMSO) δ 8.10 (d, $J = 7.7$ Hz, 1H), 8.00 (d, $J = 9.0$ Hz, 1H), 7.91 (d, $J = 8.4$ Hz, 1H), 7.88 – 7.81 (m, 1H), 7.75 (s, 1H), 7.48 – 7.40 (m, 1H), 7.28 – 7.18 (m, 1H), 6.98 (d, $J = 8.1$ Hz, 1H), 6.61 (d, $J = 8.1$ Hz, 1H), 4.49 – 4.42 (m, 1H), 4.17 – 4.12 (m, 1H), 3.74 (s, 1H), 3.71 (s, 1H), 3.60 (s, 1H), 3.57 (s, 1H), 3.08 – 3.00 (m, 1H), 2.95 – 2.82 (m, 1H), 2.68 – 2.60 (m, 1H), 1.94 – 1.86 (m, 1H), 0.71 (d, $J = 6.6$ Hz, 1H). The calculated m/z value = 595.27.

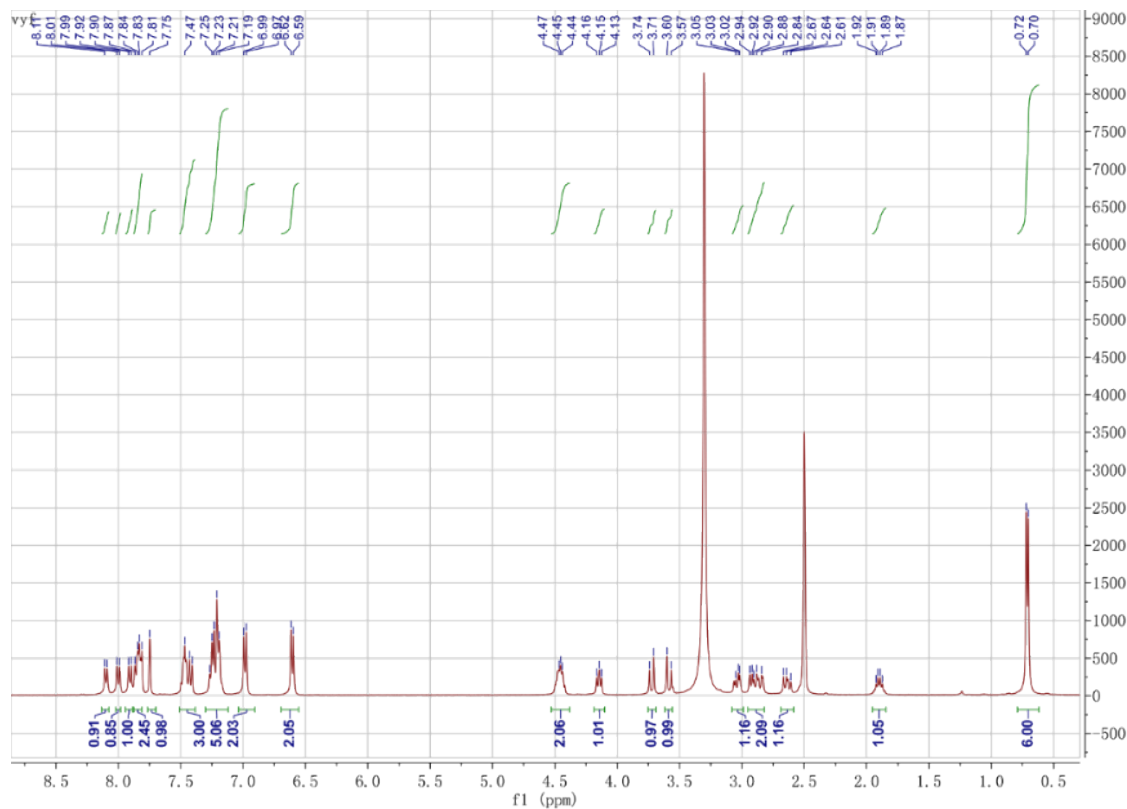


Fig. S5 ^1H NMR of Nap-VYF

