Supporting Information

Materials and Methods

DNA oligonucleotides were designed by a computer program "SEQUIN" (Seeman, N. C. J. Biomol. Struct. Dyn. 1990, 8, 573-581) to minimize sequence symmetry. Oligonucleotides was synthesized and purified by reverse phase HPLC by Shanghai Sangon Biotech Co., Ltd. and were used without further purification. Mica sheets for AFM were from Beijing Zhongjingkeyi Technology Co., Ltd.

DNA sequences (5'-3'):

PX55 (84mer)

strand1:
TCGCAGGAGACATTCAGGCTAAAGGACAGATTCGAGATCATGGCTAGAGTGG
CTGCGATGGAAGGTGTAGAGTCAGGAAAGGTC

strand2:
GCACTTGACCTTCCTTGACTCTGAATCTTCCACCACTCTAGCCATGATCTCGA
AGTGCAATCTGTTCCTTAGCCTACACGTCTC

PX65 (86mer)

strand1:

TCGCAGGAGACATTCAGGCTTTAAGGACAGATTCGAGATCATGGCTAGAGTG
GCTGCGATGGAAGGTGTAGAGGTCAGGAAAGGTC

strand2:

GCACTTGACCTTCCTTGACCTCTGAATCTTCCACCACTCTAGCCATGATCTCG
AAGTGCAATCTGTTCCTAAAGCCTACACGTCTC

PX75 (88mer)

strand1:

CACCTCTGCTTTCTCTCTTCGTCGCTATGTCACAGGCACTTATCTCACGTATAG
GAGGTGGTCGAGCTGGTGTCTAAAGTTGGGAATG

strand2:

GGGCATCATTCATAGCTTTAGACAGAGACTCGACCTATACGTGAGATAAGTG
CCATGCCCTGTGACCCAACGACGAAGACCAGAAGCA

PX85 (90mer)

strand1:

TGCCGACCTAGACTGCTACCTTCCCTCTGATCATTTCTGGTTGACATTGCGAC
ACTCGGCATCTCGACCTTGTACTGTGAACTTCTGCTG

strand2:

CGAGCACAGCACAGAGTCACAGTAGCAGTTCGAGAGTGTCGCAATGTCAACC
AGATGCTCGAATGATGAAGTGGAAGGTACAAGGCTAGG

PX95 (92mer)

strand1:
TGCCGACCTAGACTGCTTACCTTCCCTCTGATCATTTCTGGTTGACATTGCGA
CACTCGGCATCTGGACCTTGTTACTGTGACATTCTGCTG

strand2:
CGAGCACAGCACAGAGTCACAGTAAGCAGTTCCAGAGTGTCGCAATGTCAAC
CAGATGCTCGAATGATGAATGGGAAGGTAACAAGGCTAGG

PX64 (80mer)

strand1:
TCGCAGGAGACATCAGGCTTTAGGACAGATCGAGATCATGGCTAGAGTGGCT
GCGATGAAGGGTAGAGGTCAGAAAGGTC

strand2:
GCACTTGACCTTCCTGACCTCTGATCTTCACCACTCTAGCCATGATCTCGAAG
TGCATCTGTTCTAAAGCCTACCGTCTC

PX74 (84mer)

