

Well-defined nano-sunflowers formed by self-assembly of a rod-coil amphiphile in water and their morphology transformation based on a water-soluble pillar[5]arene

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1. Materials and methods

Hydroquinone, 1,10-dibromodecane, Ag₂O, K₂CO₃, CH₃CN, I₂, HIO₃, H₂SO₄, CH₃COOH, 4-biphenylboronic acid, tetrakis(triphenylphosphine)palladium(0), 3-ethyl-1-methyl-1H-imidazol-3-ium hexafluorophosphate (V) **M**, and 1-methylimidazole were reagent grade and used as received. Solvents were either employed as purchased or dried according to procedures described in the literatures. Water-soluble pillar[5]arene **WP5** and rod-coil amphiphile were **RCA** prepared according to the literature.^{S1,S2} ¹H NMR spectra were collected on a Varian Unity INOVA-400 spectrometer (Bruker) with internal standard TMS. The TEM images were obtained using a HITACHI instrument with an accelerating voltage of 80 kV. Dynamic light scattering (DLS) was carried out on a Malvern Nanosizer S instrument at room temperature. The fluorescence titration experiments were conducted on a RF-5301 spectrofluorophotometer (Shimadzu Corporation, Japan). EDX was examined by TEM (JEM-1200EX) instrument.

2. Self-assembly of rod-coil amphiphilie in water

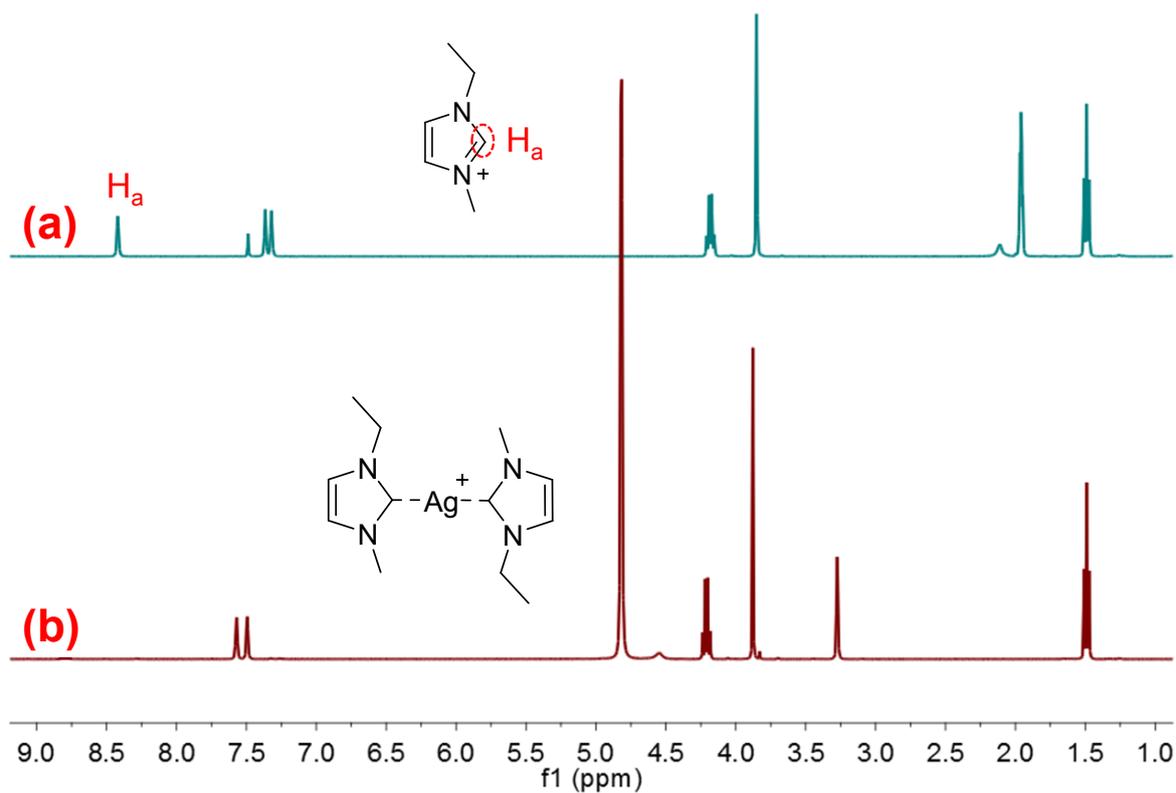


Fig. S1 (a) ¹H NMR spectrum (400 Hz, CDCl₃/CD₃CN, rt) of **M**. (b) ¹H NMR spectrum (400 Hz, CD₃COCD₃, rt) of **M** after addition of Ag₂O^{S3}.

In an aqueous solution of **RCA** (2.00×10^{-5} M, 10.0 mL) which prepared more than 12 hours, 0.10g Ag_2O power was added, after stirring 1h, the excess insoluble Ag_2O power was removed and the solution was used for further investigated.

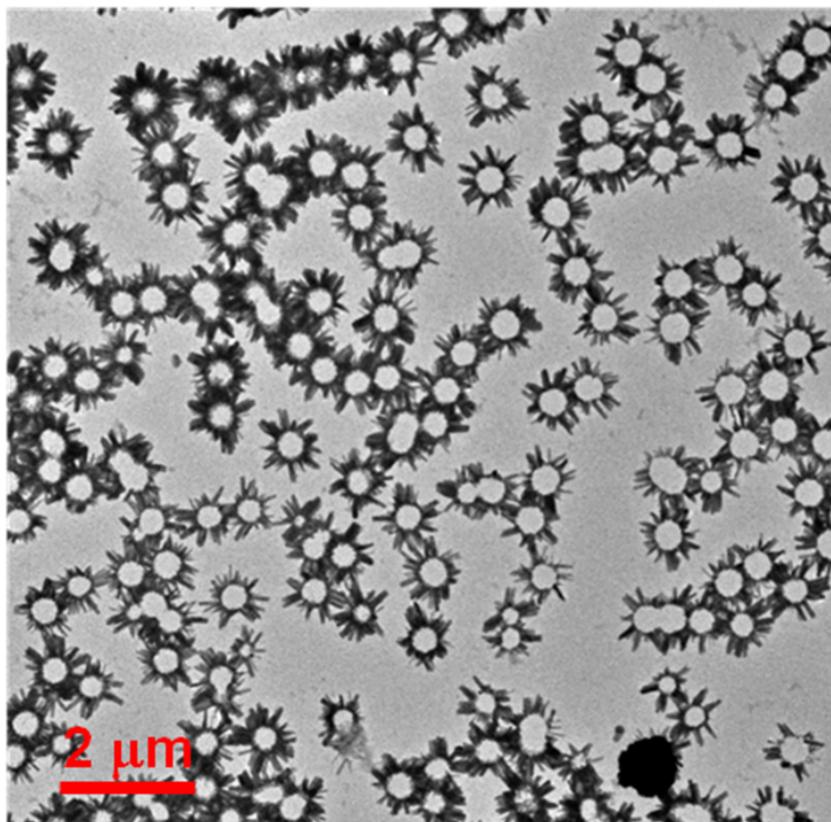


Fig. S2 TEM image of nano-sunflowers self-assembled from **RCA** after addition of Ag_2O and stirred for 1 hour.

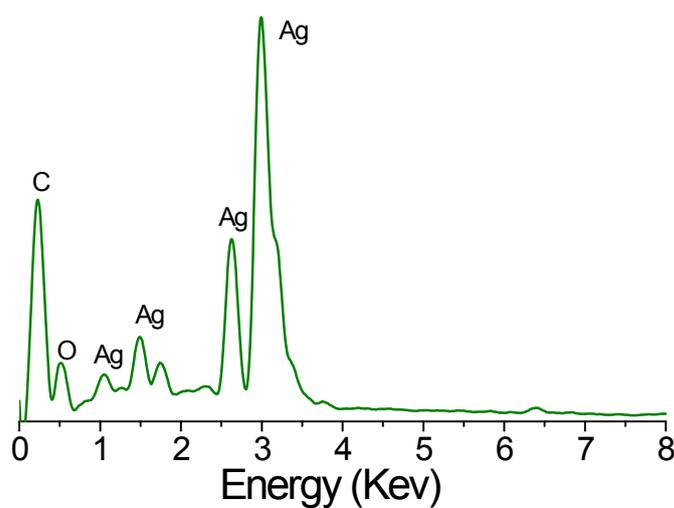


Fig. S3 EDX study of nano-sunflowers self-assembled from **RCA** after addition of Ag_2O and stirred for 1 hour.

