Supporting Information

Nanofiber formation from sequence-selective DNA-templated self-assembly of a thymidylic acid-appended bolaamphiphile

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Sample Preparation

Thymidylic acid-appended bolaamphiphile **1** was synthesized by the phosphoramidite technique described with its stereochemistry in reference 10. Synthetic oligonucleotides **2**, **3**, **4**, and **5** were purchased from Fasmac Co (Kanagawa, Japan). Bolaamphiphile **1** was dissolved in a 0.1× TE buffer solution (1.0 mM tris-HCl and 0.1 mM EDTA, pH = 8.0) by sonication and heating at 90 ºC for 30 min. Templates **2** and **3** were added to the solution and the solution was divided into three portions and gradually cooled to room temperature to form whitish viscous solutions. Solutions of either the target oligonucleotide (**4**) or a non-target oligonucleotide (**5**) in 0.1× TE buffer were added to each of two portions, and no oligonucleotide was added to the third portion. These three portions were kept at 20 °C for one day prior to analysis. The final concentrations of bolaamphiphile **1** and oligonucleotides **2**, **3**, **4**, and **5** were 1.8×10^{-2} M, 9.0×10^{-4} M, 9.0×10^{-4} M, 1×10^{-4} M, and 1×10^{-4} M, respectively.

AFM Observation

One microliter of each aqueous solution was placed on highly oriented pyrolytic graphite and dried in air for a few minutes. The specimen was then washed with 10 μl of cold Millipore water 2 times and blotted with filter paper. Tapping-mode AFM was

carried out with a Nanonavi station and an S-image system (SII NanoTechnology Inc., Tokyo, Japan) using a silicon micro-cantilever (spring constant 40 N m^{-1}, frequency ≈ 120 kHz, Olympus).

UV melting curve measurements

Solutions of **1** alone, **1**/**2**/**3**/**4**, **1**/**2**/**3**, and **2**/**3**/**4** were prepared in 0.1× TE buffer using the similar procedure described in sample preparation and subjected to UV melting experiments in a quartz cell (l = 1.0 cm). The concentrations of **1**, **2**, **3**, and **4** were 3.6 × 10^{-5} M, 1.8 v 10^{-6} M, 1.8 × 10^{-6} M, and 2 × 10^{-7} M, respectively. The UV absorbance at 260 nm was measured with a UV-1800 spectrometer (Shimadzu Co., Kyoto, Japan) at a heating rate of 0.5 degC min^{-1} after annealing at 10 °C for 30 minutes, and T_m analyses were conducted using a TMSPC-8 system (Shimadzu Co., Kyoto, Japan). Tm values were calculated from the first-derivative curves of the UV melting curve measurements as shown in Figure S1. The UV melting curve of the **1**/**2**/**3**/**5** system was obtained by the similar procedure described above and Tm was appeared at 57 °C as shown in Figure S2.

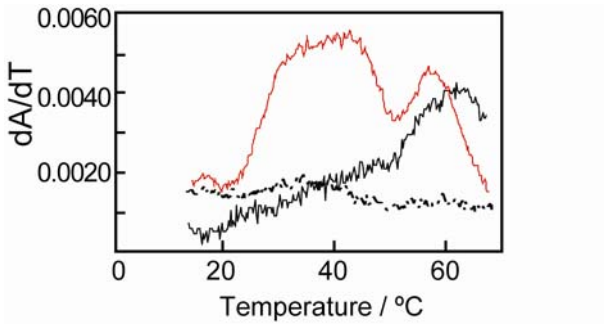

Figure S1 The first-derivative curves of the UV melting curves shown in Figure 3 for the **1**/**2**/**3**/**4** (red), **1**/**2**/**3** (black), and **2**/**3**/**4** (dotted) systems.

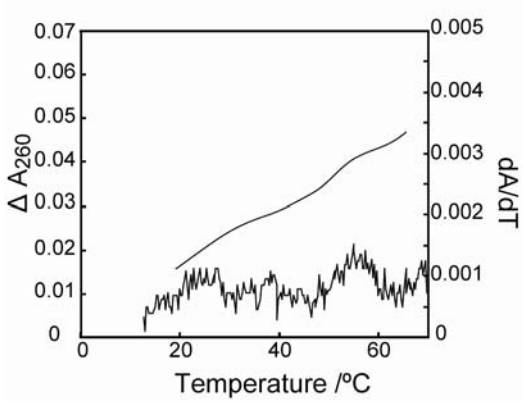

Figure S2 The melting and first-derivative curves of the **1**/**2**/**3**/**5** system in 0.1× TE buffer solution.