Electronic Supplementary Material (ESI) for Soft Matter.

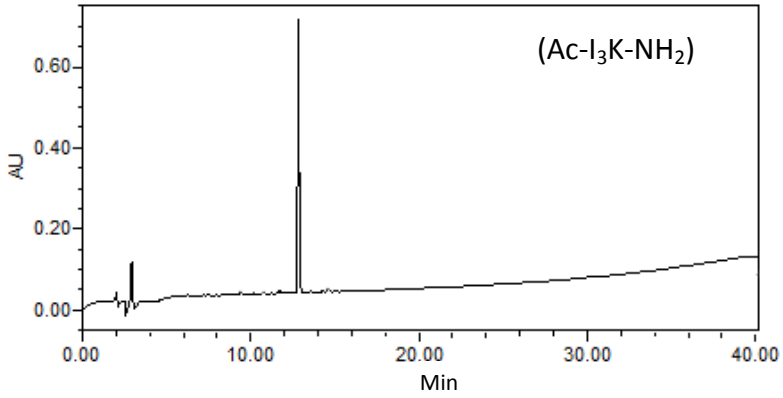
Electronic Supplementary Information (ESI)

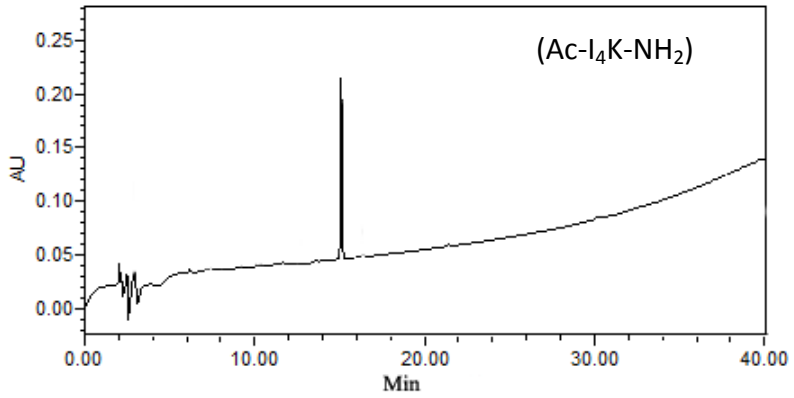
Controlled Silica Deposition on Self-assembled Peptide Nanostructures via Varying Molecular Structures of Short Amphiphilic Peptides

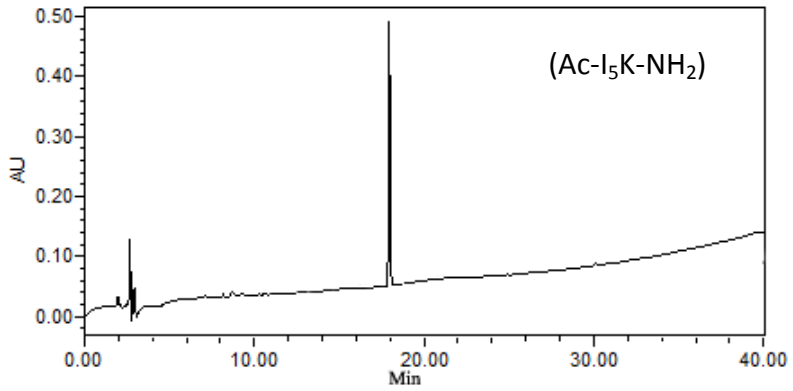
Shengjie Wang,[a] Junyi Xue,[a] Yurong Zhao,[a] Mingxuan Du,[a] Li Deng,[a] Hai Xu*[a] and Jian R. Lu[b]

