

Supplementary Information

Symmetry Breaking of Au Nanospheres Confined in 1D Nanocylinders: Exploring Helical Assembly by 3D Transmission Electron Microscopy

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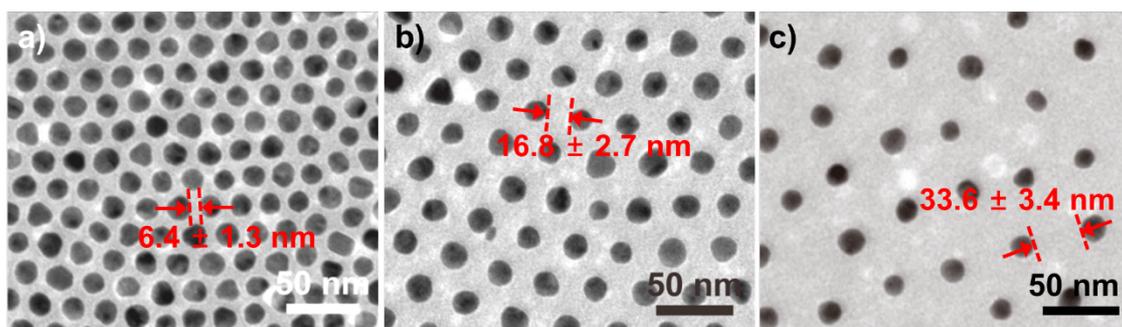


Figure S1. TEM images of AuNPs@PS monolayer packing films organized from (a) AuNPs@PS_{5k}, (b) AuNPs@PS_{29k}, and (c) AuNPs@PS_{50k}, respectively. The polymer shell of AuNPs@PS, which can determine the diameter of the entire NP, was measured from the interparticle distance between two AuNPs@PS. The gap distances between neighboring AuNPs@PS were 6.4 ± 1.3 , 16.8 ± 2.7 , and 33.6 ± 3.4 nm for (a) AuNPs@PS_{5k}, (b) AuNPs@PS_{29k}, and (c) AuNPs@PS_{50k}, respectively.

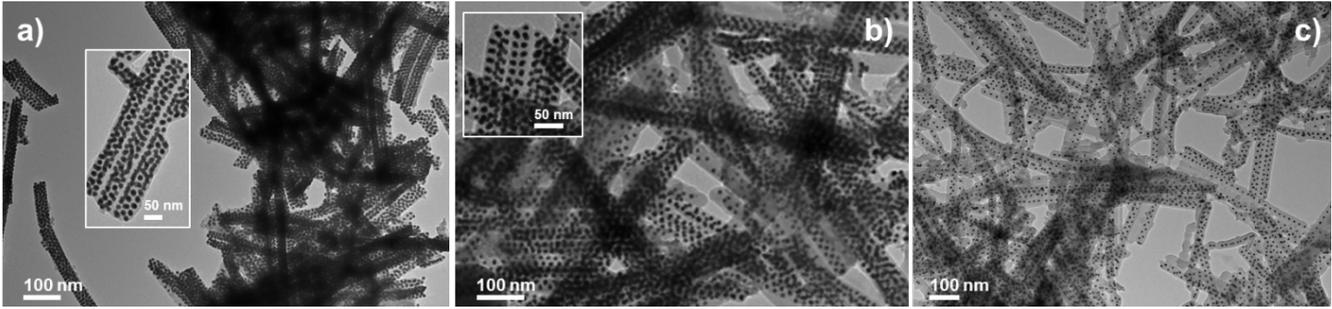


Figure S2. Large-area TEM images of (a) AuNPs@PS_{5k}, (b) AuNPs@PS_{29k}, and (c) AuNPs@PS_{50k} hybrid assemblies. All assemblies were isolated from the AAO template with a diameter of 61.8 nm.

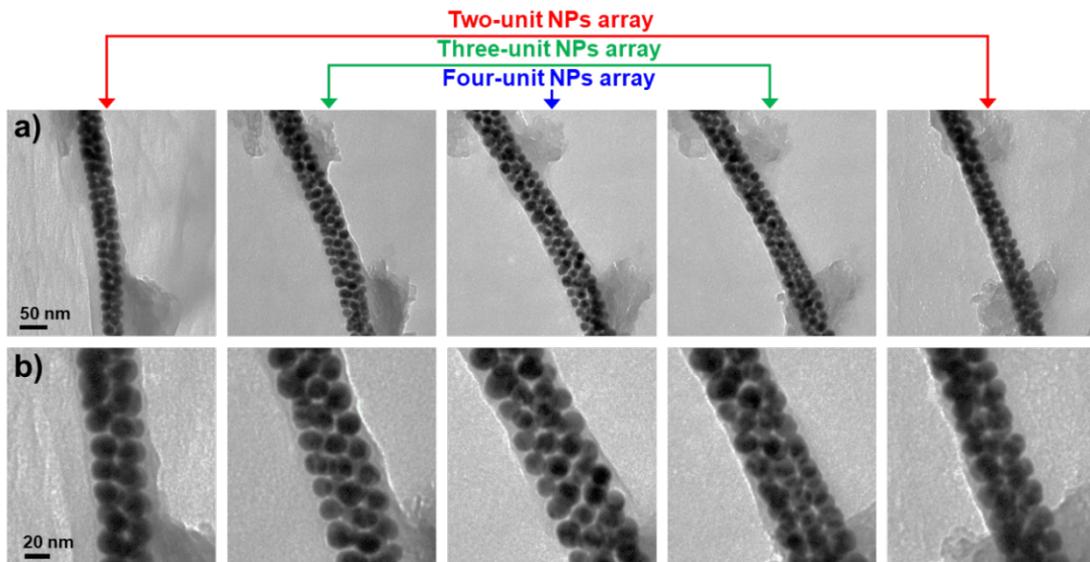


Figure S3. (a) TEM images and (b) the related enlarged TEM images showing the three representative structures of AuNPs@PS_{5k} ($D_c = 61.8$ nm) hybrid assemblies acquired with tilting angles from -70° to $+62^\circ$.

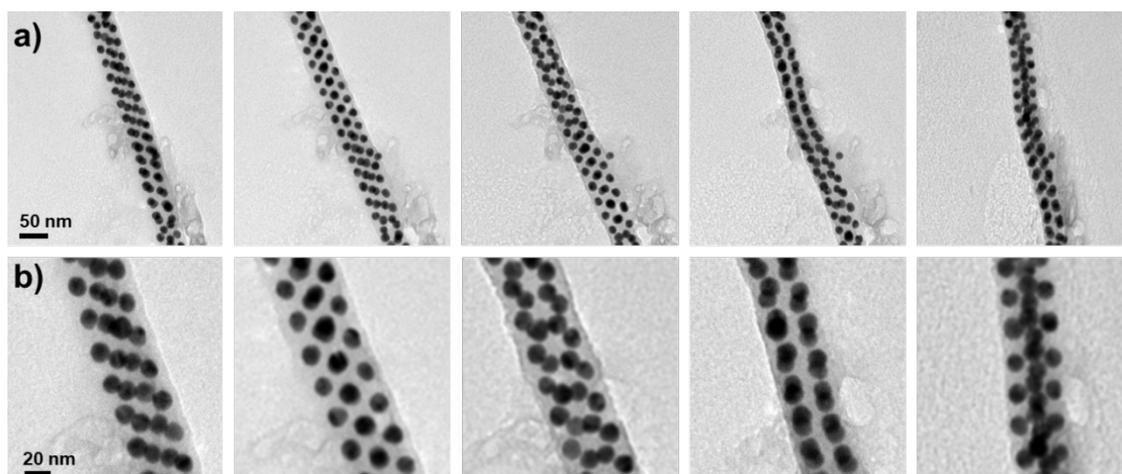


Figure S4. (a) TEM images and (b) the related enlarged TEM images showing the five representative structures of AuNPs@PS_{29k} ($D_C = 61.8$ nm) hybrid assemblies acquired with tilting angles from -44° to $+70^\circ$.

