Electronic Supplementary Material (ESI) for Dalton Transactions.

Supporting Information for

Structural Roles of Amphiphilic Peptide Tails on Silica Biomineralization

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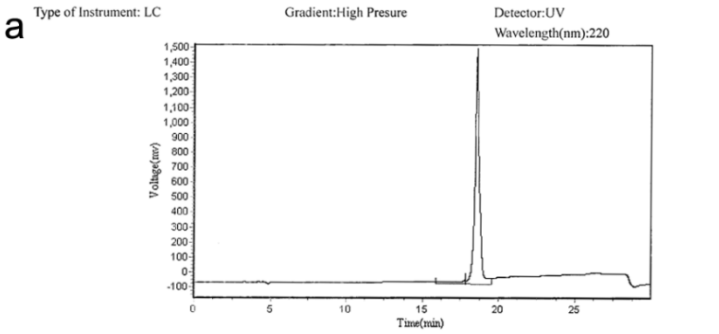
Materials. The designed peptides were purchased from Shanghai Biotech Bioscience & Technology Co., Ltd, which have a purity of at least 95% (Figures S1 and S2). Tetraethyl orthosilicate (TEOS, 98%) and trimethoxysilylpropyl-N,N,N-trimethylammonium chloride (TMAPS, 50% in methanol) were purchased from Aldrich and Gelest, respectively. All chemicals were used as received without further purification.

Sample Preparation. The designed amphiphilic peptides were dissolved in pure water (18.2 MΩ•cm), and reached a weight concentration of 0.1%. Sodium hydroxide was added to adjust the pH to neutral (6.0−8.0) after the dissolution of the peptide. The designated amount of TMAPS was added to the homogeneous peptide solutions at room temperature. Then, TEOS was added to the mixed solution of the amphiphilic peptide and TMAPS. The oil drops of TEOS gradually disappeared, and the solution became cloudy and highly dense. The molar composition of the reaction mixture was peptide:TMAPS:TEOS = 1.0:4.0:16.0. One hour later, stirring was stopped, and the reaction mixture was aged at 353 K for 3 days. The powder product was recovered by centrifugation and freeze dried.

Characterization. SEM observation was performed with a field emission-scanning electron microscope JEOL JSM-7401F microscope at 0.8-1.0 kV. To observe the genuine external surface, the samples were observed without any metal coating. TEM observation was performed using a JEOL JEM-2100 microscope operated at 200 kV (Cs 1.0 mm, point resolution 0.23 nm). Images were recorded with a KeenView CCD camera (resolution 1376 x 1032 pixels, pixel size 6.45 x 6.45 μm) at 30 000–120 000 times magnification under low-dose conditions. CD and UV/Vis spectra were recorded using a JASCO J-815 spectropolarimeter. The spectra baseline was corrected using pure water. The spectra were obtained at the peptide concentration of 0.01 mmol/L, and peptide:TMAPS:TEOS = 1.0:4.0:16.0. The spectra were recording by taking 3

averages from 190 to 350 nm with a 0.5-nm step and a 1-s collection time per step at room temperature. Thermogravimetric analyses were performed on Pyris 1 thermogravimetric analyzer (Perkin Elmer, Inc., USA). It was performed in air from 40°C to 750°C, and the heating rate was 20 °C/min.

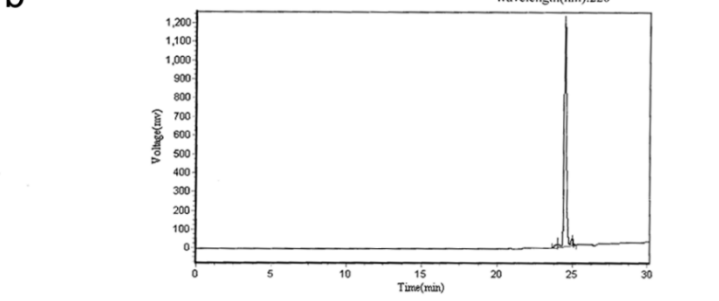
a



Results

Peak No.	Peak ID	Ret Time	Height	Area	Conc.
1		17.810	23884.998	1613693.250	4.8999
2		18.547	1518819.750	31319168.000	95.1001
Total			1542704.748	32932861.250	100.0000

