Supporting Information

One-Pot Synthesis of Pd Nanorings Using a Soft Template of Spindle-Shaped Amphiphilic Molecular Assembly

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S1. Results

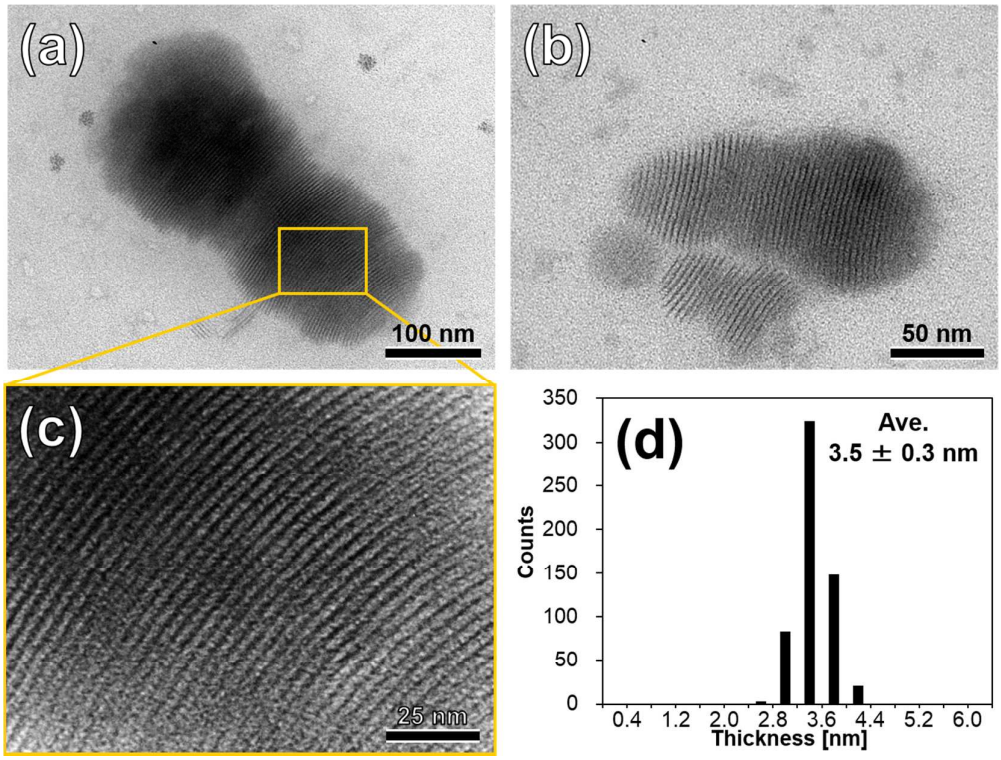

Figure S1. (a, b) Representative TEM images of dried and stained molecular self-assembly of C18AA. (c) High-magnification image of (a). (d) Thickness distribution in one layer of self-assembled C18AA molecules.

