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Self-Assembly of DNA Nanoprisms with Only Two Component Strands

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Supplementary Information

Materials and Methods

Oligonucleotides. DNA oligonucleotides were designed by a computer program "SEQUIN" (N. C. Seeman, *J. Biomol. Struct. Dyn.* 1990, **8**, 573-581.), purchased from Integrated DNA Technologies, Inc., and purified by denaturing polyacrylamide gel electrophoresis (PAGE). DNA sequence (underlined bases are the hinges):

L_3-nT: 5′-[AGGCACCATCG(T)nAGGTCTTGCC]$_3$ -3′ (n = 0-1);
L_k: 5′-(AGGCACCATCG T AGGTCTTGCC)$_k$ -3′ (k = 3-6);
Sc-nT: 5′-CGATGGTGCCTGGCAAGACCT(T)nTGAGCGCTCA-3′ (n = 0-3);
Sa: 5′-CGATGGTGCCTGGCAAGACCT T TCCGAACTGA-3′;
Sb: 5′-CGATGGTGCCTGGCAAGACCT T TCAGTTCGGA-3′;

Formation of DNA complexes. DNA strands were combined according to the correct molecular ratios in a tris-acetic-EDTA-Mg^{2+} (TAE/Mg^{2+}) buffer, which consisted of Tris (40 mM, pH 8.0), acetic acid (20 mM), EDTA (2 mM), and $Mg(CH_3COO)_2$ (12.5 mM). All hetero-prisms used the corresponding central strands L_k, and short strands Sa and Sb. The prism construction followed two-step self-assembly: (1) polygonal face motif formation: the mixture of L_k strand and Sa (or Sb) was annealed: 95 °C / 5 min, 65 °C / 30 min, 50 °C / 30 min, 37 °C / 30 min, 22 °C / 30 min, and 4 °C / 30 min; (2) prism formation: motif L_k / Sa and motif L_k / Sb were mixed together at 1:1 ratio and then re-annealed: 50 °C / 30 min, 37 °C / 30 min, 22 °C / 30 min, and 4 °C / 30 min. Homo-prisms were assembled a one-pot process: cooling solution of the L_k / Sc-nT (m = 0-3) at ratio 1:*k*: 95 °C / 5 min; 65 °C / 45 min; 50 °C / 45 min; 37 °C / 45 min; 22 °C / 45 min; and 4 °C / 45 min. DNA concentrations were used as indicated in Figs. 2-4 unless specifically stated otherwise. DNA samples were then directly used for characterization, without further fractionation or purification.

Native PAGE. Gels contained 6% polyacrylamide (19:1 acrylamide/bisacrylamide) and were run on a SE-600 electrophoresis unit (18 cm × 16 cm, Hoefer) at 4°C (250 V, constant voltage). The running buffer of the electrophoresis was TAE/Mg^{2+} buffer. After electrophoresis, the gels were stained with Stains-all dye (Sigma) and scanned by a HP office scanner. The band intensity was estimated by Image J, an NIH-developed image-processing computer software.