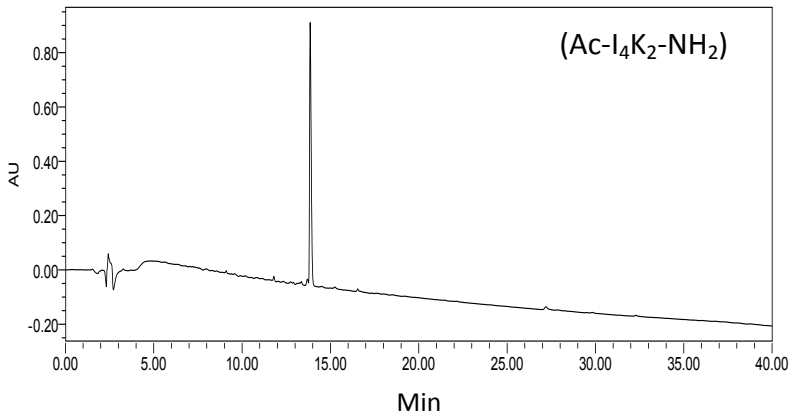
[a] Center for Bioengineering and Biotechnology, China University of Petroleum (East China), Qingdao 266580, P. R. of China.

[b] Biological Physics Group, School of Physics and Astronomy, University of Manchester, Schuster Building, Manchester M139JP, UK.


(Ac-I3K-NH2)
AU
0.60
0.40
0.20
0.00
0.00
10.00
20.00
30.00
40.00
Min


(Ac-I4K-NH2)
AU
0.25
0.20
0.15
0.10
0.05
0.00
0.00
10.00
20.00
30.00
40.00
Min


(Ac-I5K-NH2)
AU
0.50
0.40
0.30
0.20
0.10
0.00
0.00
10.00
20.00
30.00
40.00
Min


(Ac-I4K2-NH2)
AU
0.80
0.60
0.40
0.20
0.00
-0.20
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
Min