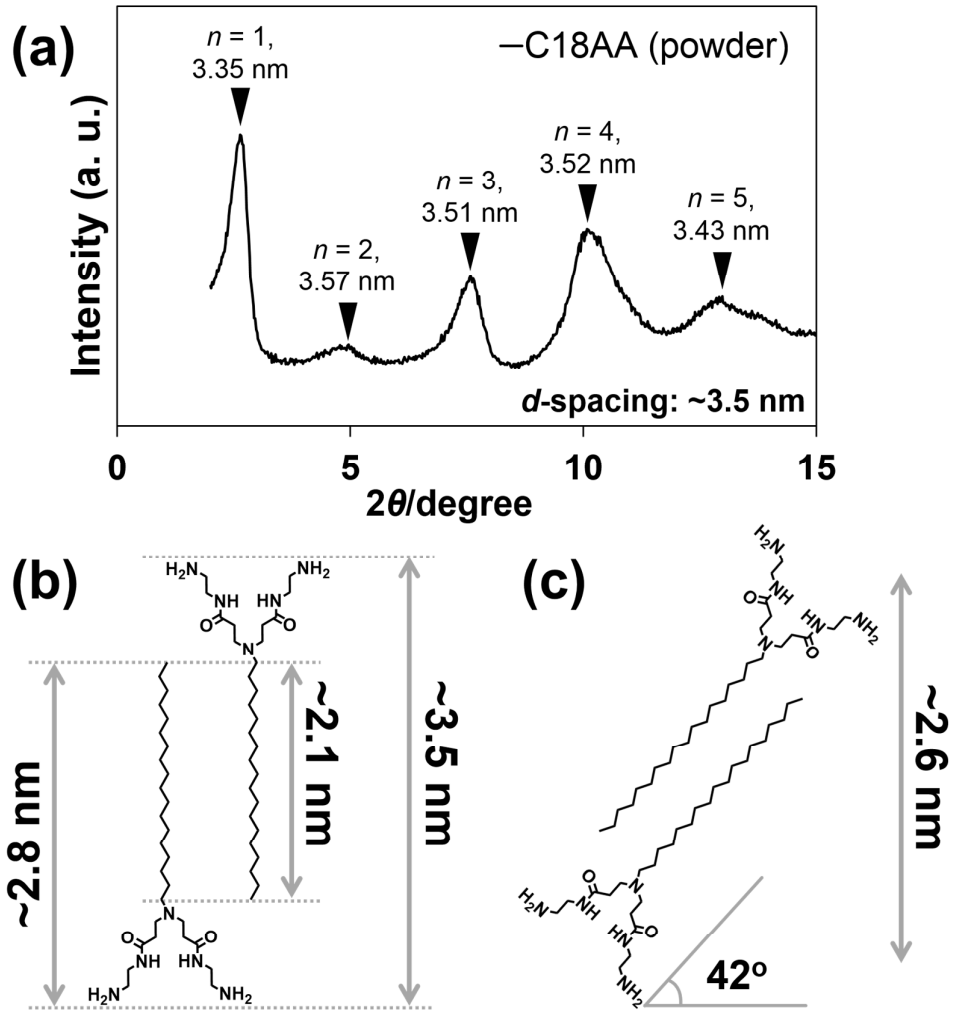

Figure S2. (a) XRD pattern of C18AA. (b) Length of C18AA molecule and thickness of bilayer of C18AA, in which the hydrocarbon chains were arranged in an interdigitated fashion. (c) Calculated length of inclined C18AA bilayer.

The length of the C18AA molecule and bilayer of C18AA with interlocking hydrocarbon chains were calculated from the C18AA molecular length of ~2.8 nm [S1], C–C length of 0.15 nm, and C–C–C angle of 109.5° [S2] in the alkyl chain.