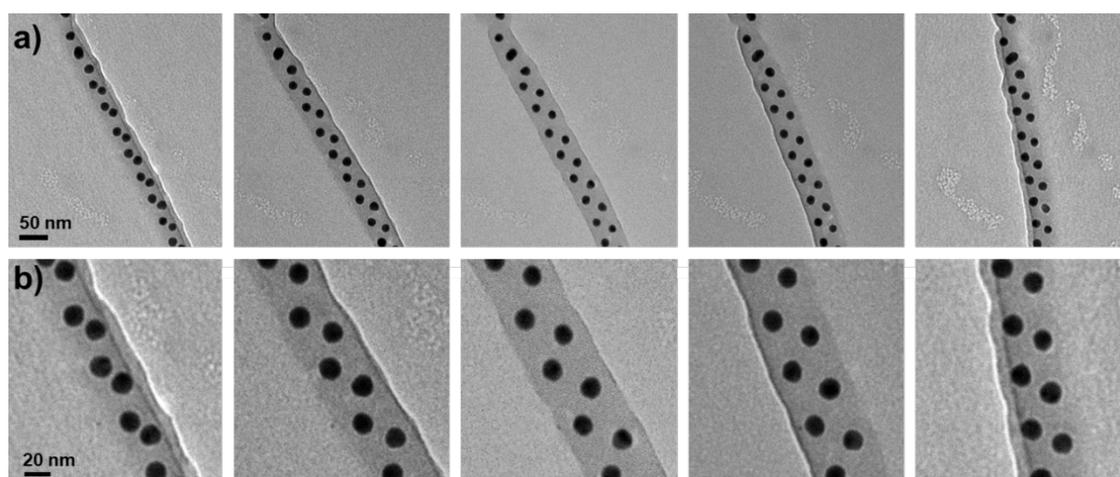


Figure S5. (a) TEM images and (b) the related enlarged TEM images showing the zig-zag structures of AuNPs@PS_{50k} ($D_C = 61.8$ nm) hybrid assemblies acquired with tilting angles from -50° to $+50^\circ$.

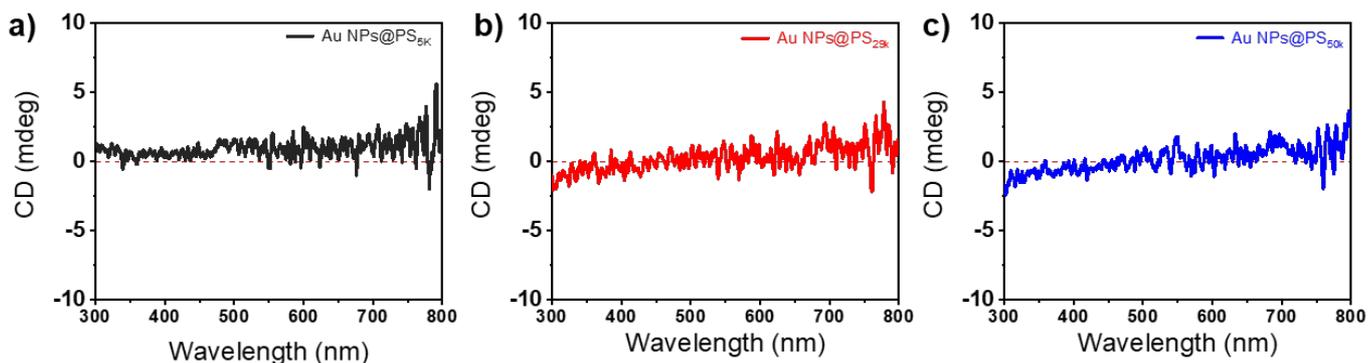


Figure S6. CD spectra of 0.25 mg/mL solutions of (a) AuNPs@PS_{5k}, (b) AuNPs@PS_{29k}, and (c) AuNPs@PS_{50k}.

● Movies for SI

When D_C is about 61.8 nm,

Movie S1. Pre-aligned movie of hybrid assemblies showing the helical array of AuNPs@PS_{5k}.

Movie S2. Reconstruction movie of hybrid assemblies showing the helical array of AuNPs@PS_{5k}.

Movie S3. 3D volume movie of hybrid assemblies showing the helical array of AuNPs@PS_{5k}.

Movie S4. Pre-aligned movie of hybrid assemblies showing the helical array of AuNPs@PS_{29k}.

Movie S5. Reconstruction movie of hybrid assemblies showing the helical array of AuNPs@PS_{29k}.

Movie S6. 3D volume movie of hybrid assemblies showing the helical array of AuNPs@PS_{29k}.

Movie S7. Pre-aligned movie of hybrid assemblies showing the helical array of AuNPs@PS_{50k}.

Movie S8. 3D volume movie of hybrid assemblies showing the helical array of AuNPs@PS_{50k}.