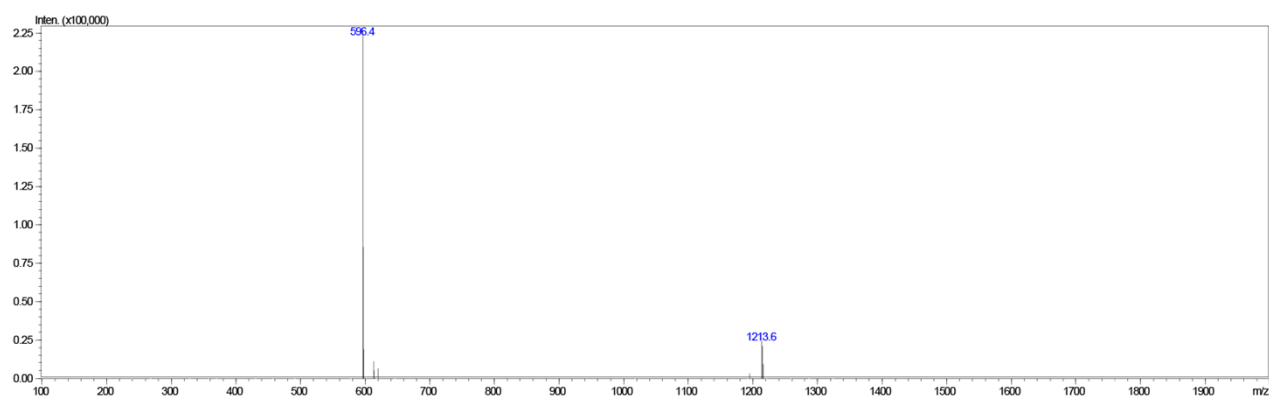


Fig. S6. Mass Spectrum of Nap-VYF

Compound Nap-FYV: ^1H NMR (400 MHz, DMSO) δ 8.25 – 8.19 (m, 1H), 8.05 (d, $J = 8.1$ Hz, 1H), 7.99 (d, $J = 8.6$ Hz, 1H), 7.85 (d, $J = 7.4$ Hz, 1H), 7.81 – 7.72 (m, 2H), 7.59 (s, 1H), 7.50 – 7.42 (m, 2H), 7.20 – 7.10 (m, 5H), 7.04 (d, $J = 8.3$ Hz, 2H), 6.63 (d, $J = 8.3$ Hz, 2H), 4.60 – 4.48 (m, 2H), 3.60 (s, 1H), 3.56 (s, 1H), 3.50 (s, 1H), 3.46 (s, 1H), 3.01 – 2.90 (m, 2H), 2.77 – 2.68 (m, 2H), 2.11 – 2.02 (m, 1H), 1.24 (s, 1H), 0.89 (d, $J = 6.8$ Hz, 5H). The calculated m/z value = 595.27.