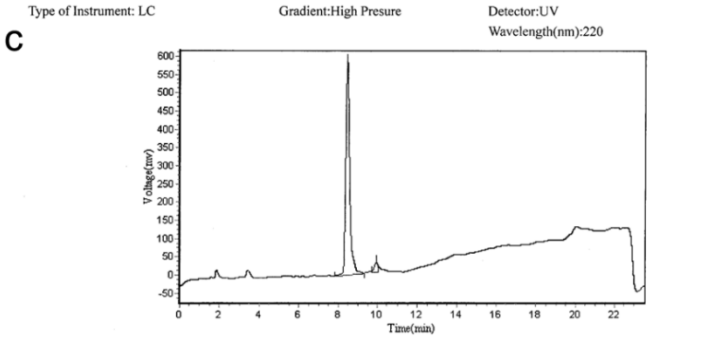
b



Results

Peak No.	Peak ID	Ret Time	Height	Area	Conc.
1		24.017	15628.104	202901.156	1.4792
2		24.483	1186879.250	13364637.000	97.4323
3		24.483	37109.262	95677.578	0.6975
4		24.483	21963.684	53624.414	0.3909
Total			1261580.299	13716840.148	100.0000

c



Results

Peak No.	Peak ID	Ret Time	Height	Area	Conc.
1		8.462	582168.125	8250005.500	95.7843
2		9.940	27108.545	363100.500	4.2157
Total			609276.670	8613106.000	100.0000

Figure S1. HPLC analysis of P1-4 (a-d).

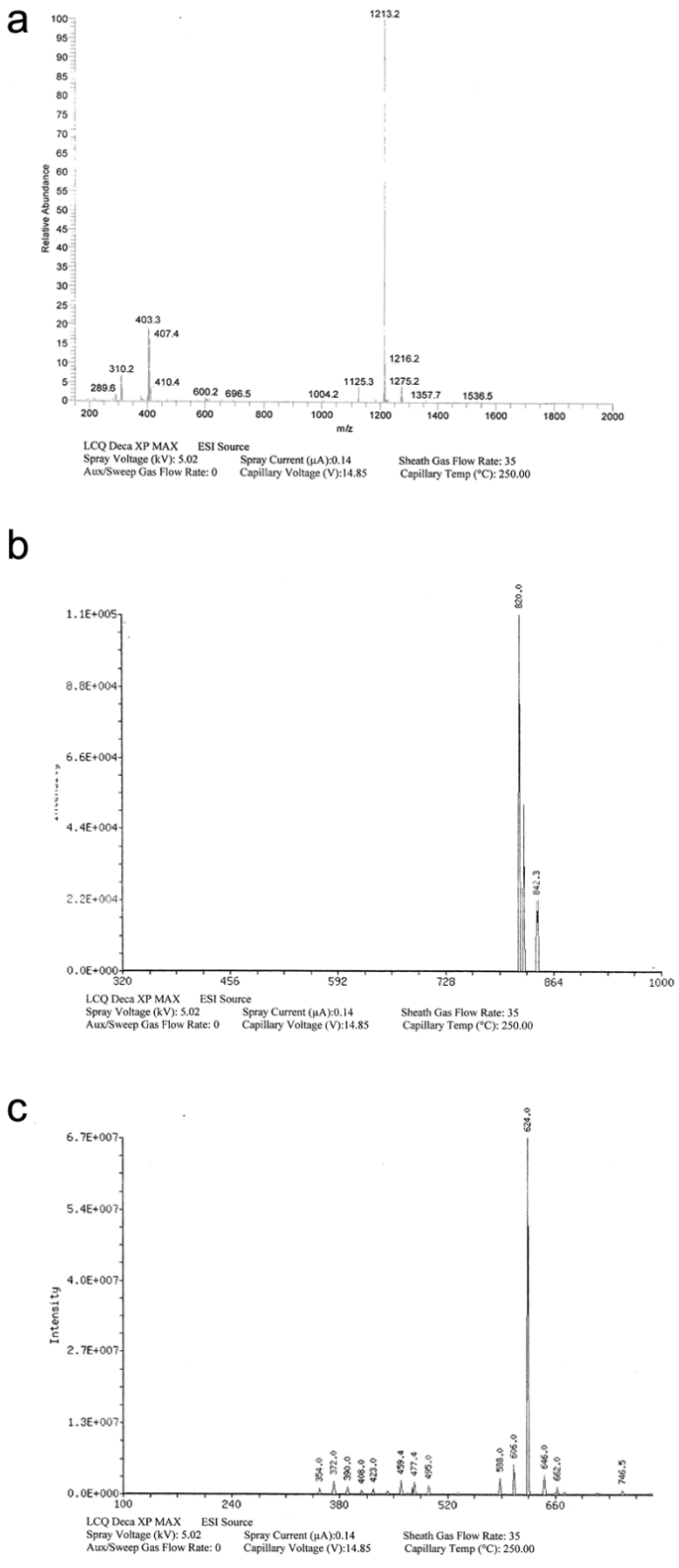


Figure S2. ESI-MS spectra of P1-4 (a-d).

