Supplementary Material (ESI) for Chemical Communications

Supporting Information

for

Formation of Chiral Mesostructured Porphyrin-Silica Hybrids

Huibin Qiu, Junjie Xie and Shunai Che*

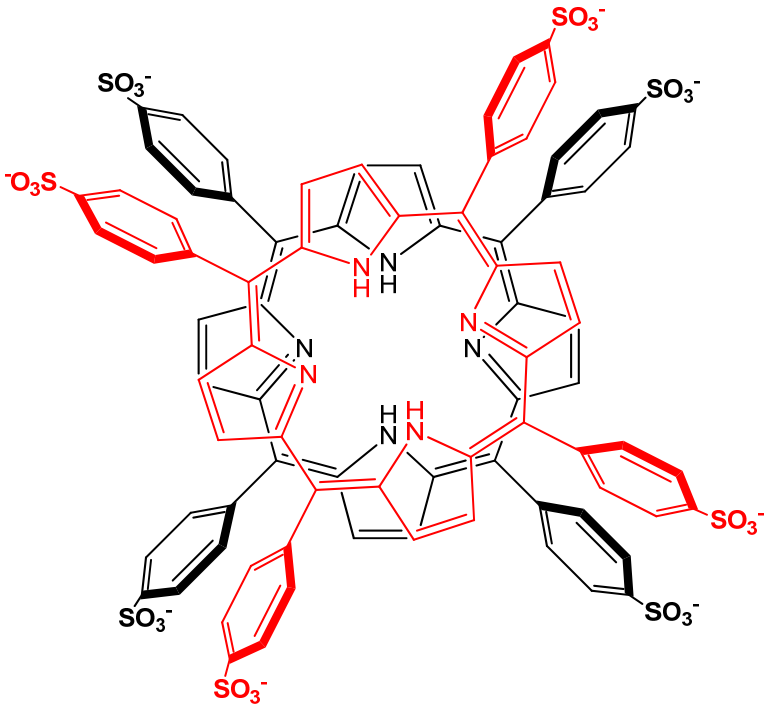
School of Chemistry and Chemical Engineering, State Key Laboratory of Metal Matrix Composites, Shanghai Jiao Tong University, 800 Dongchuan Road, Shanghai, 200240, P. R. China.

E-mail: chesa@sjtu.edu.cn

Experimental details

Synthesis. Typically, 0.10 mmol of TSPP (acid form) and 3.75 ml of 0.10 mol/L NaOH aqueous solution were added to 90.00 ml of 10 % (v/v) EtOH aqueous solution with stirring at room temperature. After TSPP was completely dissolved, a mixture of TMAPS (0.60 mmol) and TEOS (4.00 mmol) was added with stirring in 10 min. The mixture was then allowed to react statically at room temperature for 3 days. The product was collected by centrifugal separation and dried in the air at 313 K. For the addition of chiral dapants, typically, 0.01 mmol of (*R*)- or (*S*)-1,1'-bi-2-naphthol was dissolve in 0.1 ml EtOH. The mixture was then added to the above porphyrin solution with stirring at room temperature for 1 hour. The following synthesis procedure is the same to that described above.

Characterization. XRD patterns were recorded on a Rigaku D/Max 2000 powder diffractometer equipped with Cu Ka radiation. The morphologies of all samples were observed with a JEOL JSM-7401F microscope at 1.0 kV. TEM observation was performed with a JEOL JEM-2100 microscope operated at 200 kV. For the carbonization of porphyrins, the samples were calcined in N_2 for 4 hours at 673 K, which makes the mesostructure more stable under electron beams. DRUV spectra were taken on a Shimadzu UV-2450 spectropolarimeter fitted with DRUV apparatus. DRCD spectra were taken on a JASCO J-815 spectropolarimeter fitted with DRCD apparatus.



Scheme S1. Helical stacking of TSPP in a face-to-face style.