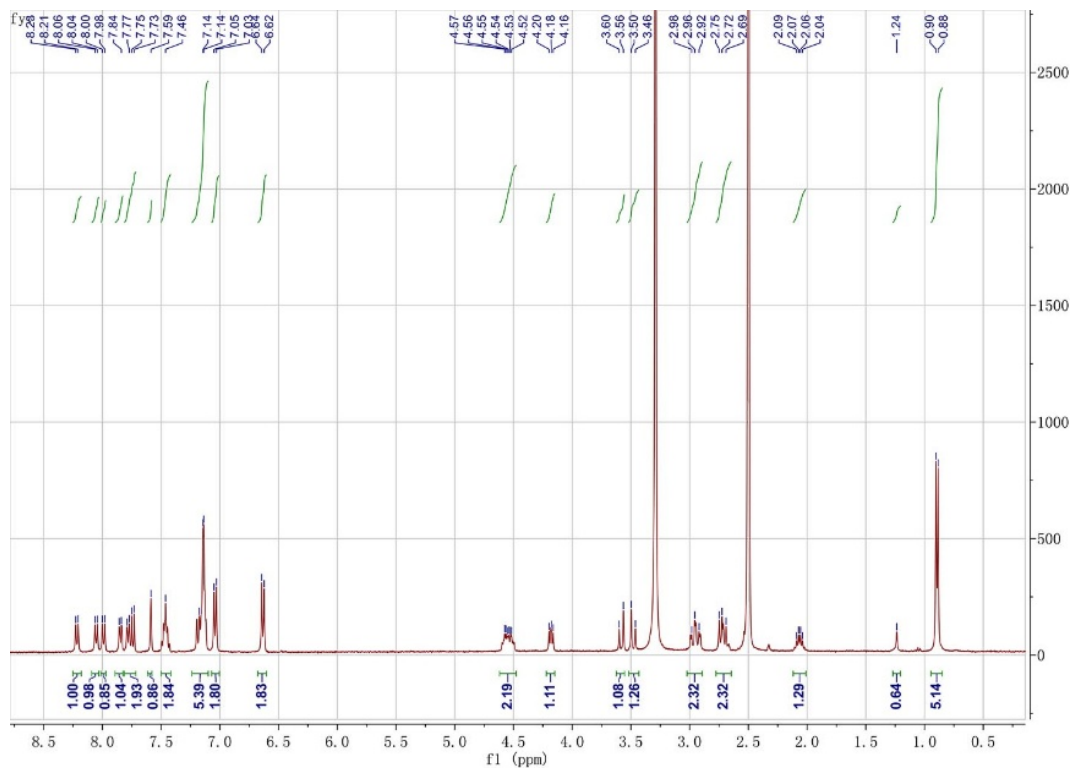


Fig. S7 ^1H NMR of Nap-FYV

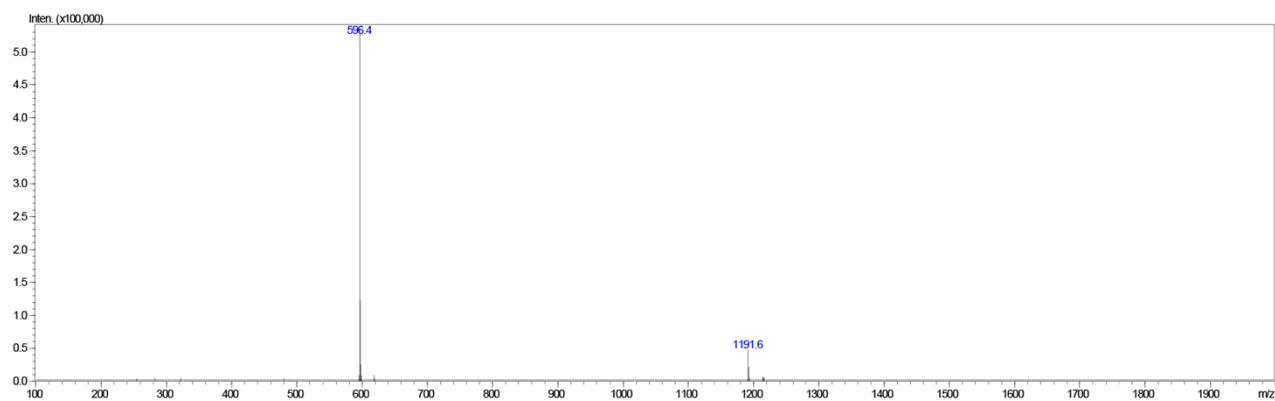


Fig. S8 Mass Spectrum of Nap-FYV

Compound Nap-VFY: $^1\text{H NMR}$ (400 MHz, DMSO) δ 8.09 (d, $J = 7.6$ Hz, 1H), 8.05 (d, $J = 8.8$ Hz, 1H), 7.87 (d, $J = 7.5$ Hz, 1H), 7.82 (d, $J = 8.1$ Hz, 1H), 7.74 (s, 1H), 7.47 (s, 1H), 7.42 (d, $J = 8.3$ Hz, 1H), 7.20 – 7.14 (m, 1H), 7.13 – 7.08 (m, 1H), 6.99 (d, $J = 7.8$ Hz, 1H), 6.64 (d, $J = 7.6$ Hz, 1H), 4.56 (s, 1H), 4.40 – 4.34 (m, 1H), 4.15 (t, $J = 7.6$ Hz, 1H), 3.72 (s, 1H), 3.69 (s, 1H), 3.60 (s, 1H), 3.57 (s, 1H), 3.01 – 2.88 (m, 1H), 2.85 – 2.70 (m, 1H), 1.90 (dd, $J = 13.1, 5.8$ Hz, 1H), 0.71 (d, $J = 6.5$ Hz, 1H). The calculated m/z value = 595.27.