strand1:
CACCTCTGCTTTCCTCTTCGTCGCTAGTCTCAGGCACTTATCTCACGTATAGGA
GGTGGTCGAGCTGTGTCTAAAGTTGGAATG

strand2:
GGGCATCATTCTAGCTTTAGACAGGACTCGACCTATACGTGAGATAAGTGCC
ATGCCCTGAGACCAACGACGAAGACAGAAGCA

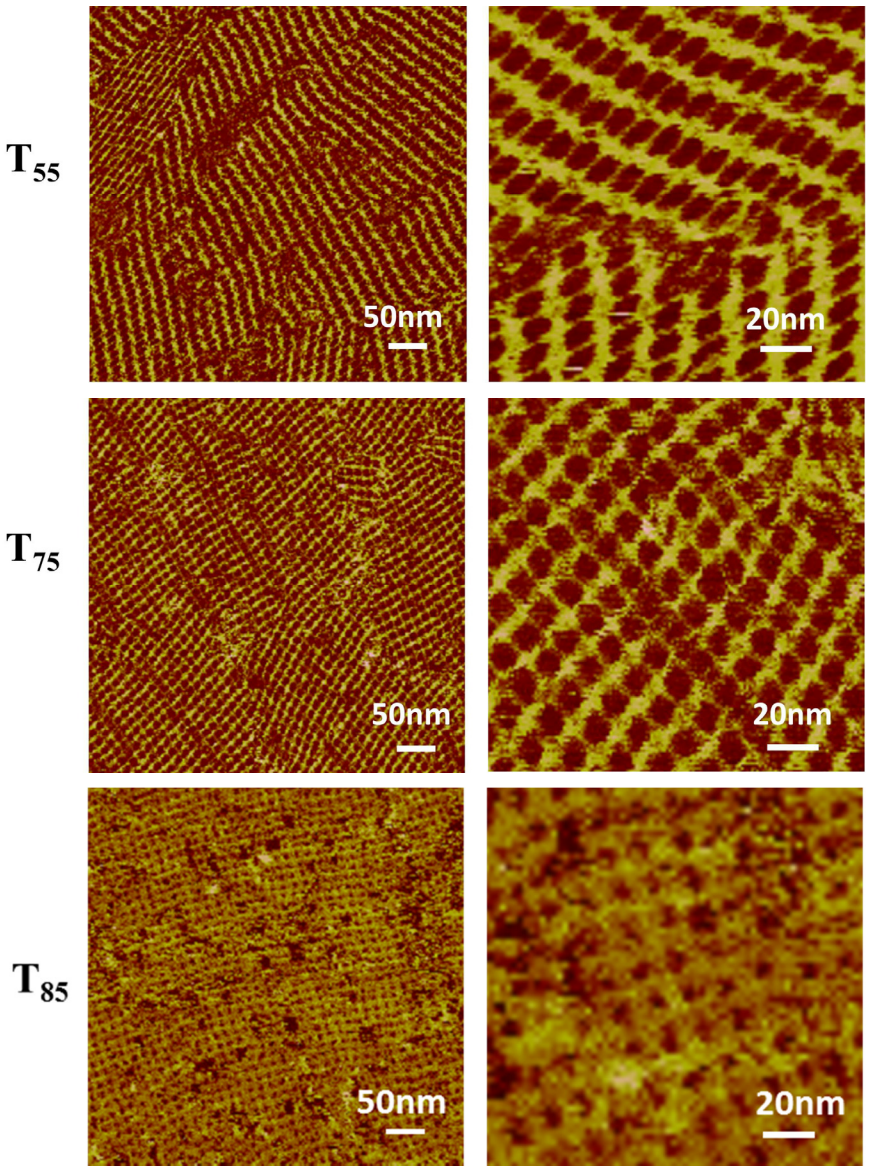
Assembly Procedure:

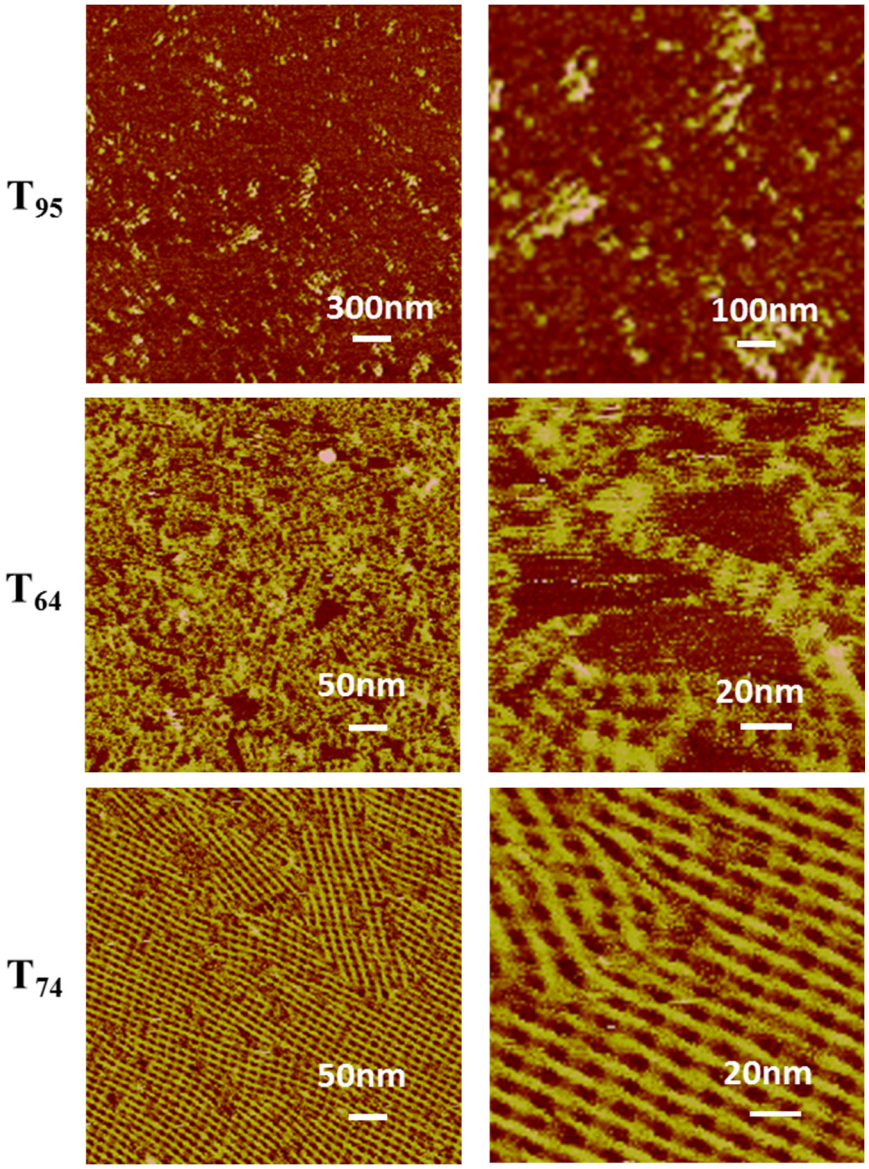
The two DNA strands of each experiment were mixed at 1:1 molar ratio and dissolved to a concentration of 0.1μM for mica assisted assembly in TAE/Mg^{2+} buffer (40 mM Tris base, pH8.0, 20 mM acetic acid, 2 mM EDTA, and 50 mM magnesium acetate). Assembly was started by inserting a 1 cm×0.2 cm mica substrate in a 200 μl solution and annealed from 95 °C to 25 °C at a rate of –0.2 °C/min consisting of 5 cycles from 60°C to 35 °C, in a BIOER PCR instrument. Mica was then directly observed by AFM.

Atomic force microscopy（AFM）imaging:

1×TAE/Mg (50 mM) buffer was added to both the mica surface and the liquid cell. The AFM measurements were carried out using ScanAsyst Fluid+ tips (Bruker probes, nominal tip radius 2 nm, nominal spring constants 0.7 N m^{-1}) on the Bruker Multimode 8 instrument.

Figure S1. AFM images of DNA tiles with different parameters of PX structures. In each panel, the tile name is shown on left and a pair of AFM images at two different magnifications are shown on right.




T_{95}
300nm
100nm
T_{64}
50nm
20nm
T_{74}
50nm
20nm