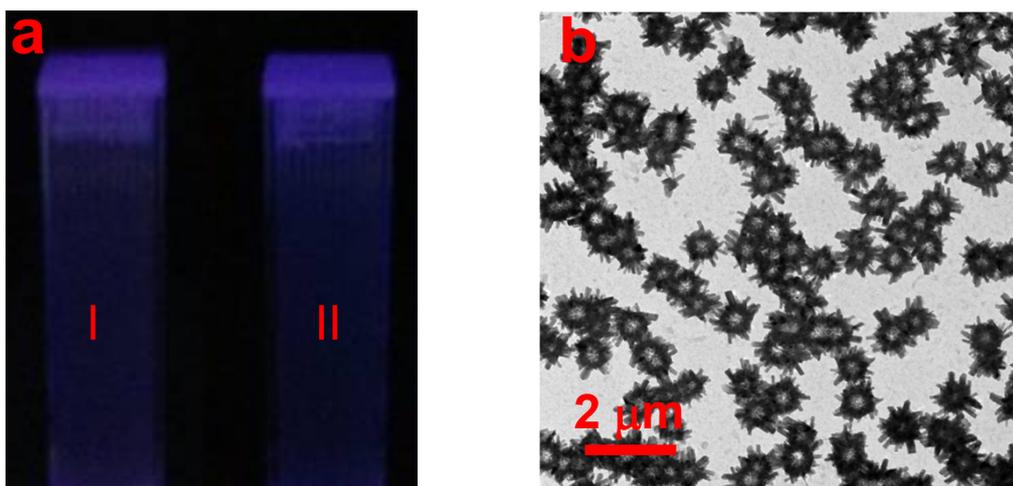


Fig. S4 (a) Fluorescent photographs of **RCA** after addition of Ag_2O (I) and further addition of **WP5** (II). (b) TEM image of nano-sunflowers self-assembled from **RCA** after addition of Ag_2O and stirred for 1 hour and further addition of **WP5**.

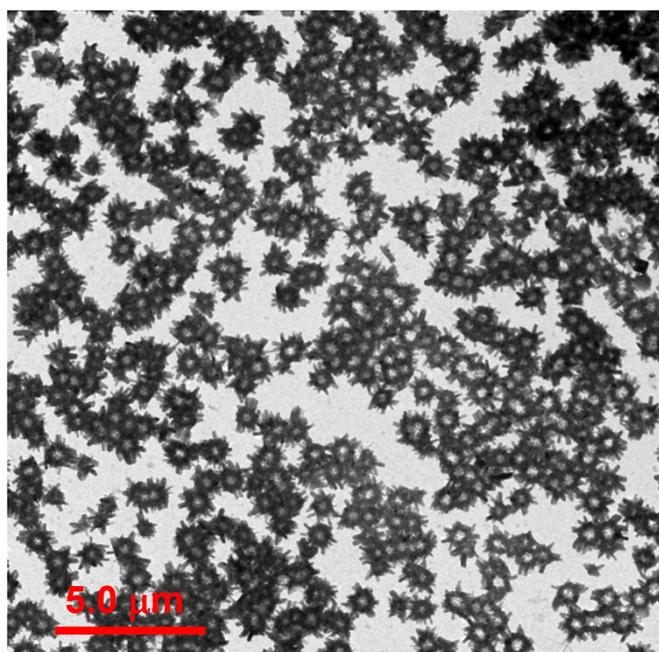


Fig. S5 TEM image of nano-sunflowers which self-assembled from nanosheets react with Ag_2O first, and then stay for 10 hours.

3. References:

- S1. T. Ogoshi, M. Hashizume, T. Yamagishi and Y. Nakamoto, *Chem. Commun.*, 2010, **46**, 3708–3710.
- S2. Y. Yao, X. Chi, Y. Zhou and F. Huang, *Chem. Sci.*, 2014, DOI: 10.1039/C4SC00585F.
- S3. J. C. Garrison and W. J. Youngs, *Chem. Rev.*, 2005, **105**, 3978-4008.