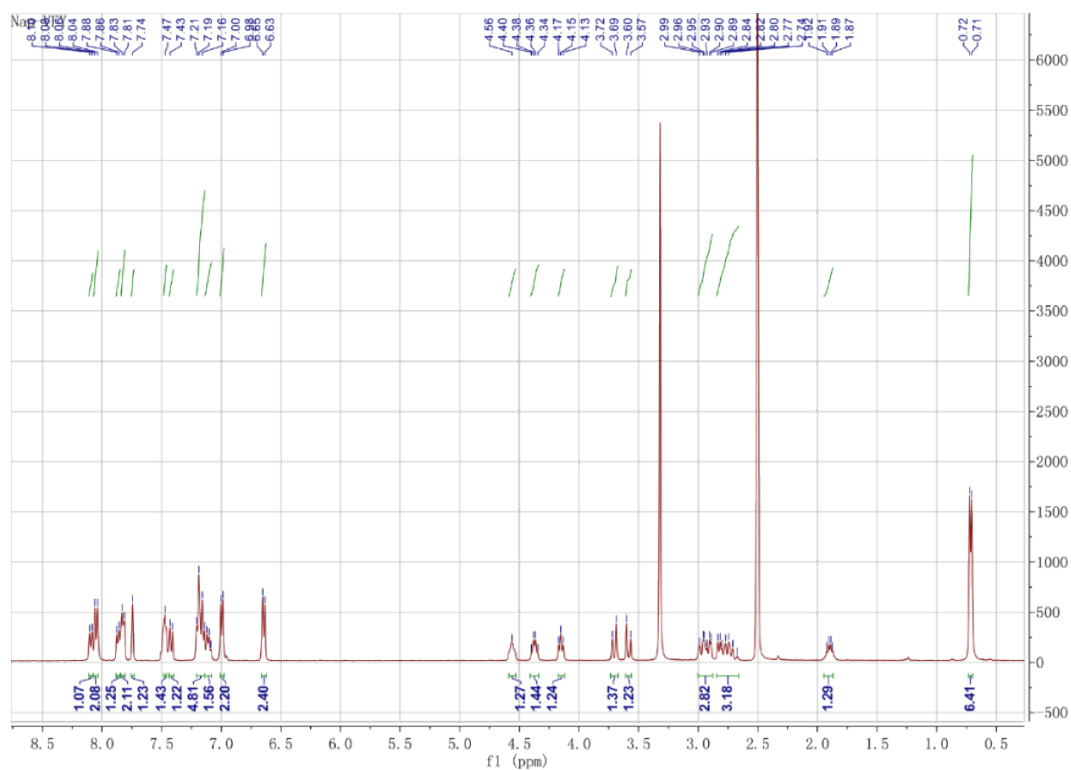


Fig. S9 $^1\text{H NMR}$ of Nap-VFY

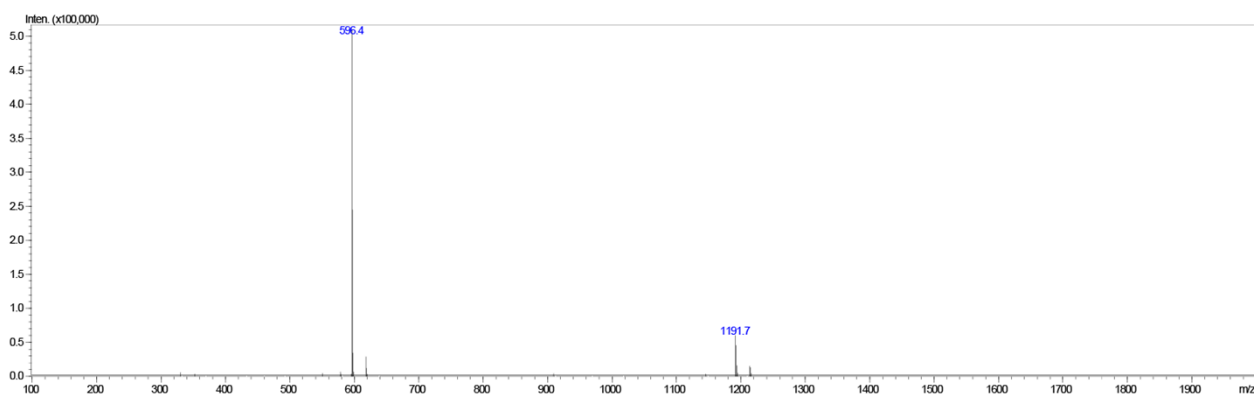


Fig. S10 Mass Spectrum of Nap-VFY

Compound Nap-YFV: ^1H NMR (400 MHz, DMSO) δ 8.16 – 8.07 (m, 1H), 8.02 (d, $J = 8.3$ Hz, 1H), 7.84 (d, $J = 8.7$ Hz, 1H), 7.81 – 7.73 (m, 1H), 7.59 (s, 1H), 7.49 – 7.43 (m, 1H), 7.27 – 7.18 (m, 2H), 7.16 (d, $J = 6.8$ Hz, 1H), 6.95 (d, $J = 8.3$ Hz, 1H), 6.56 (d, $J = 8.3$ Hz, 1H), 4.68 – 4.62 (m, 1H), 4.47 – 4.41 (m, 1H), 4.20 – 4.16 (m, 1H), 3.59 (s, 1H), 3.56 (s, 1H), 3.50 (s, 1H), 3.47 (s, 1H), 3.08 – 3.00 (m, 1H), 2.87 – 2.78 (m, 1H), 2.67 – 2.57 (m, 1H), 2.07 (d, $J = 6.3$ Hz, 1H), 0.90 (d, $J = 6.8$ Hz, 3H). The calculated m/z value = 595.27.

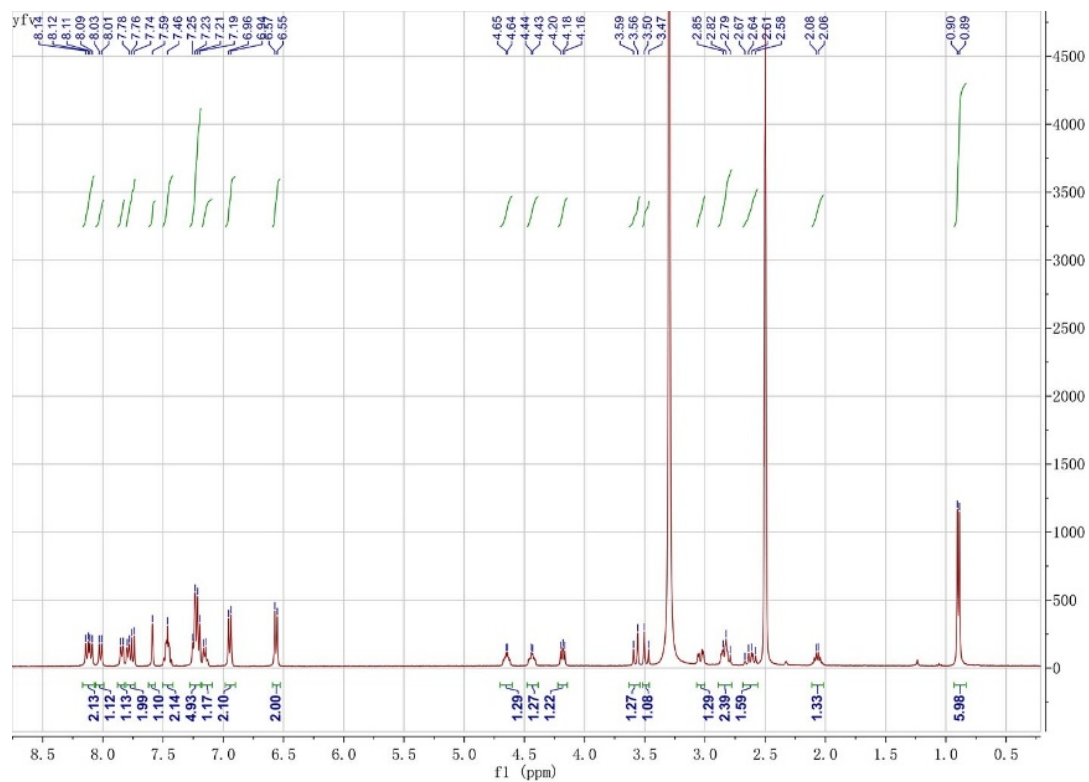


Fig. S11 ^1H NMR of Nap-YFV

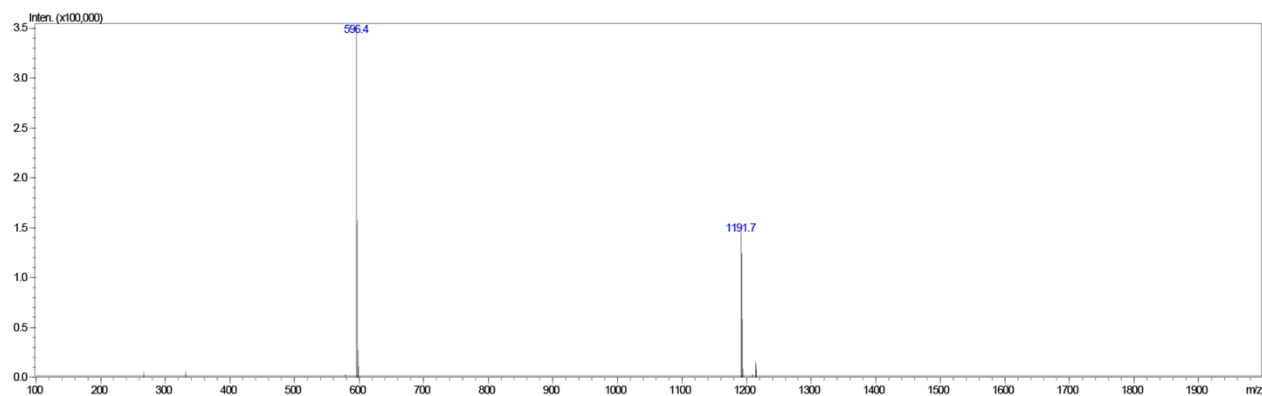


Fig. S12 Mass Spectrum of Nap-YFV

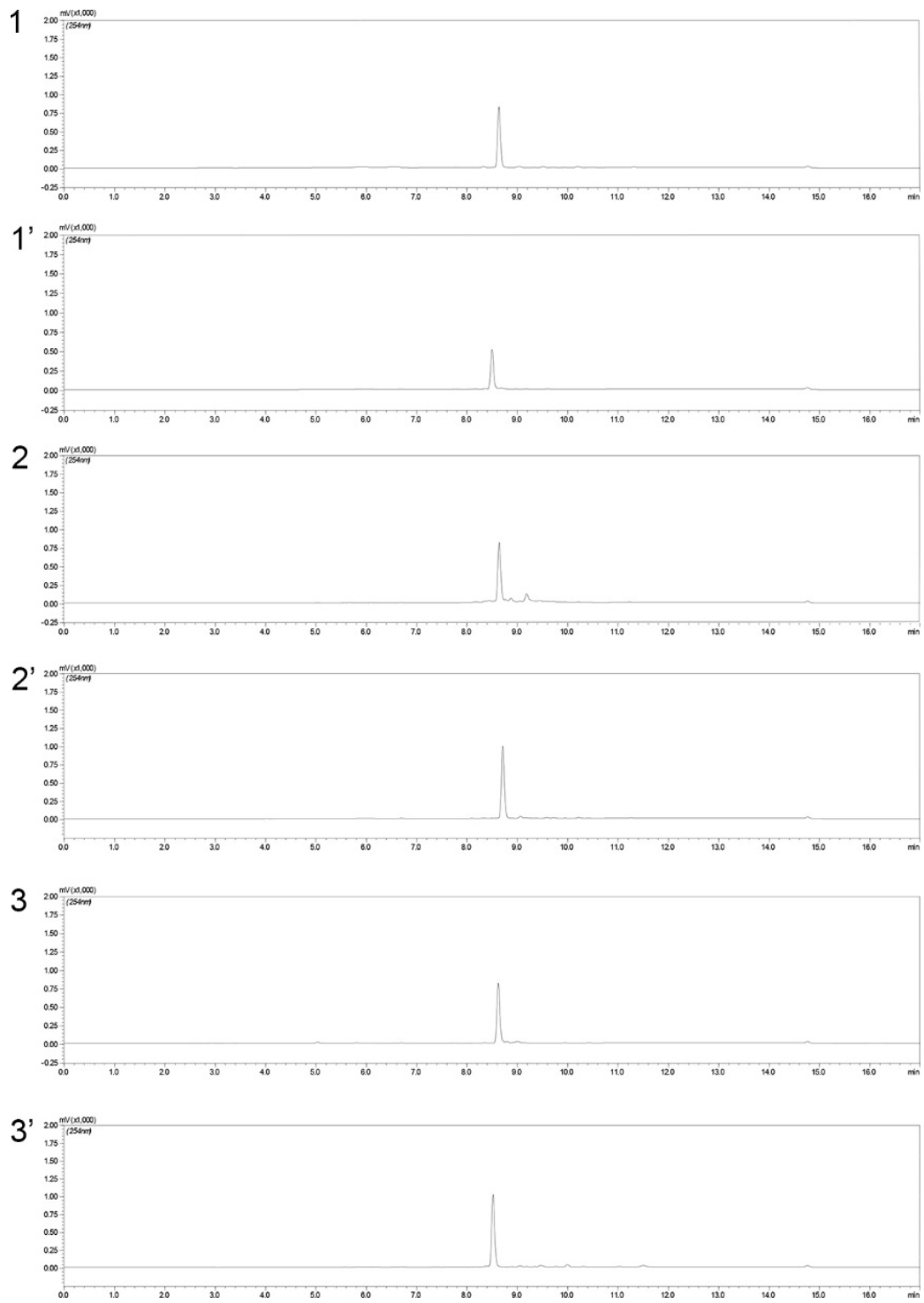


Fig. S13 HPLC chromatograms and retention time of different peptides