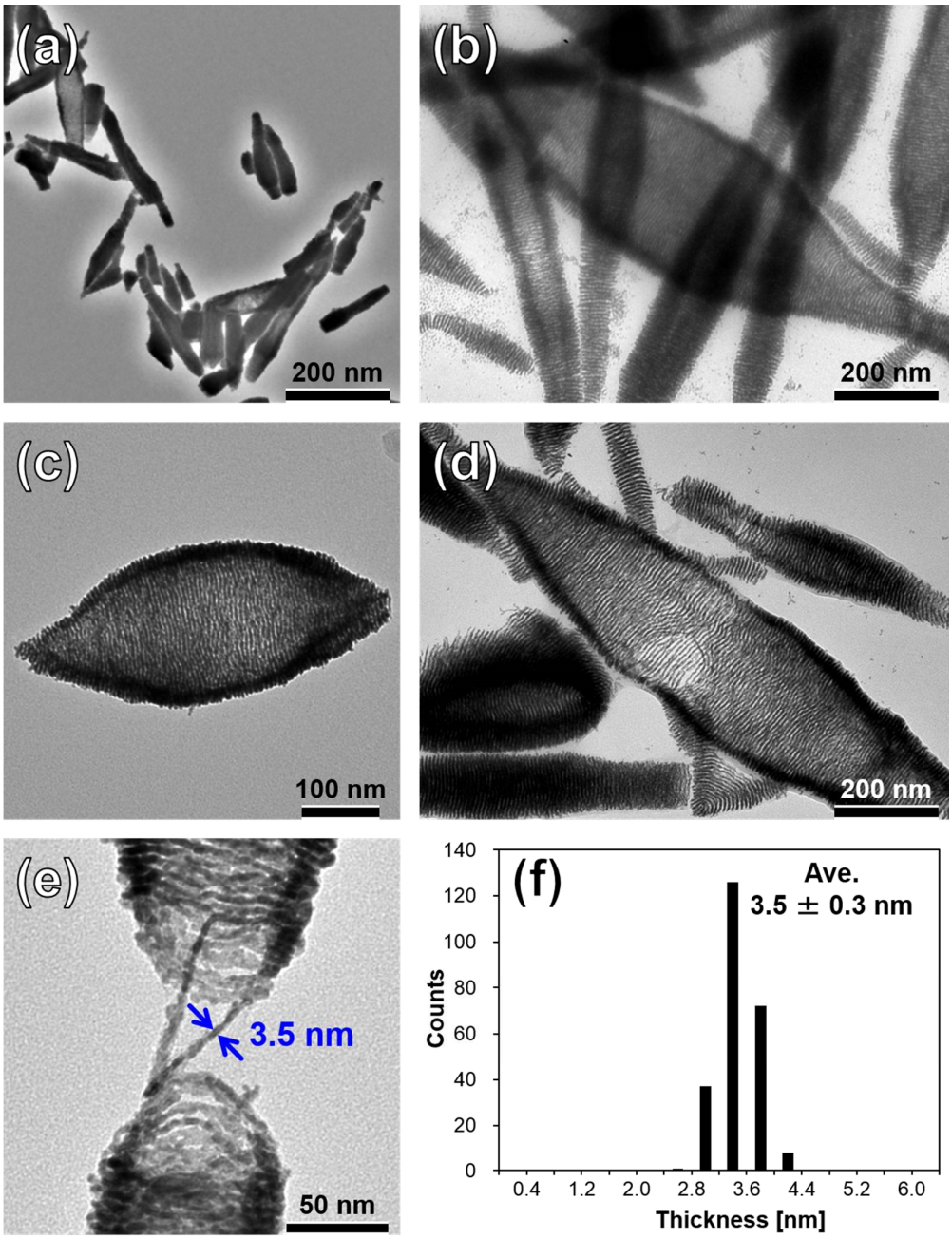

Figure S3. (a–c) Representative TEM images of Pd nanorings. (d, e) TEM images of broken assembly of Pd nanorings. (f) Thickness distribution of resultant Pd nanorings.

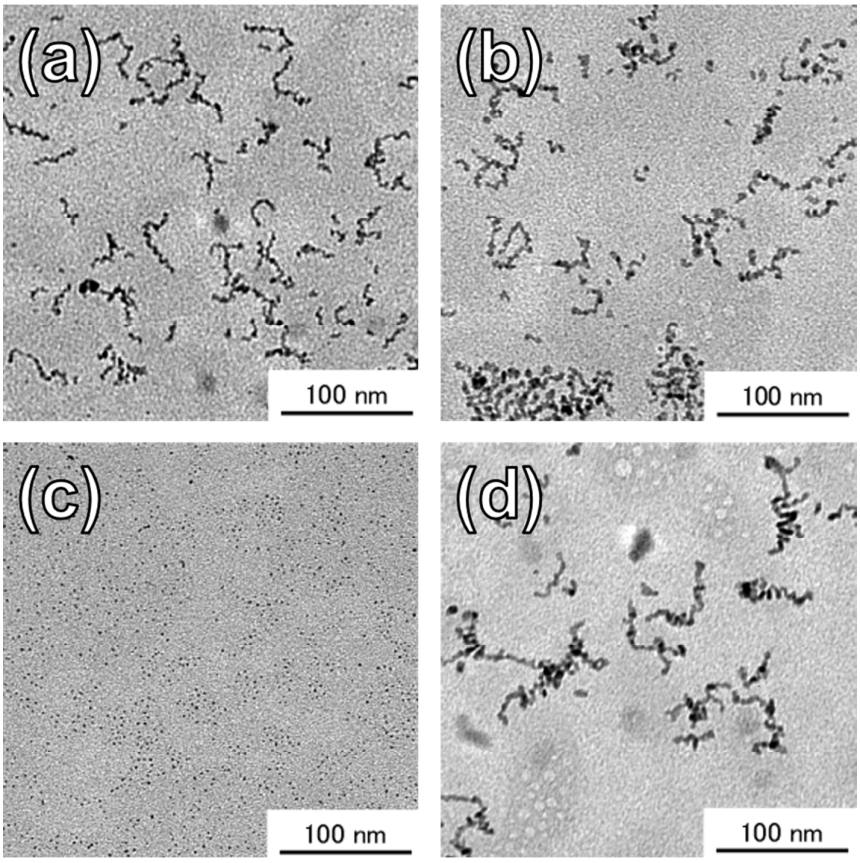

Figure S4. TEM images of the samples prepared with (a) 3.7 mg and (b) 74 mg of C18AA instead of 7.4 mg of C18AA, (c) ~0.08 M and (d) ~1.5 M of aqueous $NaBH_4$ solution instead of ~0.75 M of aqueous NaBH4 solution.

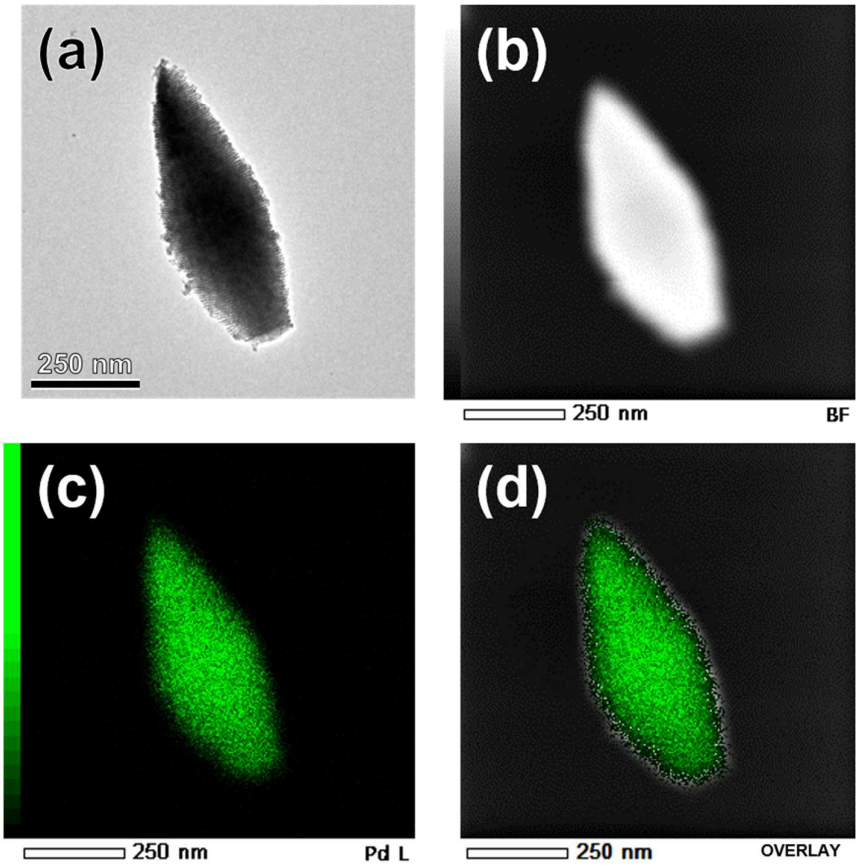

Figure S5. (a) TEM image and (b) HAADF-STEM image of Pd nanorings. (c) EDS mapping image of Pd nanorings. (d) Overlay image of (b) and (c).

