

Electronic supplementary information (ESI)

DNA Dumbbell Tiles with Uneven Widths for 2D Arrays

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1 Additional AFM images of 2D DNA arrays and their corresponding section profiles

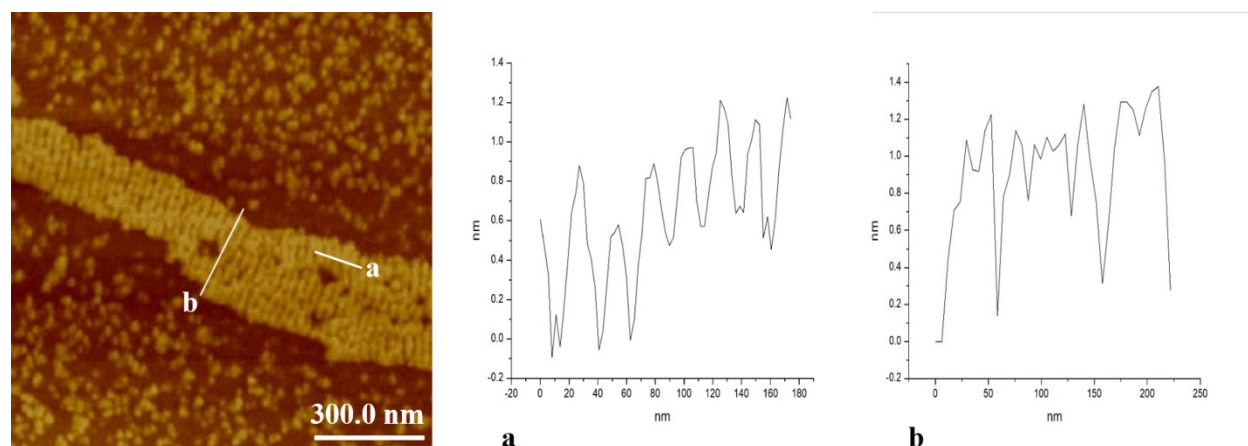


Fig. S1 An AFM image of array-A₀ and its section profiles. Section profile **a** provides the periodic distance of the A₀ tile length at around 23.0 nm. Section profile **b** provides the nanoribbon width at 230 nm and height at 1.0 nm, respectively.

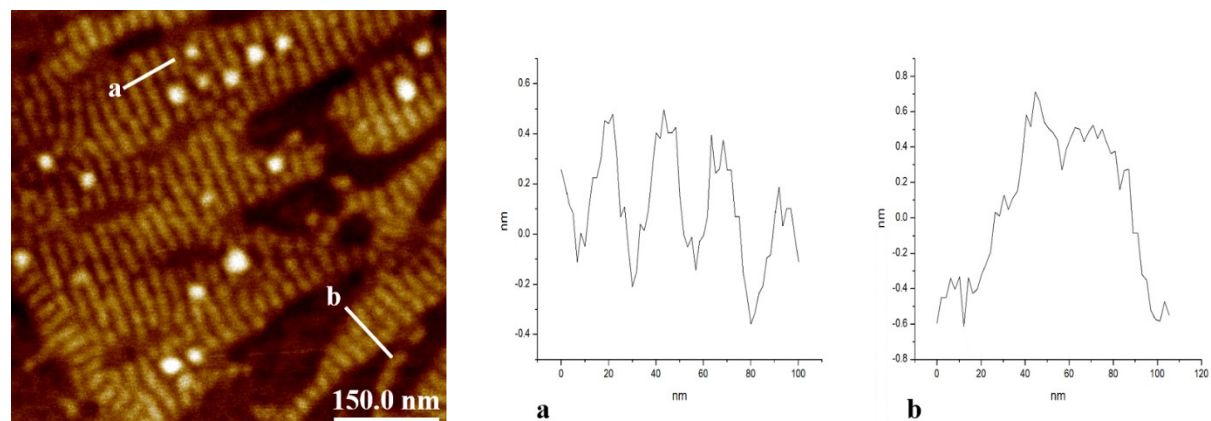


Fig. S2 An AFM image of array-A_E and its section profiles. Section profile **a** provides the periodic distance of the A_E tile length at around 21.0 nm. Section profile **b** provides a nanoribbon width at 90.0 nm and height at 1.0 nm, respectively.