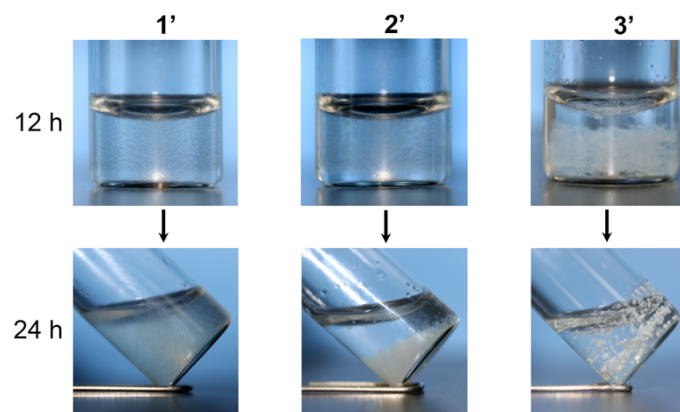


Fig. S14 Optical images of progress of gel morphology at room temperature

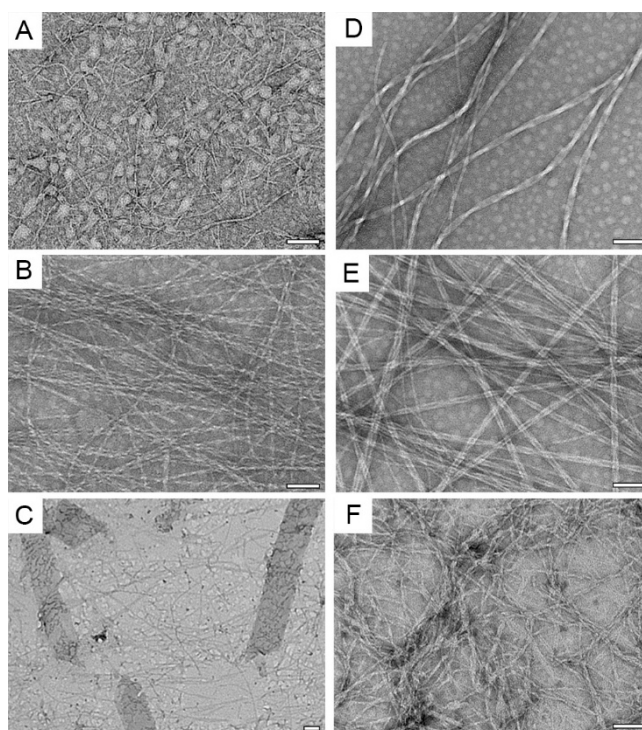


Fig. S15 TEM images of (A-C) aggregation of $1+1'$, $2+2'$ and $3+3'$ at the ratio of 1:5 and (D-F) aggregation of $1+1'$, $2+2'$ and $3+3'$ at the ratio of 5:1. The scale bar is 100 nm.

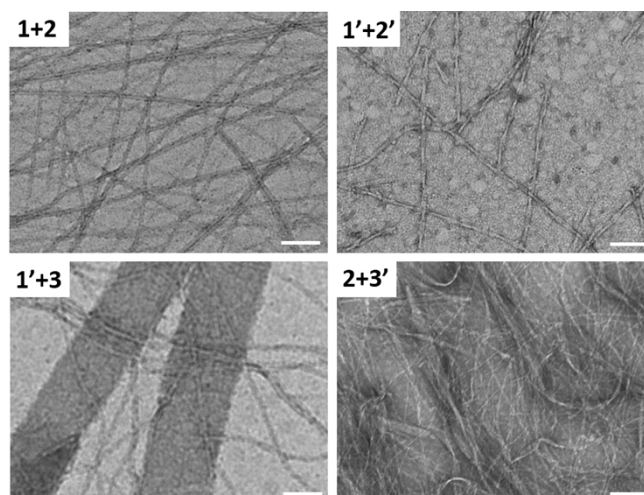


Fig. S16 TEM images of collocation of non-reverse sequences. The scale bar is 100 nm.

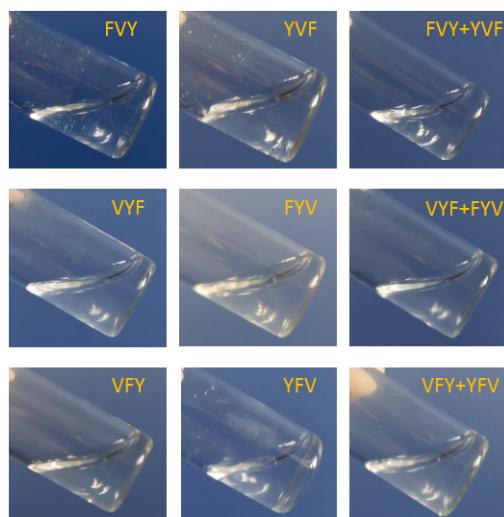


Fig. S17 Optical images of solution of peptides without Nap-capping and solution of corresponding mixture.

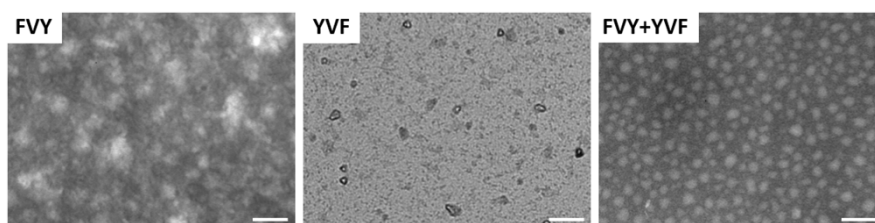


Fig. S18 Optical images of solution of peptides without Nap-capping and solution of corresponding mixture. The scale bar is 100 nm.