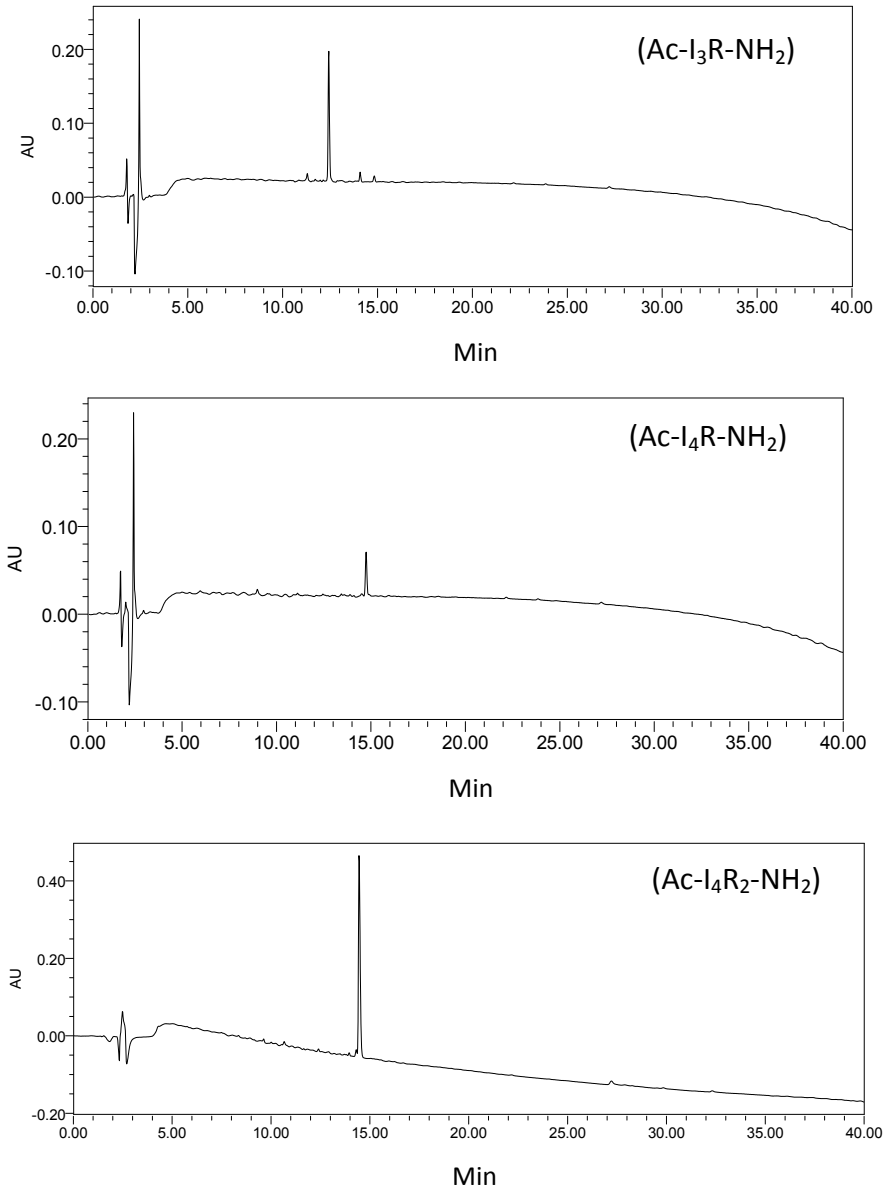
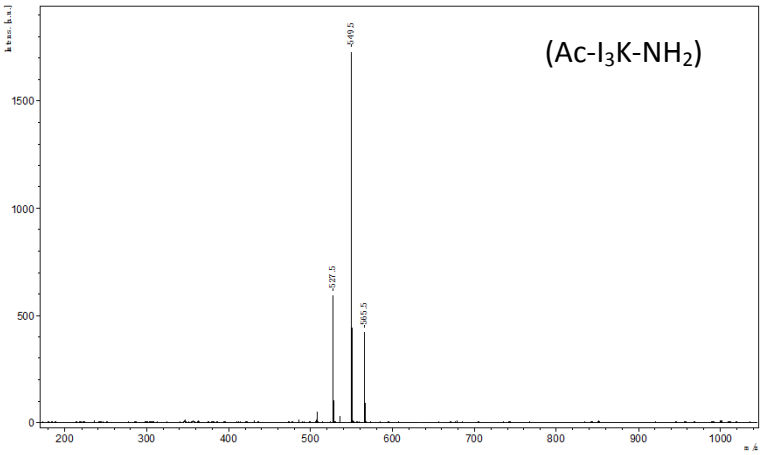
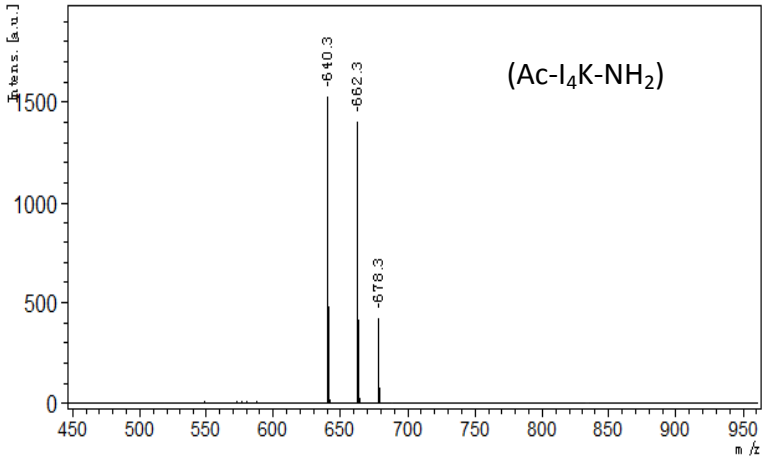