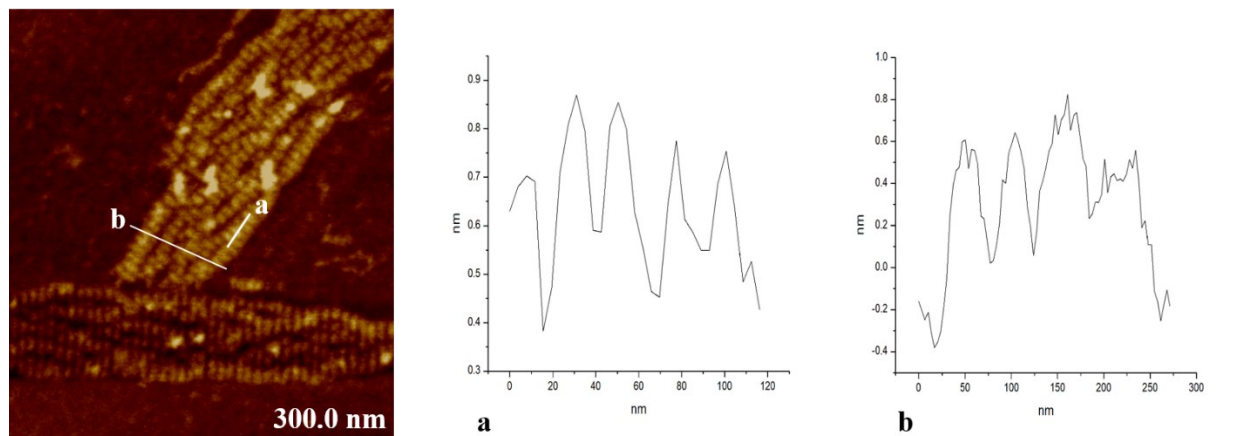


Fig. S3 An AFM image of array-B_E and its section profiles. Section profile **a** provides the periodic distance of the B_E tile length at around 23.0 nm. Section profile **b** provides an average nanoribbon width of this patch of array-B_E at 50.0 nm and height at 1.0 nm, respectively.

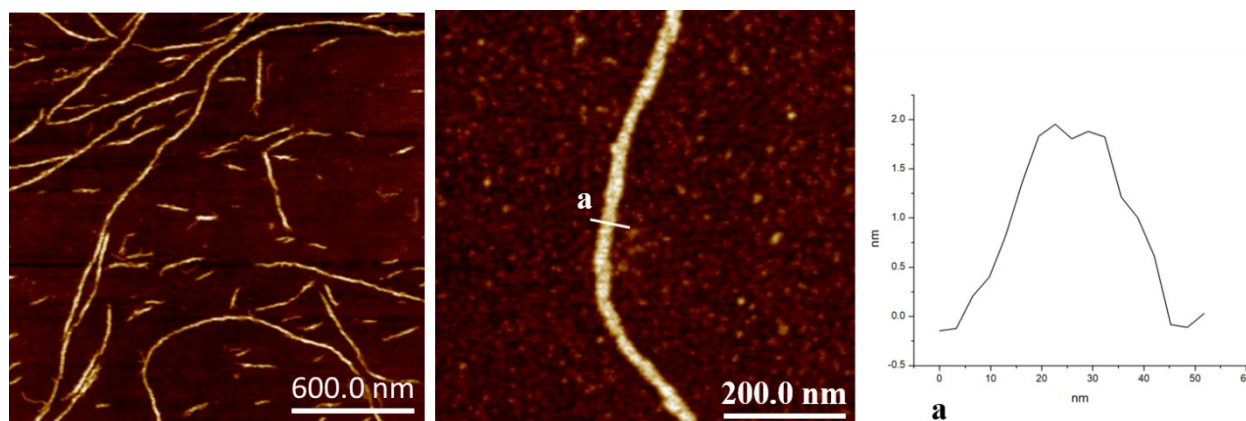


Fig. S4 The panoramic (left) and high-resolution (middle) AFM images of array-B_O, and a section profile of the mark **a**. Section profile **a** provides a nanotube width at 30.0 nm and height at 2.0 nm.