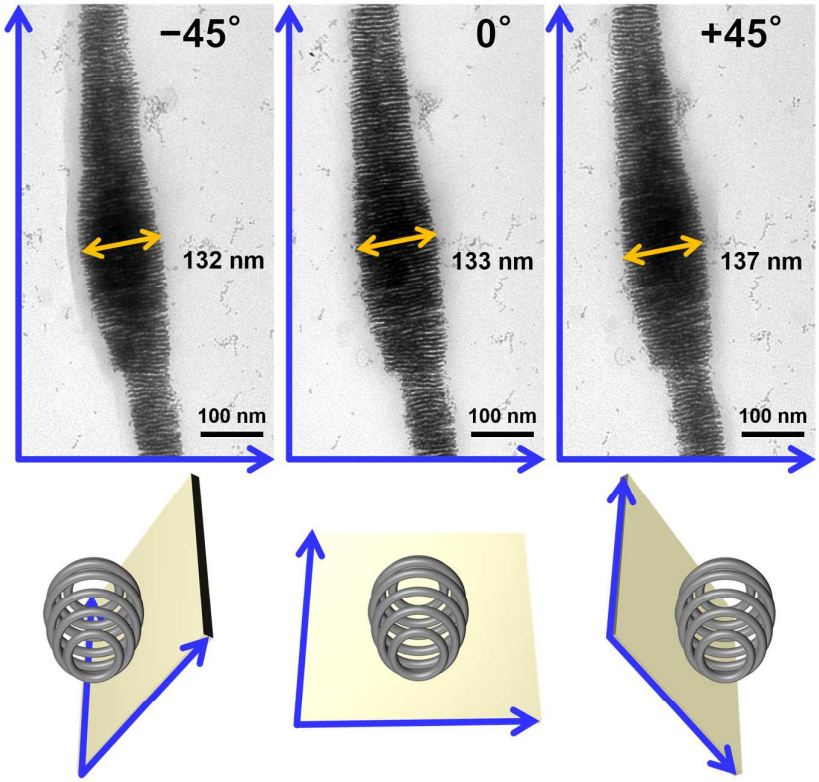

Figure S6. TEM images of Pd nanorings at various tilt angles.

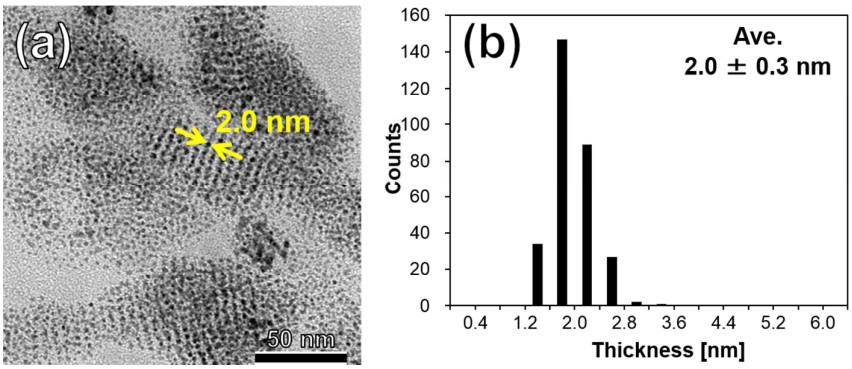

Figure S7. (a) Representative TEM image of Pd NP arrays prepared after a reaction duration of 0.5 min. (b) Thickness distribution of resultant Pd NPs.

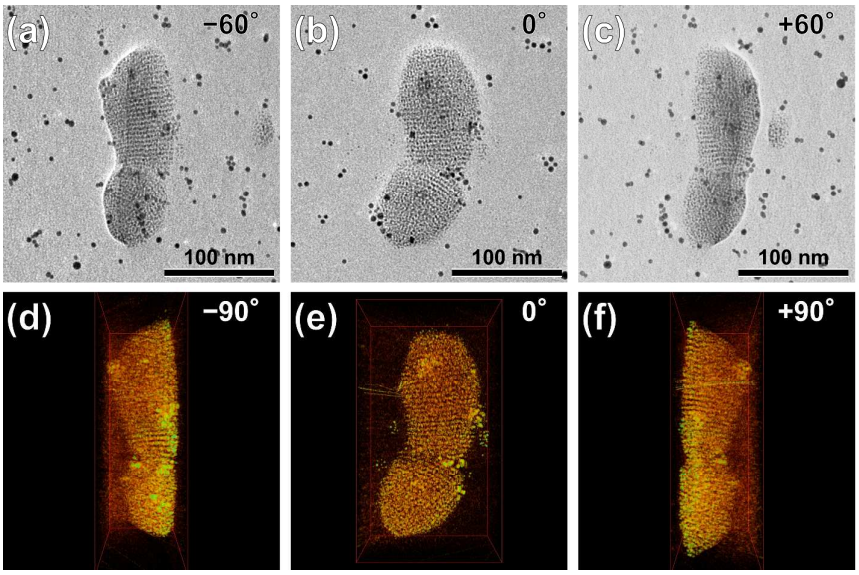

Figure S8. (a–c) TEM images of Pd NP arrays at various tilt angles, prepared after a reaction duration of 0.5 min. (d–f) TEM 3D tomography image of (b) at various angles.

A copper grid was modified with dodecane thiol-capped Au NPs as markers for the three-dimensional (3D) reconstruction.

S2. References

[S1] C. Morita, H. Tanuma, C. Kawai, Y. Ito, Y. Imura and T. Kawai, *Langmuir*, 2013, **29**, 1669–1675.

[S2] Y. Okawa and M. Aono, *J. Chem. Phys.*, 2001, **115**, 2317–2322.