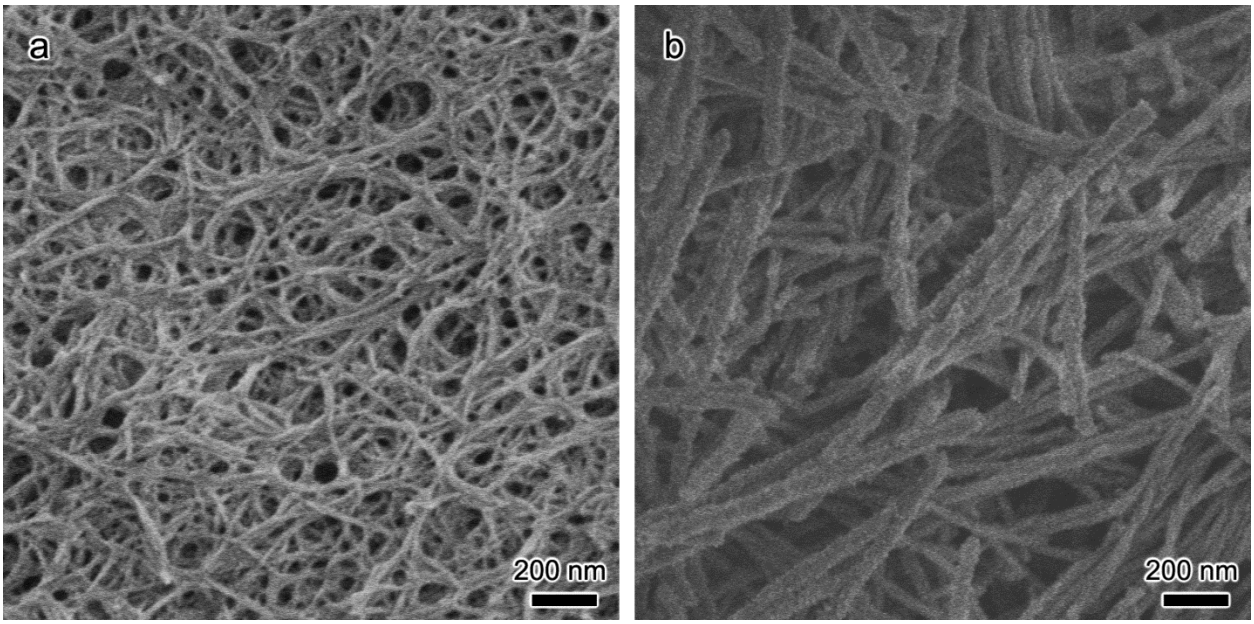


Figure S3. Low magnification SEM images of nanoribbons prepared from P1 (a) and nanofibers prepared from P2 (b).