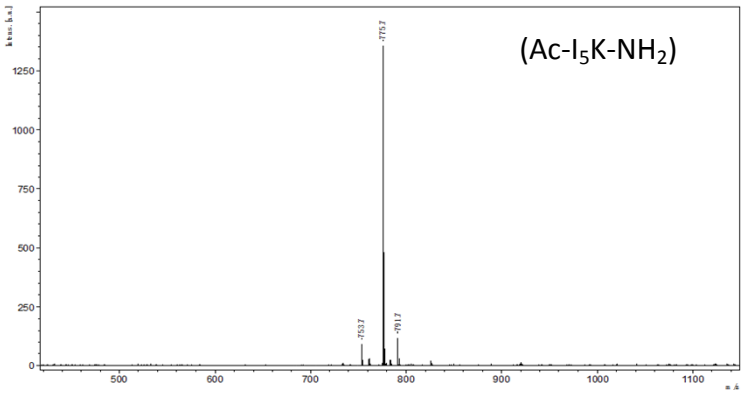
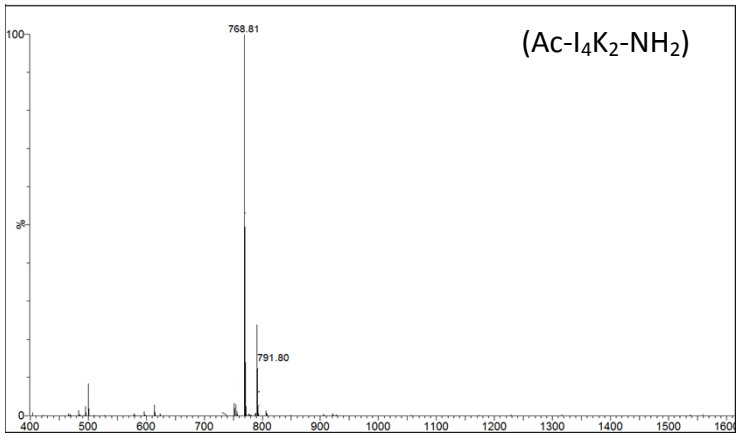