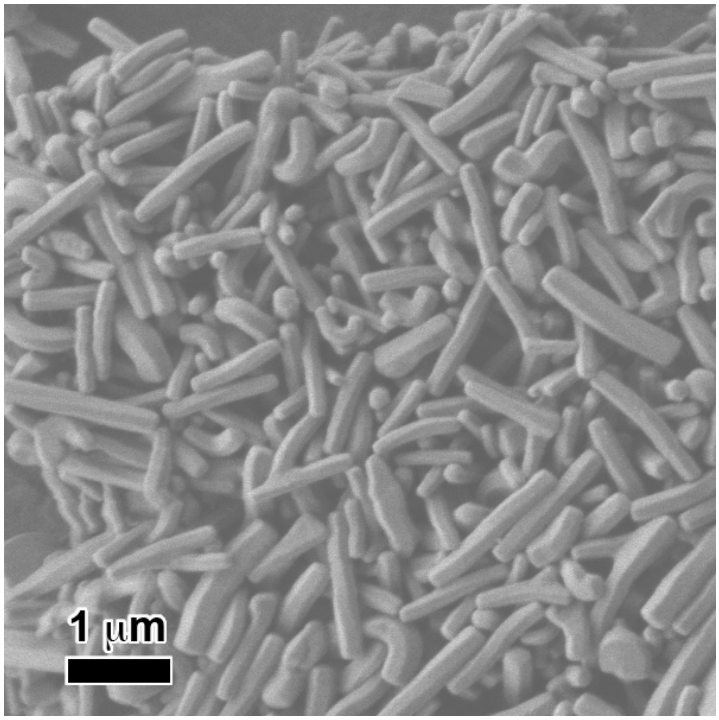


Fig. S1 Low-magnification SEM image of the chiral mesostructured TPPS-silica hybrid shown in Fig. 1.

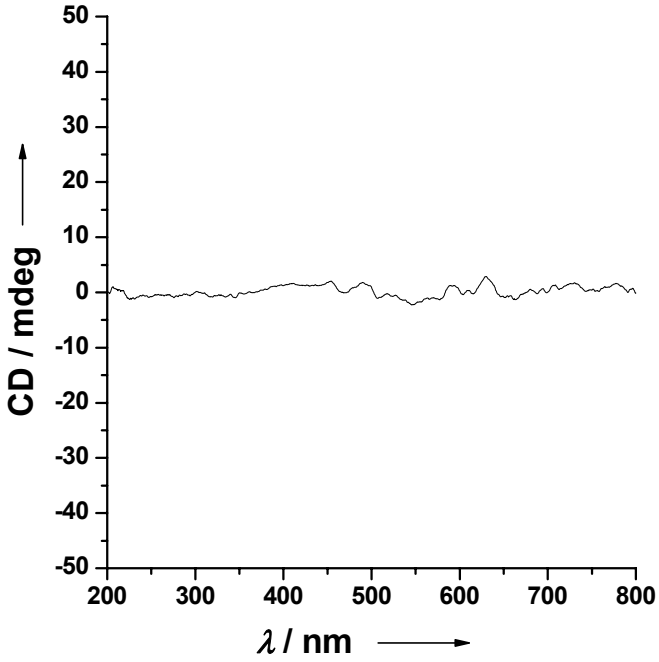


Fig. S2 DRCD spectrum of the chiral mesostructured TPPS-silica hybrid shown in Fig. 1.