2. Oligonucleotide sequences used in this work

2.1 Schematic drawings and sequences of the linear templates for the synthesis of DNA dumbbell A and B molecules

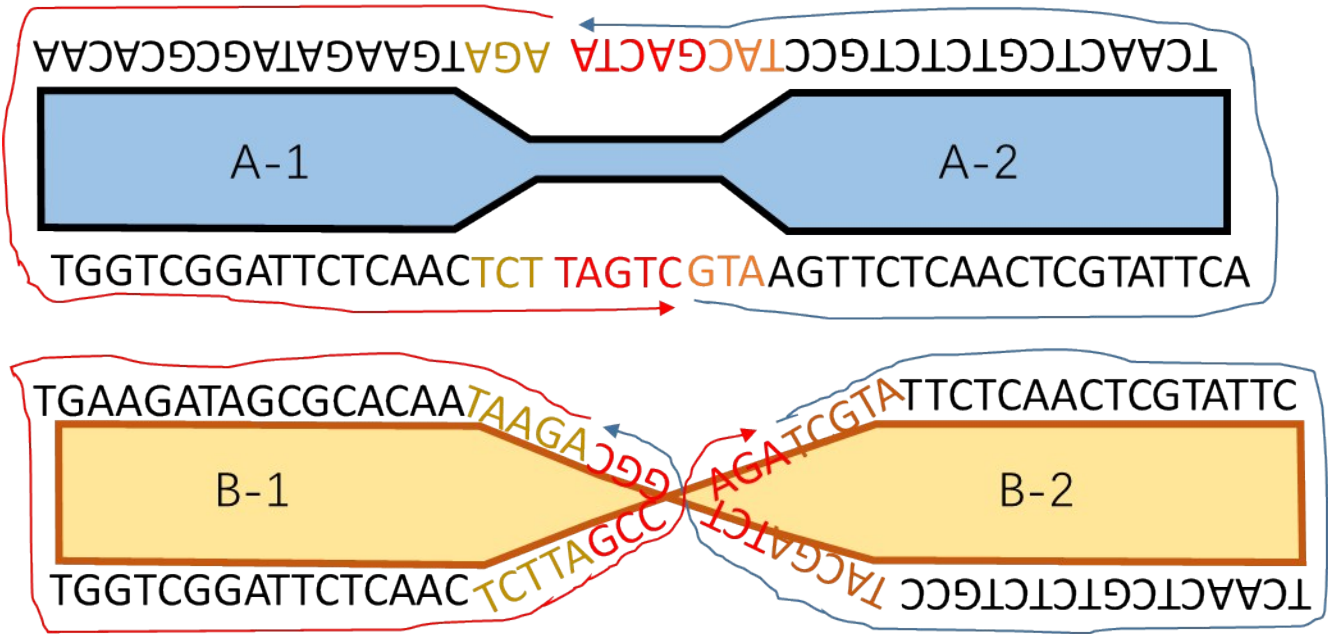


Fig. S5 Schematic drawings of DNA dumbbell sequences and nick sites for A (upper) and B (bottom) dumbbell molecules. The two coloured free curves in each drawing represent the two hairpin oligonucleotides.

Table S1 Sequences for dumbbell A composed of A1 and A2 and for dumbbell B composed of B1 and B2.

ID	Sequence (5' → 3')
A-1	AGATGAAGATAGCGCACAATGGTCGGATTCTCAACTCTTAGTC
A-2	GTATTCTCAACTCGTATTCTCAACTCGTCTCTGCCTACGACTA
B-1	TAAGATGAAGATAGCGCACAATGGTCGGATTCTCAACTCTTAGCCAGA
B-2	TCGTATTCTCAACTCGTATTCTCAACTCGTCTCTGCCTACGATCTGGC

2.2 Schematic drawing and sequences of the helper strands for the Ao(E) tile core

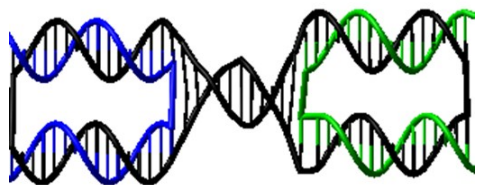


Fig. S6 Schematic drawing of the $A_{O(E)}$ tile core.

Table S2 Sequences of the helper strands for the $A_{O(E)}$ tile core.

ID	Sequence (5' → 3')
Blue	TTGTGCGCTATCTTCAGTTGAGAATCCGACCA
Green	GAATACGAGTTGAGAAGGCAGAGACGAGTTGA

2.3 Schematic drawing and sequences of the helper strands for the $B_{O(E)}$ tile core

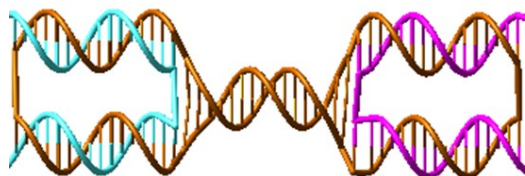


Fig. S7 Schematic drawing of the $B_{O(E)}$ tile core.

Table S3 Sequences of the helper strands for the $B_{O(E)}$ tile core.