Fig. S1 HPLC profiles of the synthesized short peptides. The experimental condition for the HPLC analysis is as follows: eluent A, 0.1% TFA in water, 0→1 min, 95%, 1→40 min, 95%→5%, 40→45 min, 5%→95%; eluent B, 0.1% TFA in acetonitrile, 0→1 min, 5%, 1→40 min, 5%→95%, 40→45 min, 95%→5%. UV, 214 nm; flow rate, 0.6 ml/min; column, RP-C18, 4.6 mm×150 mm. The measurements were performed on Waters 2695 Alliance HPLC system at temperature of 25 ^{o}C. The profiles indicate high purity with the seven peptides.


(Ac-I3K-NH2)
-549.5
-527.5
-505.5


(Ac-I4K-NH2)
Intens. [a.u.]
-640.3
-662.3
-678.3
m /z


(Ac-I5K-NH2)
-775.7
-753.7
-791.7


(Ac-I4K2-NH2)
768.81
791.80
%

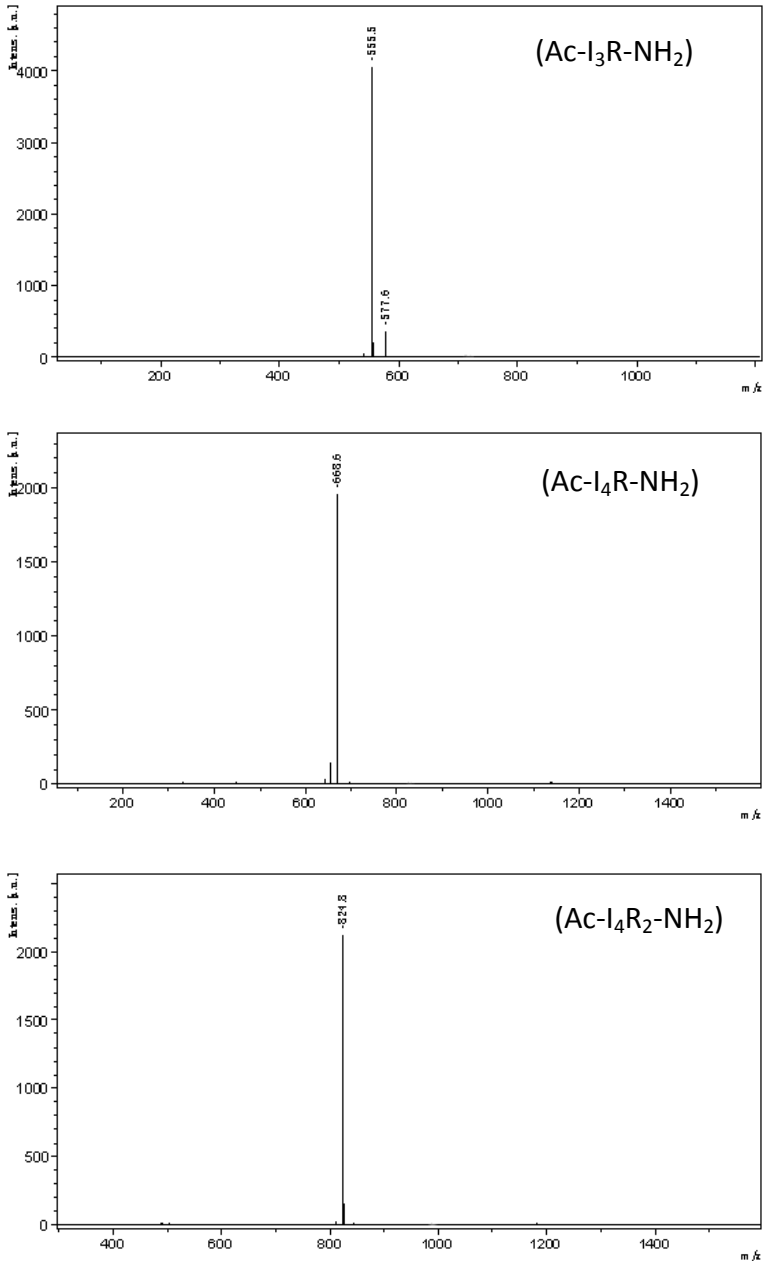


Fig. S2 MS spectra of the synthesized short peptides. The MS measurements were carried out on a Bruker Biflex III matrix assisted laser desorption/ionization time of flight (MALDI-TOF) mass spectrometer equipped with a 337 nm nitrogen laser and 4-hydroxy-α-cyanocinnamic acid was used as the matrix. The samples were dissolved with the matrix in the mixture of acetonitrile and water (1:1, v/v) which contained 1% trifluoroacetic acid (TFA). About 0.5 μl of the sample solution was placed on a metal sample plate and then allowed to air-dry at ambient temperature. Mass spectra were acquired in positive linear mode and using an acceleration voltage of 19 kV. External mass

calibration was performed using a standard peptide mixture. Spectra were obtained by setting the laser power close to the threshold of ionization and generally 100 pulses were acquired and averaged.

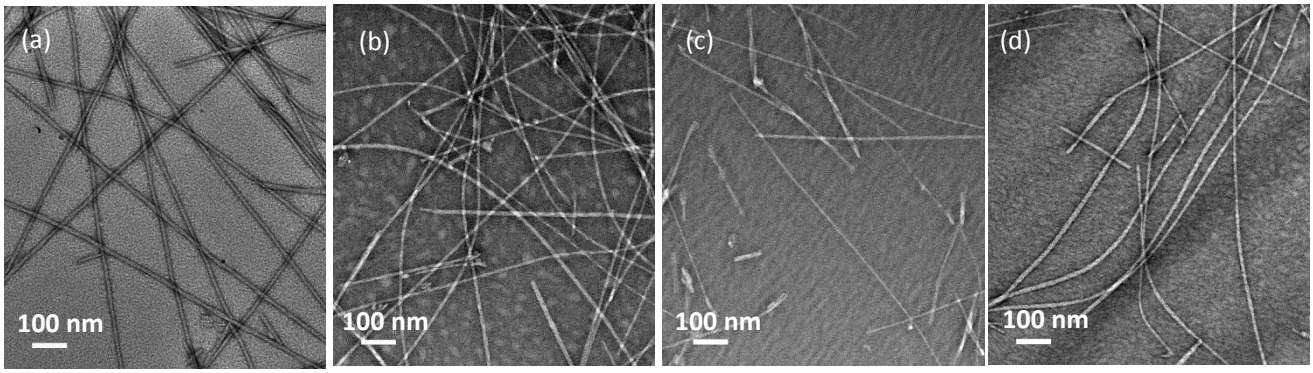


Fig. S3 TEM images of (a) I_3K, (b) I_4K, (c) I_5K, and (d) I_4K_2 self-assemblies in aqueous solution (pH 7.0).

