Electronic Supplementary Material (ESI) for Soft Matter.

Electronic Supporting Information

Recovering 3D Image of Polymeric Nanofibers in Solution through Theoretical Analysis and Monte-Carlo Simulations of Their 2D TEM Images

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S1. Preparation of six kinds of monodisperse nanofibers with different lengths

PEO_{113}-*b*-$P4VP_{74}$ (poly(ethylene oxide)$_{113}$-*block*-poly(4-vinyl pyridine)$_{74}$, subscripts represent the average degrees of polymerization; M_w/M_n = 1.29) micelles were prepared in a water/methanol (4:1, *V*/*V*) mixture by adding carbon dioxide saturated water into a PEO-*b*-P4VP (2.0 mg/mL) methanol solution. 1 mL DNA solution in deionized water (0.2 mg/mL) was added into 10 mL of the micelle solution (0.4 mg/mL) over 15 minutes. In the final mixture, the mass ratio of DNA to the micelles was 1:20. The PEO_{113}-*b*-$P4VP_{74}$ micelles assembled with the linear DNA as the template into monodisperse beads-on-string morphology. After two days, the micelles on each string fully fused with each other to form monodisperse core-shell nanofibers. The shell of the core-shell nanofibers is formed by soluble PEO block chains, which makes the nanofiber well-dispersed in water, and the core is formed by aggregated P4VP block chains. The nanofibers were slightly crosslinked by 1,2-bis(2-iodoethoxy)ethane to stabilize them.

The length of the nanofibers can be tailored by using monodisperse linear DNA with different lengths. Herein, DNA with 2686, 4731, 5522, 6625, 7544, and 8592 base pairs were used respectively.

S2. Transmission Electron Microscopy (TEM)

For the preparation of TEM samples, a droplet of the nanofiber solution was dropped on a TEM copper grid. The excess solution was absorbed by a piece of filter paper immediately,

and the copper grid was then dried under room temperature. TEM images were taken on Philip CM120.