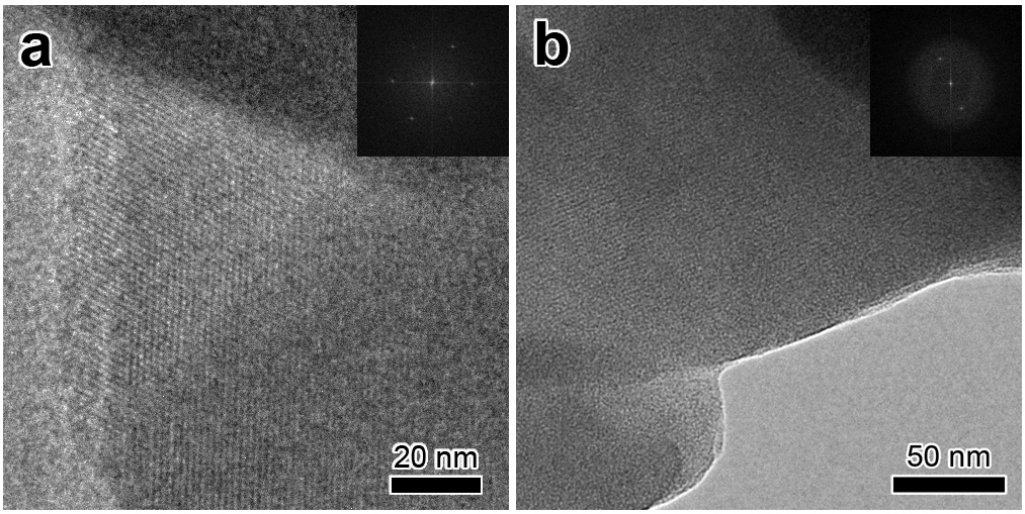


Fig. S3 HRTEM images and corresponding electron diffractions (inset) of the as-synthesized chiral mesostructured TPPS-silica hybrid. The sample was microtomed to get ultra thin sections of hybrids. The microtoming was performed on powders that had been embedded in an epoxy resin, which was polymerized at 70 °C for 12 h. Ultra thin sections (thickness 50–100 nm) were cut using a Leica Ultracut UC6 equipped with a glass knife, and the sections were picked up on Cu grids.