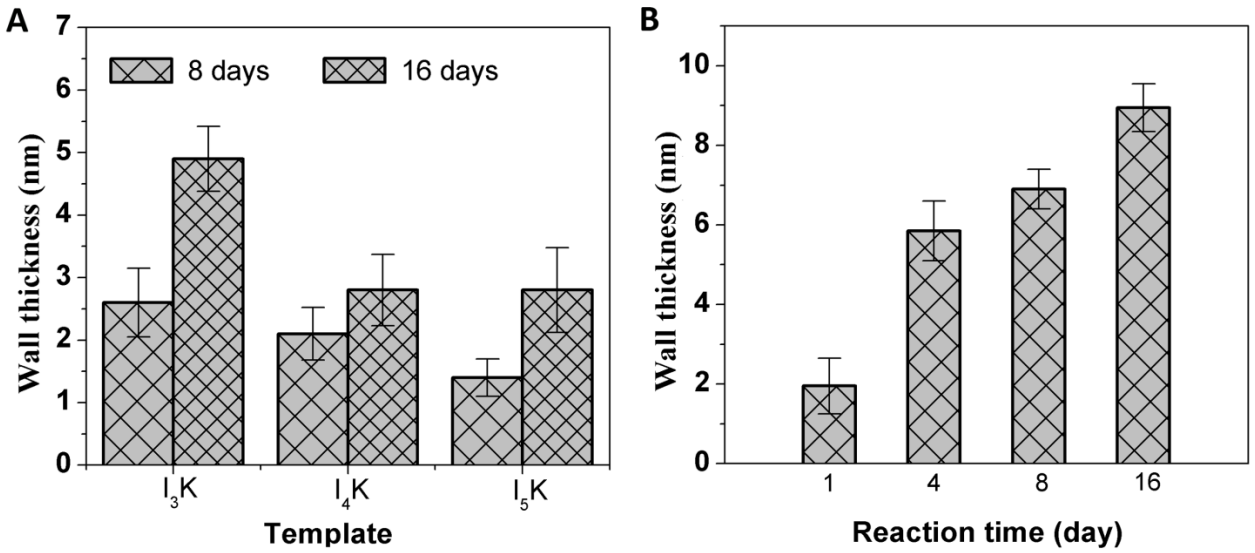


Fig. S4 The wall thickness of the silica nanotubes template by the peptide assemblies.