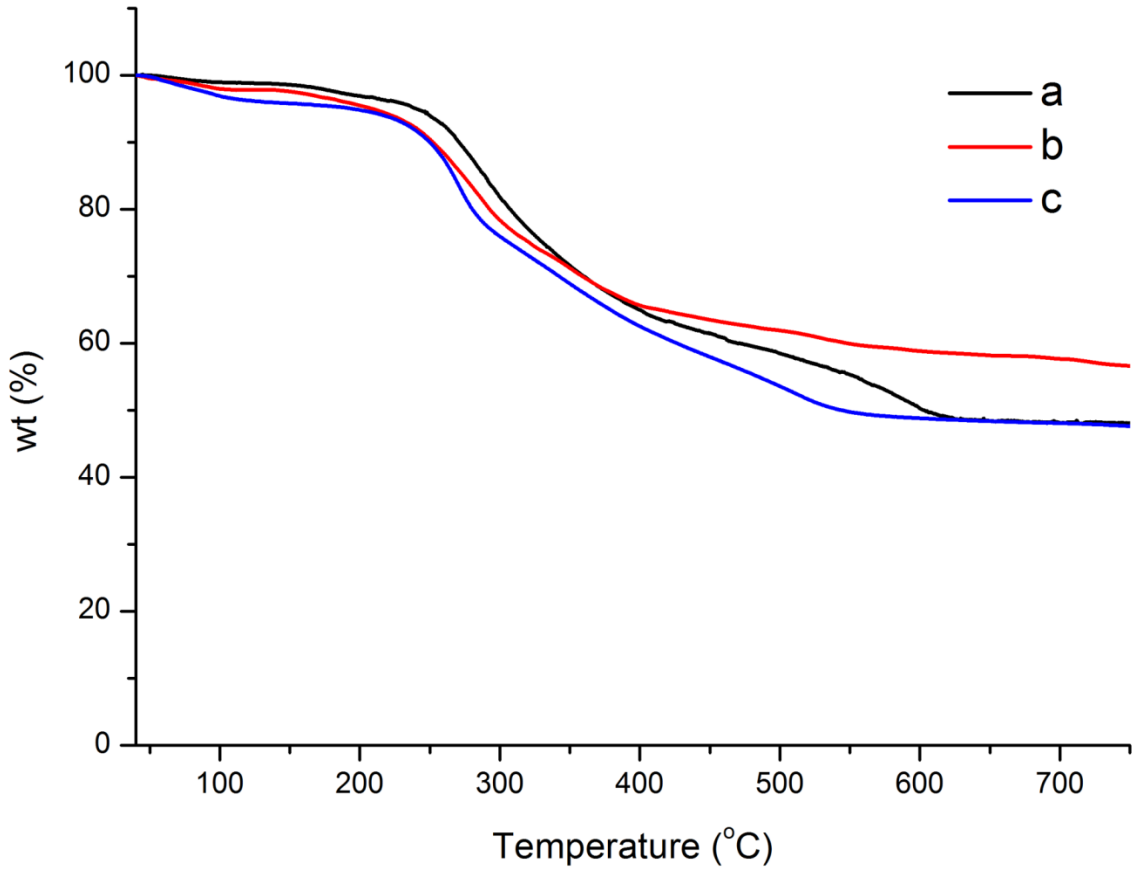


Figure S4. TGA curves of PTS1-3 (a-c).

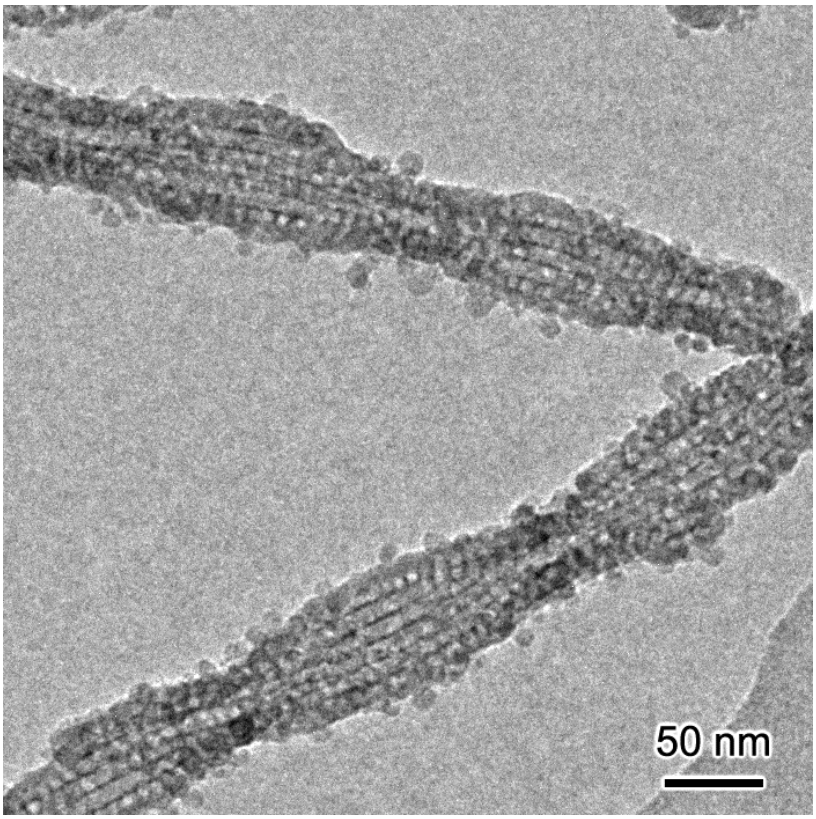


Figure S5. TEM image of calcined PTS2, showing that the nanostructure was remained.