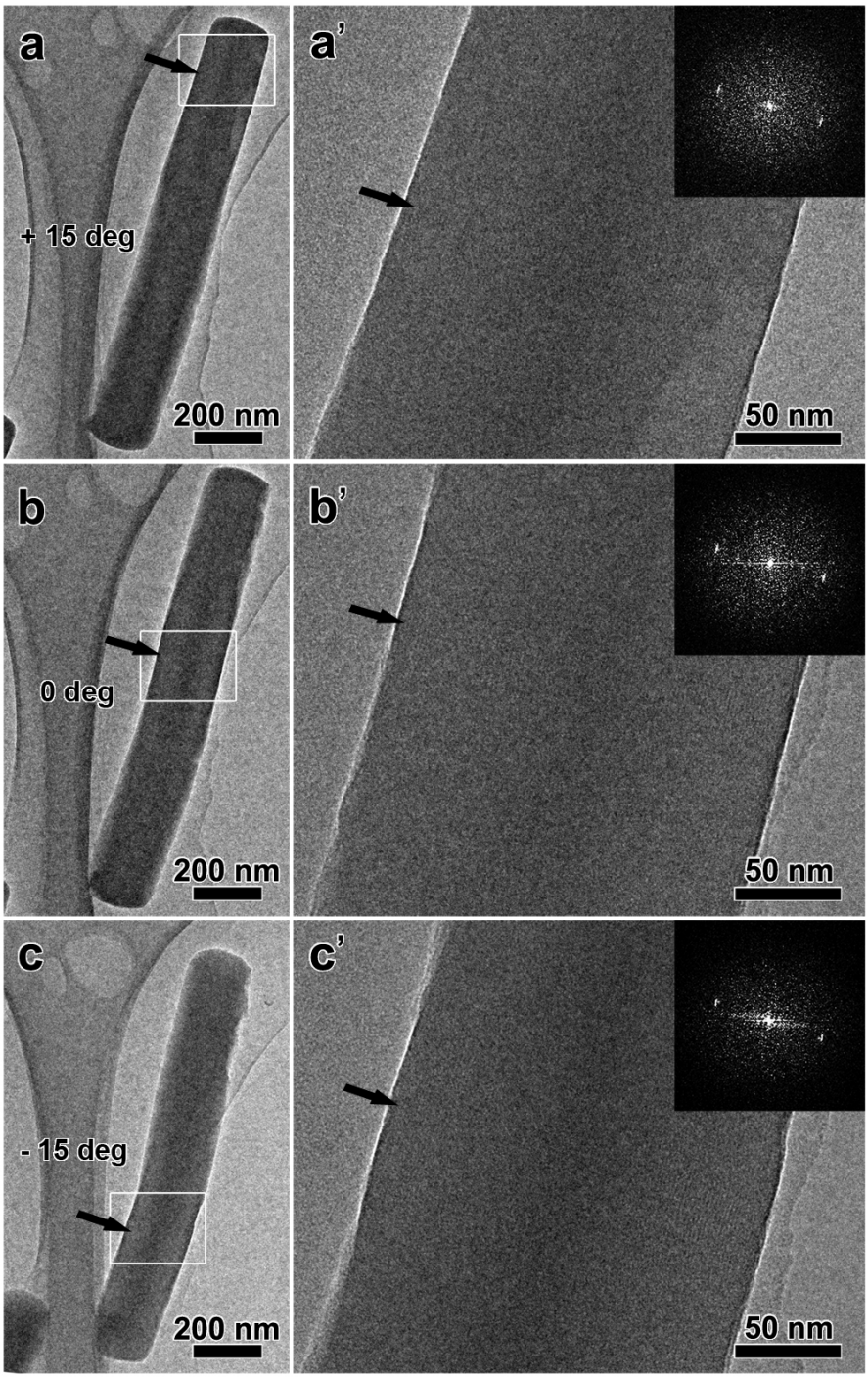


Fig. S4 (a-c) TEM images of a chiral mesostructured TSPP-silica hybrid crystal (after being calcined in N_2) taken at different tilting angles along the rod axis. (a'-c') high-magnification TEM images and corresponding electron diffractions (inset) of the selected areas shown in (a-c) where the {10} fringes locate.

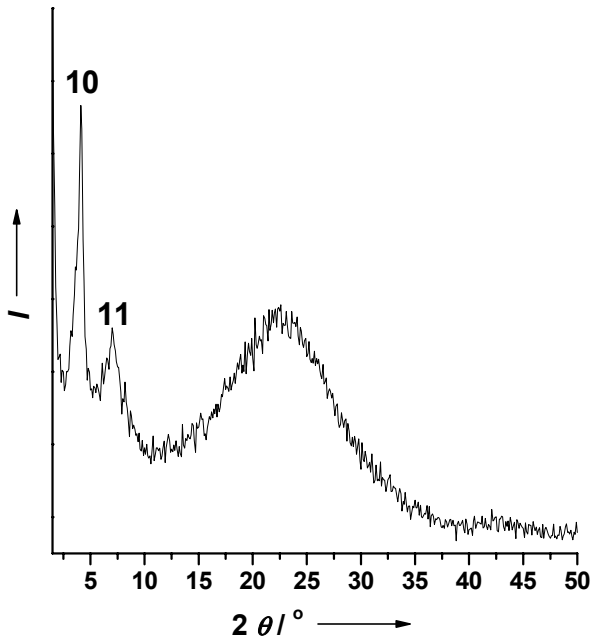


Fig. S5 Wide-angle XRD pattern of the chiral mesostructured TPPS-silica hybrid shown in Fig. 1 after being calcined in N_2.

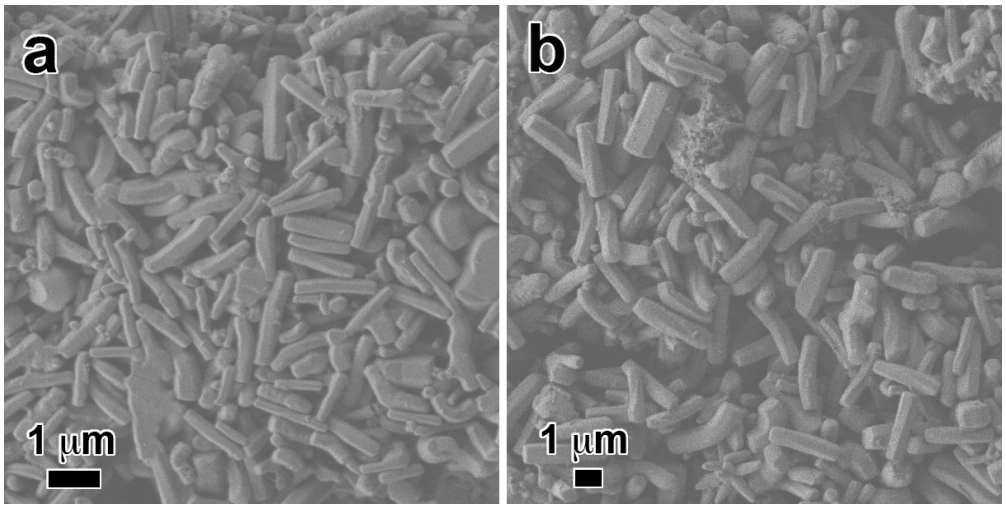


Fig. S6 Low-magnification SEM images of the left- (a) and right-handed excess (b) chiral mesostructured TSPP-silica hybrids shown in Fig. 3.