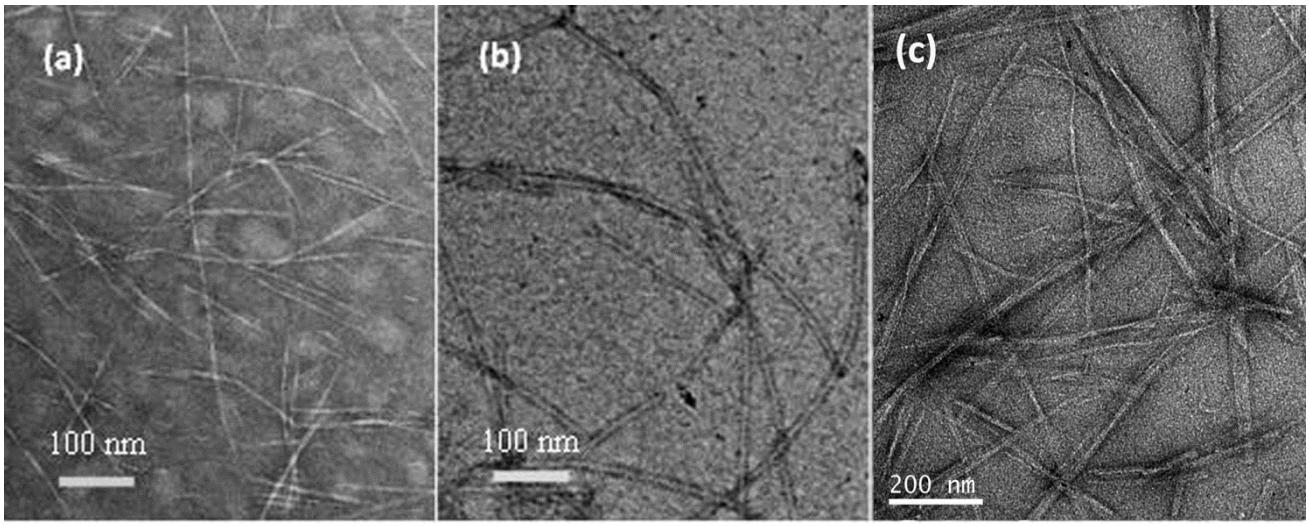


Fig. S5 TEM images of (a) I_3R, (b) I_4R, and (c) I_4R_2 self-assemblies in aqueous solution (pH 7.0).

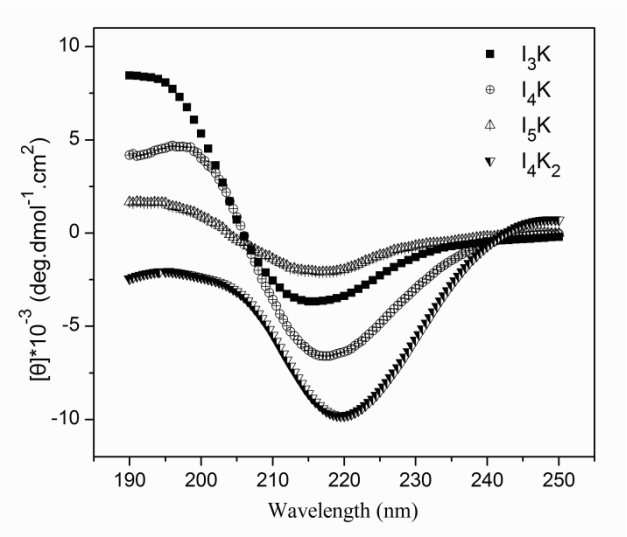


Fig. S6 CD spectra of I_3K, I_4K, I_5K and I_4K_2 at a concentration of 1.0 mM in aqueous solution (pH 7.0).

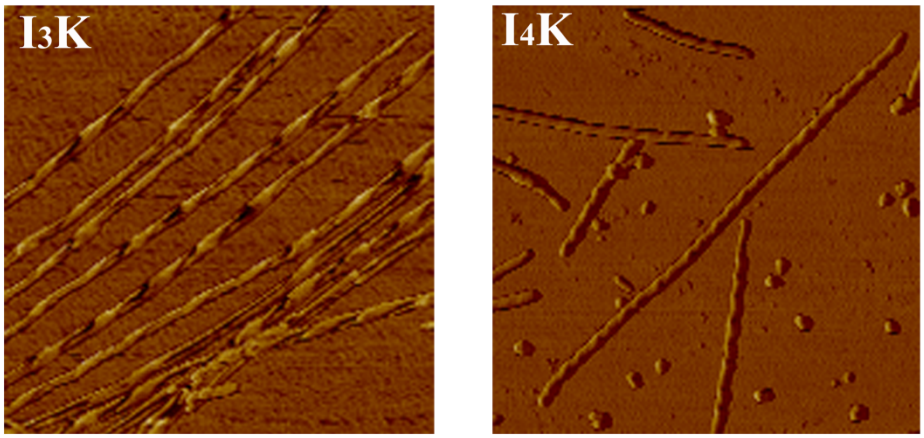


Fig. S7 AFM phase images of I_3K and I_4K nanofibrils.

Table S1 The main fitting parameters for the SANS curves as shown in Fig. 5.

Peptides	I_3K	I_4K	I_4K_2
Fitting Models	HollowCylinderModel	FlexCylEllipXModel	FlexCylEllipXModel
Parameters:			
axis ratio	/	3	4
core	10-20 Å	/	/
radius	40-45 Å	27 Å	14 Å
length	>1000 Å	>1000 Å	>1000 Å
sldCyl	3e-06	3e-06	4e-06
sldSlov	6.21e-06	6.21e-06	6.21e-06