Supporting information

A-motif Regulated Assembly towards pH Responsive DNA Nano-network

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Experimental Section

Materials and methods: Tris (tris-hydroxymethylaminomethane) was purchased from USB. NaH_2PO_4 (Sodium phosphate monobasic dehydrate) and Na_2HPO_4 (Sodium phosphate dibasic dodecahydrate) were purchased from sigma. DNA marker (DL 2000) was purchased from BBI. All the other reagents used in the experiments were purchased from Sigma. All the DNA oligonucleotides were purchased from Sangon Biotech (ShangHai, China) and purified by HPLC. Concentration of each DNA was estimated by absorption at 260 nm. Molar extinction coefficients were estimated by the nearest neighbor method. All DNA oligonucleotides used in the experiments are listed in Table S1.

Electrophoresis: The native PAGE experiments were carried out on a 10% polyacrylamide (19:1 acrylamide:bisacrylamide ratio) gel and run for 2.0 hours with a field of 80 V at 4 ℃. The running buffer consisted of 50 mM Tris HCl, pH 8.0, 20 mM acetic acid, and 2 mM EDTA (TAE). 10 mM NaH_2PO4, Na_2HPO4 and H_3PO4 (pH 4.4). Gels were silver stained.

AFM (atomic force microscopy): AFM imaging was performed in tapping mode in air on a Multimode V using NP-S tips (Veeco Inc.) 10 μl diluted sample of the DNA assembly was applied to a piece of freshly cleaved mica and left to adsorb to the surface for 10 min. Then the substrate was dried with compressed air.

Circular Dichroism spectra: Circular dichroism spectra were recorded on a JASCO J-810 spectropolarimeter using a quartz cell of 1 cm optical path length and with an instrument scanning speed of 50 nm per min and a response time of 2 s. The spectra

were scanned over a wavelength range of 220-340 nm. The CD data are a representation of three averaged scans taken at 25 °C. All CD spectra are baseline-corrected for signal contributions due to the buffer.

Metallization. First, the sample was seeded with silver by using the glutaraldehyde method. Annealed DNA was incubated with 0.2% glutaraldehyde in 1×TAE, Mg^{2+} buffer on ice for 20 min, then at room temperature for 20 min. Then the sample was incubated overnight at 4°C.

Table S1. Sequence used in the experiments

Name	Sequences
B	GCTCATGCGACTAACA15CATTGTCGGACTGCC
C	GTTAGTCGCATGAGCA15GGCAGTCCGACAATG
D	TCGTTGACAAGTCATGACTAACAGTGATGCATCGTACAGCTAGCCACTCTGACT
E	TGACTTGTCAACGTCAGTCTATGTCGTACATCATGTTGCTATGTCAGAGTGGCT
F	TCACTGTTAGTCA$_{15}$ATAGCAACATGATG
G	ACGACATAGACTGA$_{15}$AGCTGTACGATGC
B’	GCTCATGCGACTAACT$_{15}$CATTGTCGGACTGCC
C’	GTTAGTCGCATGAGCT$_{15}$GGCAGTCCGACAATG
F’	TCACTGTTAGTCT$_{15}$TTAGCAACATGATG
G’	ACGACATAGACTGT$_{15}$TGCTGTACGATGC

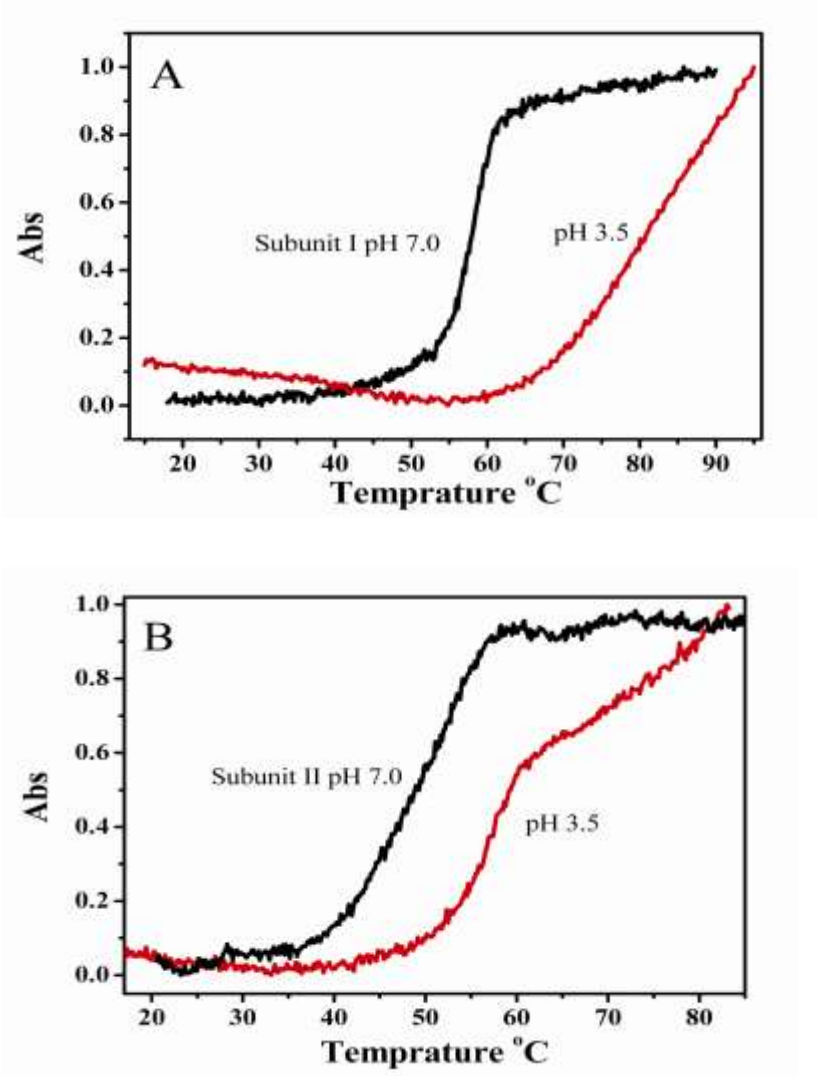

Figure S1. Thermal analysis of the structures assembled from A-motif. A) UV-melting of subunit I at pH 7.0 (black line), at pH 3.5 (red line). B) UV-melting of subunit II at pH 7.0 and 3.5.

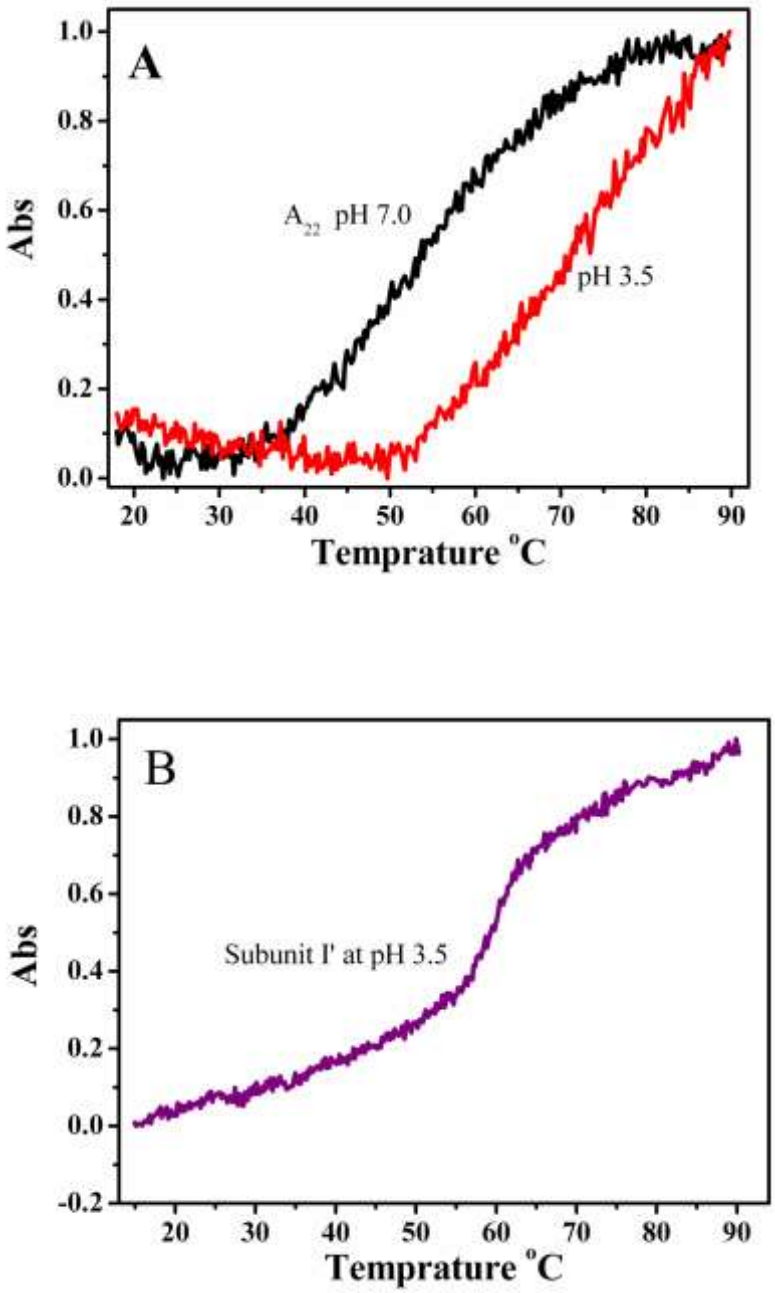

Figure S2. A) UV melting of A_{22} at pH 7.0 and 3.5; B) UV-melting of subunit I' at pH 3.5.

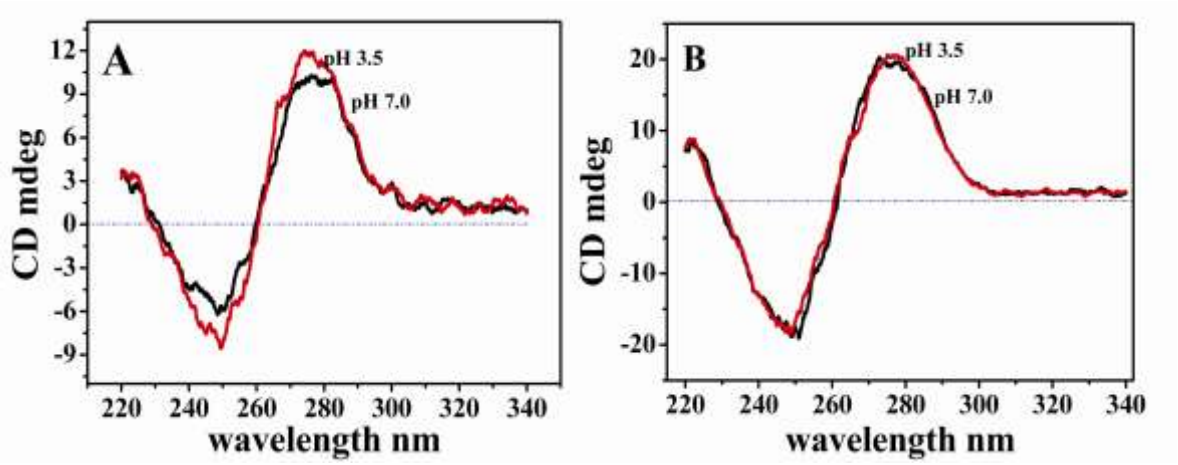

Figure S3: CD spectra of subunit I', subunit II' at pH 3.5 and 7.0 in phosphate buffer. A) Subunit I'; B) subunit II'.

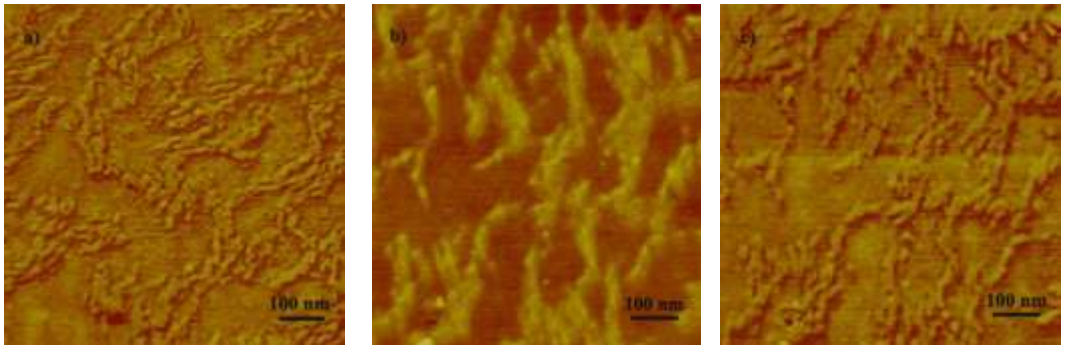

Figure S4: a) Phase image of subunit I at pH 3.5; b) height image of subunit I at pH 3.5 after three circles; c) phase image of subunit I at pH 3.5 after three circles.

