Supporting Information

1. Experimental Section

Preparation of Peptide Microtubes and Nanofibers: The lyophilized diphenylalanine peptide (Bachem, Switzerland) was dissolved in acetonitrile-water solvent (2 mg/mL) at 95 °C for 4 min, which yields a transparent solution. The acetonitrile content in solvent mixture was varied from 0% to 100%. The resulting peptide solutions were 1) in-situ cooled to room temperature; 2) deposited on microscopic glass coverslips and dried at ambient temperature. When the acetonitrile content increased to 90%, the self-assembly rate was dramatically improved and a vast number of peptide assemblies were formed within several minutes. All the self-assembly processes on glass surface were very quick and required only several seconds, due to the simultaneous cooling and evaporation of solvent.

Scanning Electron Microscopy: All the samples were sputter-coated with platinum using E1045 Pt-coater (Hitachi, Japan), and then imaged by an S-4800 field emission scanning electron microscope (Hitachi High-technologies CO., Japan) at the acceleration voltage of 5 kV.

X-Ray Diffraction: X-ray diffraction measurements were performed on a D8 Focus powder diffractometer (Bruker, German). The diffracted intensity of CuKa radiation (wavelength of 1.5418 nm, under a condition of 40 kV and 40 mA) was measured with a scan rate of 2 ^{o}/min in a 2θ range between 3 ^{o} to 50 ^{o}.

2. Supporting Figures

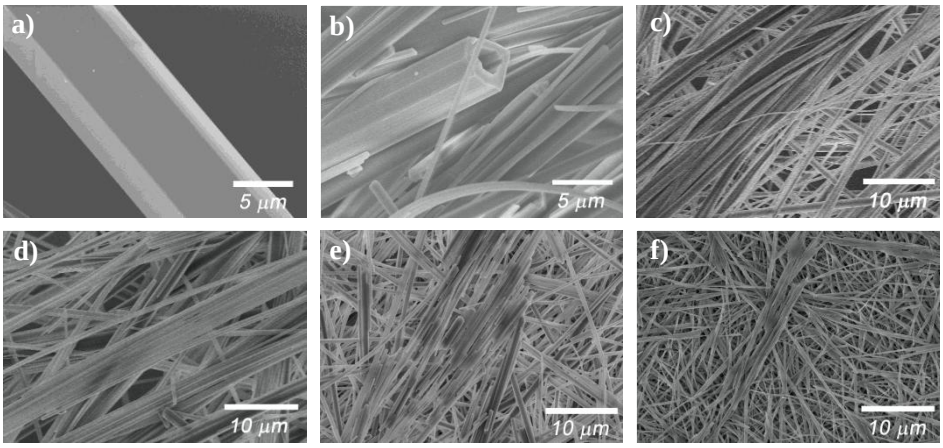

Fig. S1 SEM images of diphenylalanine assemblies (Route I) with different acetonitrile content (a-5%; b-10%; c-30%; d-70%; e-90%; f-95%).

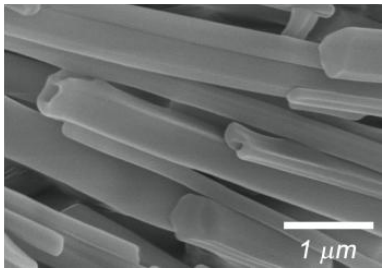

Fig. S2 SEM images of hollow diphenylalanine nanotubes (Route I) with 90% acetonitrile content.

Fig. S3 Macroscopic image of diphenylalanine assemblies formed in acetonitrile-water solvent mixture with 90% acetonitrile content (Route I).

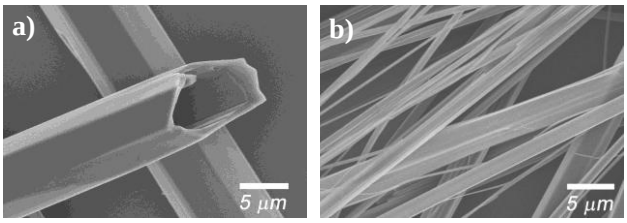

Fig. S4 SEM images of diphenylalanine assemblies (Route II) on glass surface with different acetonitrile content (a- 50%; b-70%).

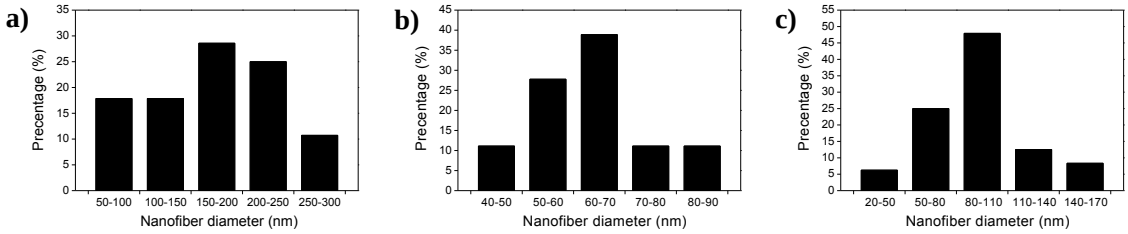

Fig. S5 Diameter distribution of nanofibers assembled on glass surfaces with various acetonitrile contents (a-90%; b-95%; c-100%).

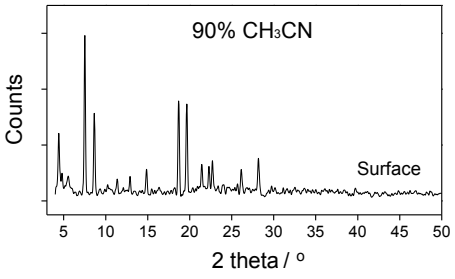

Fig. S6 Powder XRD patterns of diphenylalanine nanofibers prepared on a glass surface with 90% acetonitrile.

3. Supporting Tables

Table S1 The property parameters of organic solvents

Solvent	Polarity index	HBD ability	HBA ability	Surface tension	Assemblies morphology
Water	10.20	1.17	**0.47**	**72.80**	Nanotubes/Microtubes[a,b]
Acetonitrile	5.80	0.19	**0.40**	19.10	Nanofibers[b]
Methanol	5.10	0.98	**0.66**	22.55	Nanofibers[b]
Ethanol	4.3	0.86	**0.75**	22.27	Microcrystals[c]
Chloroform	4.10	0.20	0.10	27.16	Organogels[d]
Toluene	2.40	0.00	0.11	28.53	Organogels[d]

Note: a-ref.[1, 2] and this work; b-this work; c-Ref.[3]; d-Ref.[4].

Reference

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[2] Reches, M.; Gazit, E. *Science* **2003,** 300, 625-627.

[3] Zhu, P. L.; Yan, X. H.; Su, Y.; Yang, Y.; Li, J. B. *Chem.-Eur. J.* **2010,** 16, 3176-3183.

[4] Yan, X. H.; Cui, Y.; He, Q.; Wang, K. W.; Li, J. B. *Chem. Mat.* **2008,** 20, 1522-1526.