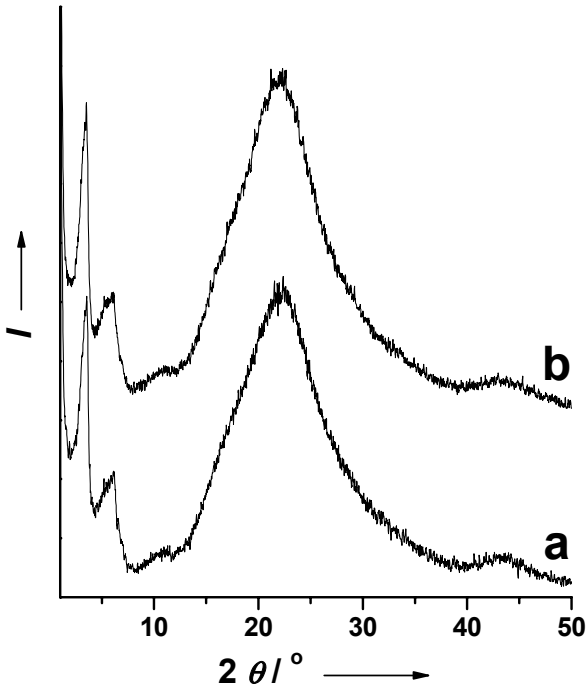


Fig. S7 Wide-angle XRD patterns of the left- (a) and right-handed excess (b) chiral mesostructured TSPP-silica hybrids shown in Fig. 3.

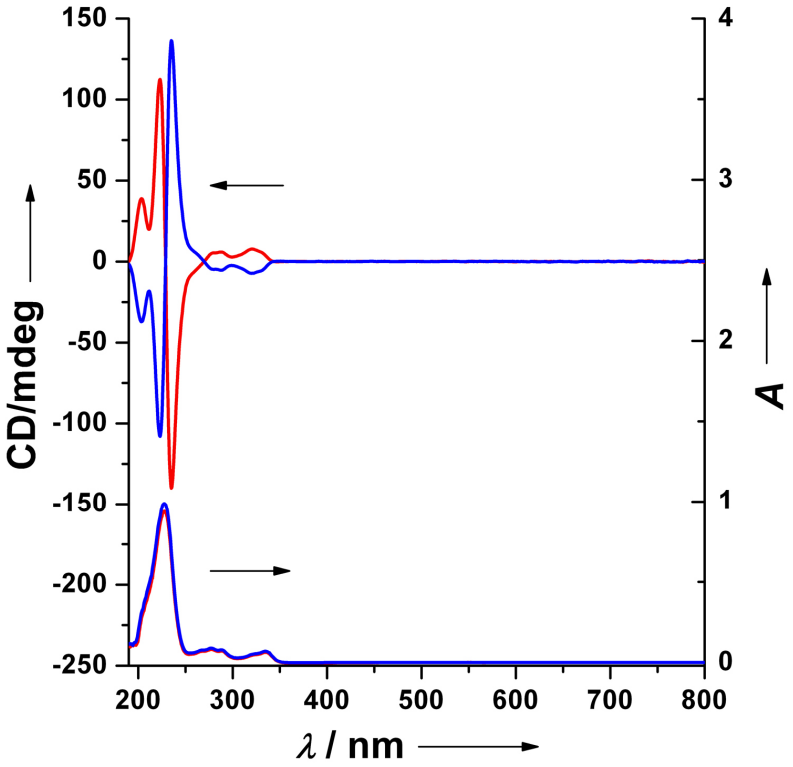


Fig. S8 CD and UV-vis spectra of (*R*)- (red line) and (*S*)-1,1'-bi-2-naphthol (blue line) in ethanol.