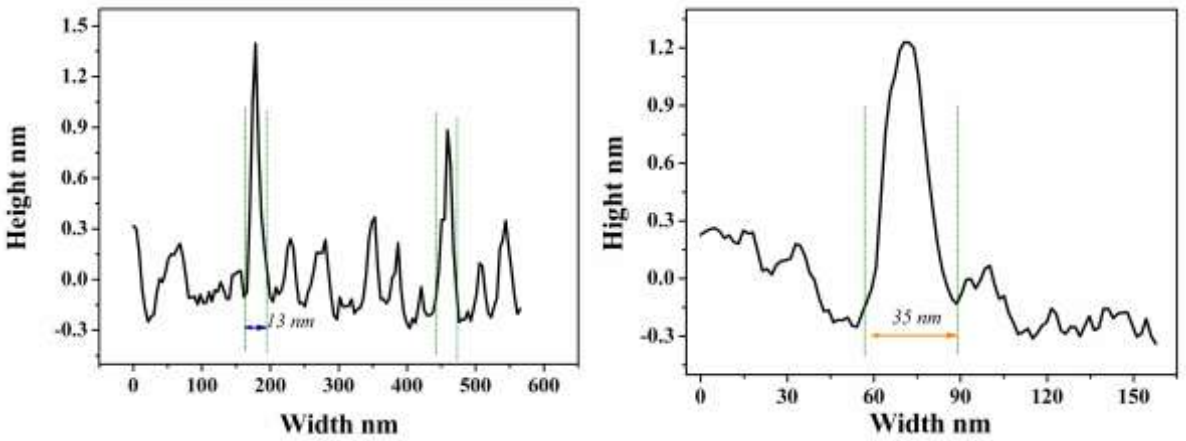

Figure S5: Height and width profile analysis of subunit II at pH 7.0 (left) and 3.5 (right).

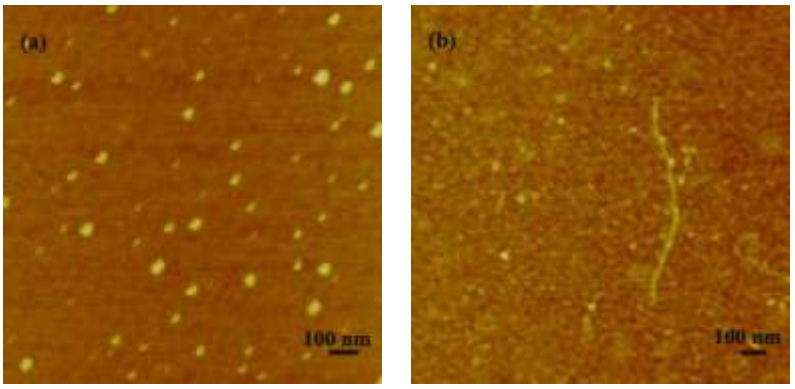

Figure S6: AFM image of (a) subunit I' and (b) subunit II' at pH 3.5.

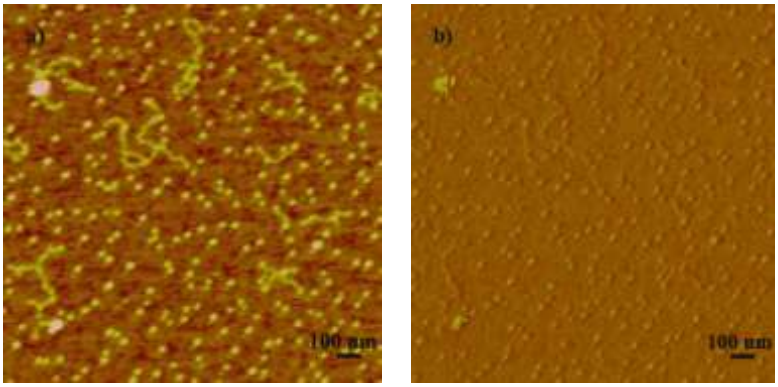

Figure S7: AFM analysis of the assembled structure as a template to grow silver nanoparticles. a) height image; b) phase image.