ID	Sequence (5' → 3')
Sky blue	TTGTGCGCTATCTTCAGTTGAGAATCCGACCA
Pink	GAATACGAGTTGAGAAGGCAGAGACGAGTTGA

2.4 Schematic drawing and sequences of the helper strands for tile A_o

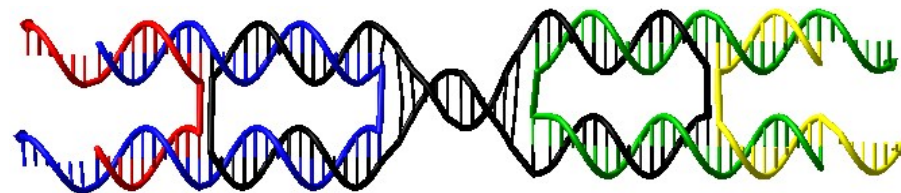


Fig. S8 Schematic drawing of tile A_o .

Table S4 Sequences of the helper strands for tile A_o

ID	Sequence (5' → 3')
Red	CATCGGTAGCGCCGTTAGTGGATGTC
Blue	CACTAACGGCGAATACGAGTTGAGAAGGCAGAGACGAGTTGAGCTACCGATGGCAGTC
Yellow	TAGCATCACGGTCAGCTCTCGACTGC
Green	GAGAGCTGACTTGTGCGCTATCTTCAGTTGAGAATCCGACCACGTGATGCTAGACATC

2.5 Schematic drawing and sequences of the helper strands for tile A_E

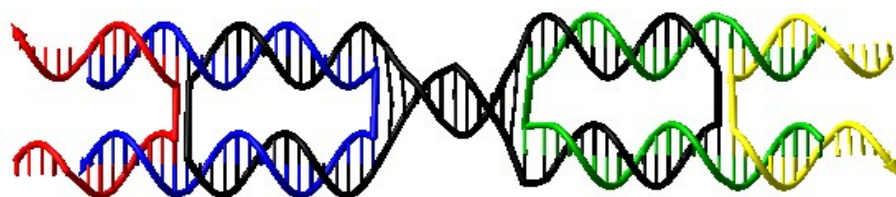


Fig. S9 Schematic drawing of tile A_E.

Table S5 Sequences of the helper strands for tile A_E

ID	Sequence (5' → 3')
Blue	GAGCTGACTTGTGCGCTATCTTCAGTTGAGAATCCGACCACGTGATGC
Red	TGACGGCATCACGGTCAGCTCACATC
Green	CTAACGGCGAATACGAGTTGAGAAGGCAGAGACGAGTTGAGCTACC GA
Yellow	CGTCATCGGTAGCGCCGTTAGGATGT

2.6 Schematic drawing and sequences of the staple strands for tile B_E

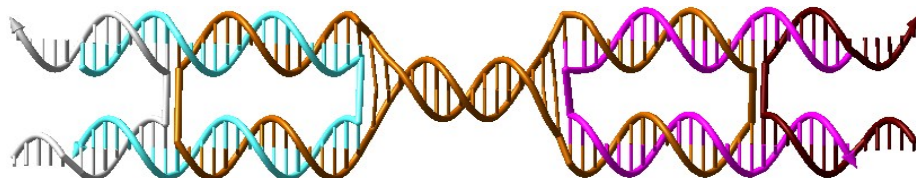


Fig. S10 Schematic drawing of tile B_E.

Table S6 Sequences of the helper strands for tile B_E.

ID	Sequence (5' → 3')
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Pink	CTAACGGCGAATACGAGTTGAGAAGGCAGAGACGAGTTGAGCTACC GA
Brown	CGTCATCGGTAGCGCCGTTAGGATGT
Sky Blue	GAGCTGACTTGTGCGCTATCTTCAGTTGAGAATCCGACCACGTGATGC
Gray	TGACGGCATCACGGTCAGCTCACATC

2.7 Schematic drawing and sequences of the helper strands for tile B₀

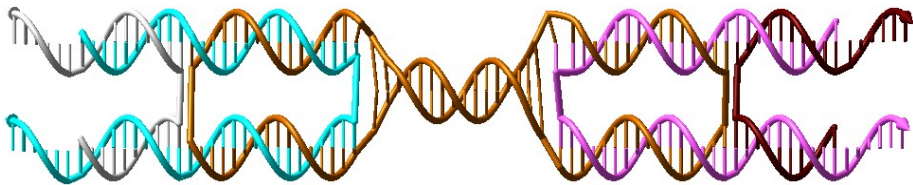


Fig. S11 Schematic drawing of tile B₀.

Table S7 Sequences of the helper strands for tile B₀

ID	Sequence (5' → 3')
Brown	TAGCATCACGGTCAGCTCTCGACTGC
Pink	GAGAGCTGACTTGTGCGCTATCTTCAGTTGAGAATCCGACCACGTGATGCTAGACATC
Gray	CATCGGTAGCGCCGTTAGTGGATGTC
Sky Blue	CACTAACGGCGAATACGAGTTGAGAAGGCAGAGACGAGTTGAGCTACCGATGGCAGTC