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

Yujuan Zhou, Yong Yao,* and Min Xue

Department of Chemistry, Zhejiang University, 310027 Hangzhou, P. R. China;
Fax: +86-571-8795-3189; Tel: +86-571-8795-3189;
E-mail: yaoyong@zju.edu.cn

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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.¹¹,¹² 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 amphiphile in water

![Diagram of molecular structures and NMR spectra](image)

**Fig. S1** (a) $^1$HNMR spectrum (400 Hz, CDCl$_3$/CD$_2$CN, rt) of M. (b) $^1$HNMR spectrum (400 Hz, CD$_3$COCD$_3$, rt) of M after addition of Ag$_2$O$^{33}$. 

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S3
In an aqueous solution of RCA \((2.00 \times 10^{-5} \text{ M}, 10.0 \text{ mL})\) which prepared more than 12 hours, 0.10g Ag\(_2\)O power was added, after stirring 1h, the excess unsoluble Ag\(_2\)O 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\(_2\)O and stirred for 1 hour.

**Fig. S3** EDX study of nano-sunflowers self-assembled from RCA after addition of Ag\(_2\)O and stirred for 1 hour.
Fig. S4 (a) Fluorescent photographs of RCA after addition of Ag$_2$O (I) and further addition of WP5 (II). (b) TEM image of nano-sunflowers self-assembled from RCA after addition of Ag$_2$O 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$_2$O first, and then stay for 10 hours.

3. References: