

Supporting information

Biomolecule-assisted route for shape-controlled synthesis of 3D flower-like CdWO_4 microstructures

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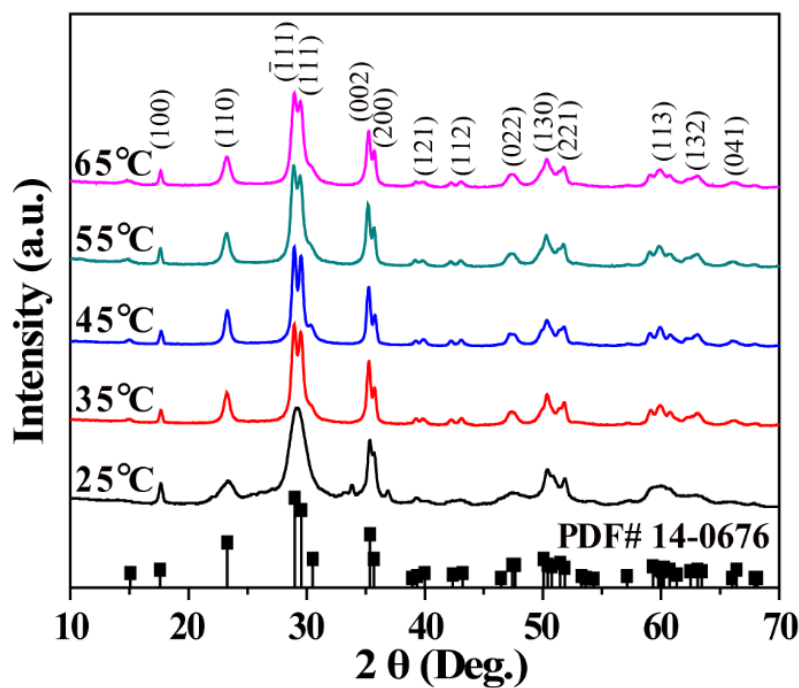


Fig. S1 XRD patterns of the samples prepared at different reaction temperature for 24 h in the assistance of SC.

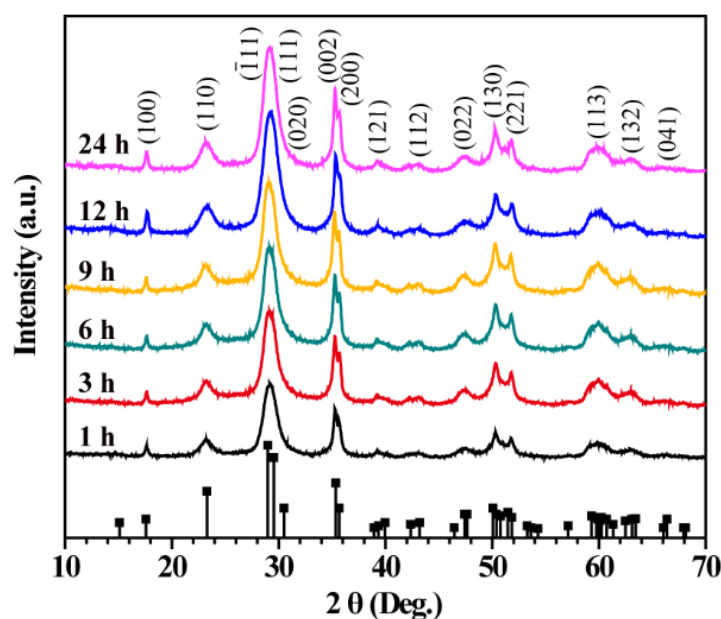


Fig. S2 XRD patterns of the samples prepared at 35 °C for different synthesis time with cadmium/tungsten in a molar ratio of 1:1.

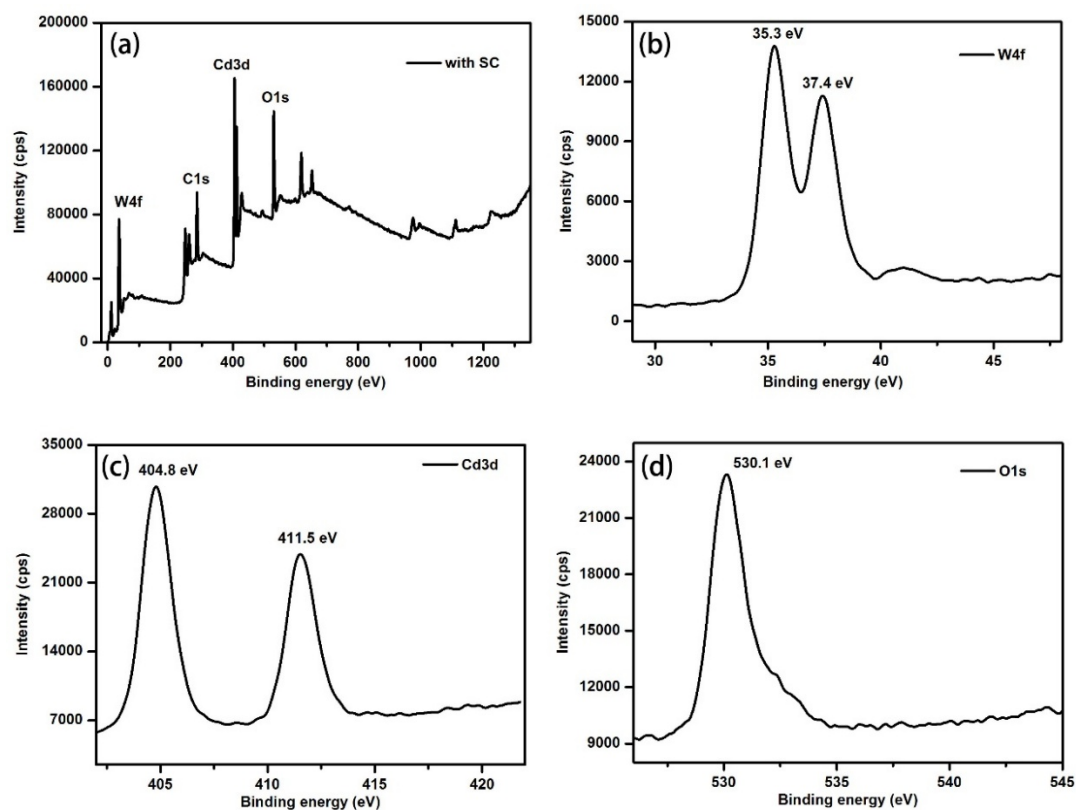


Fig. S3 XPS analysis of CdWO₄ samples prepared with SC/cadmium molar ratio of 1:1, (a) survey spectrum; (b) high resolution scan for W 4f; (c) high resolution scan for Cd 3d peaks; (d) high resolution scan for O 1s XPS spectrum.

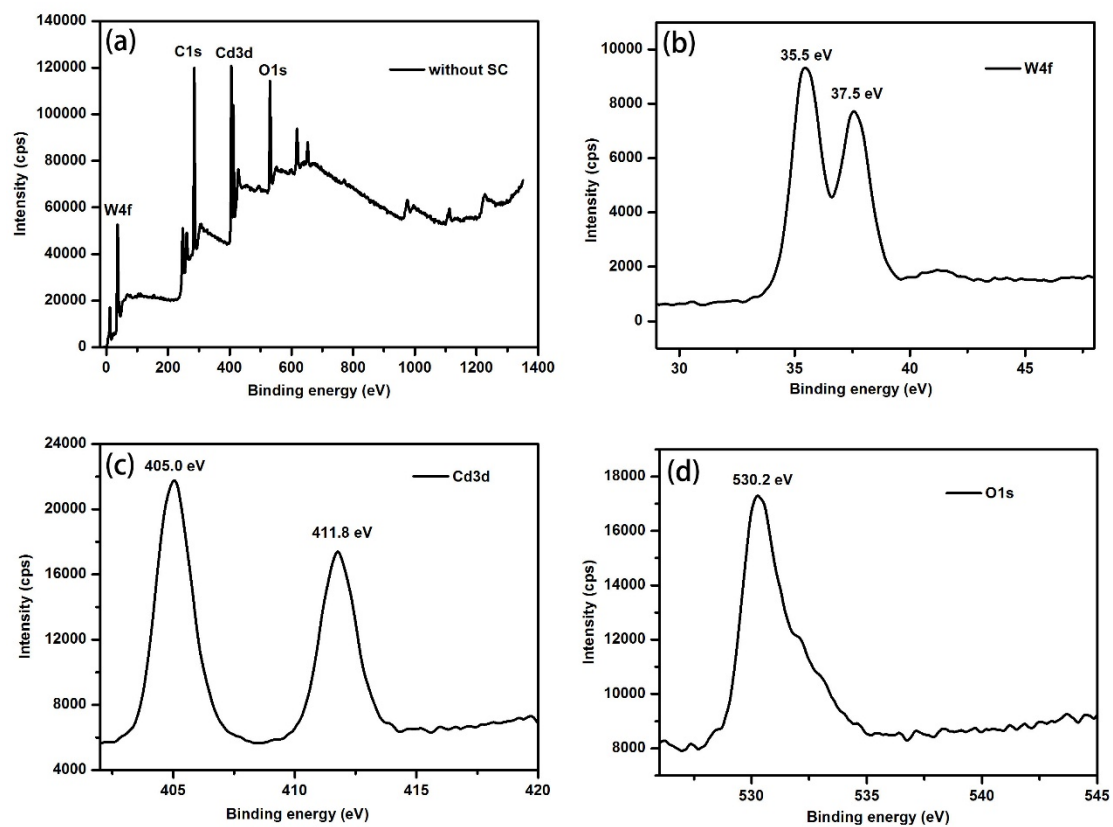


Fig. S4 XPS analysis of CdWO₄ samples prepared without SC: (a) survey spectrum; (b) high resolution scan for W 4f; (c) high resolution scan for Cd 3d peaks; (d) high resolution scan for O 1s XPS spectrum.

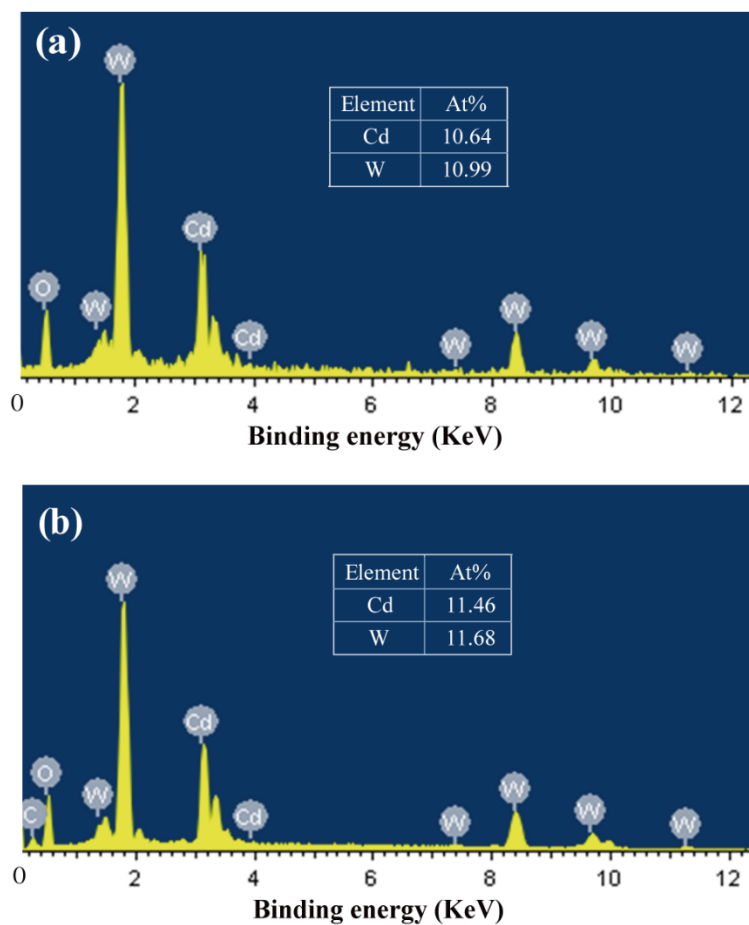


Fig. S5 EDS patterns of CdWO₄ samples prepared under SC/cadmium molar ratio of (a) 0:1 and (b) 1:1.

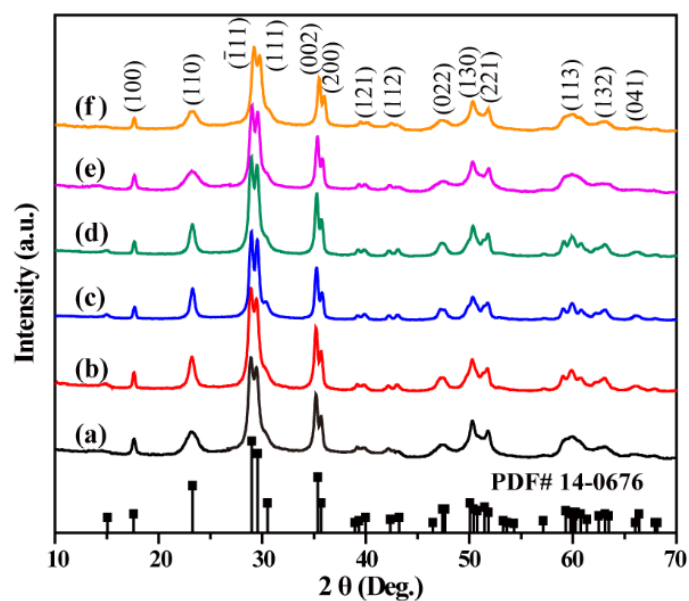


Fig. S6 XRD patterns of the samples prepared in different SC/cadmium molar ratio: (a) 0:1, (b) 0.1:1, (c) 0.5:1, (d) 1:1, (e) 1.5:1, and (f) 2:1.

Effects of the dosage of SC on the morphology of CdWO₄ products

The SEM images of the CdWO₄ products were obtained with different SC/cadmium molar ratio (Fig. 5). When no SC is used, the morphology of CdWO₄ appeared to be irregular agglomerated nanoplate (Fig. 5a). When the SC/cadmium molar ratio is 0.1, the CdWO₄ microspheres composed of numerous irregular curved nanoplates, which assembled in a randomly form aligned the surface of microspheres, were obtained. The diameter of the spheres is c.a. 2-4 μm (Fig. 5b). The product obtained with a SC/cadmium molar ratio of 0.5 has a similar morphology as above, except that the size of the building blocks becomes larger (Fig. 5c). When the SC/cadmium molar ratio is 1.0, the morphology of synthesized CdWO₄ crystals changes from the close-packed microspheres to a well-organized flower-like microstructures with the building blocks assembled in a radiative way (Fig. 5d). With the SC/cadmium molar ratio further increasing to 1.5 and 2.0, the 3D hierarchical microflowers disassemble into nanobundles and nanoplates gradually. The diameters of the nanoplates become longer than that of the building blocks of the microflowers (Fig. 5e and 5f). Although these structures are not arranged in the form as a microsphere, the CdWO₄ products are still evidenced as monoclinic single crystal phase, as revealed by the XRD pattern of the above mentioned structures (Fig. S6). From the above results, it can be seen that the appearance of CdWO₄ microstructures changes from densely packed microspheres to radiative microflowers and finally to dispersed bundles of nanoplates. The dosage of SC during the synthesis procedure is critical for the morphological control of the building blocks and the overall morphology. And there exists an optimal SC/cadmium molar ratio for the preparation of the hierarchical flower-like CdWO₄ products (the SC/cadmium molar ratio being 1.0).

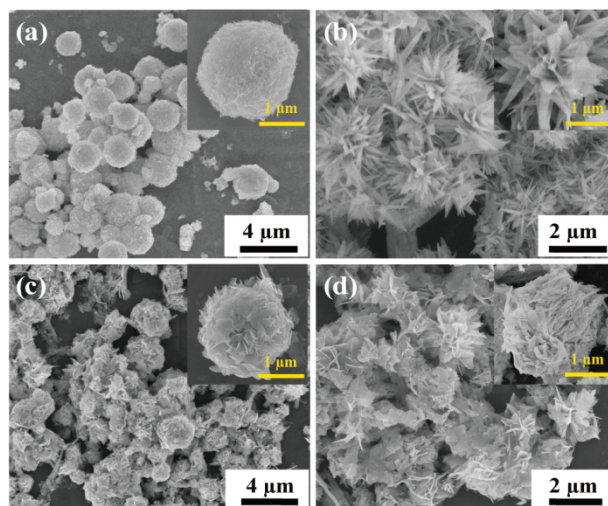


Fig. S7 SEM images of CdWO₄ samples prepared at different concentration of cadmium-cholate precursor: (a) 5 mM/5 mM, (b) 10 mM/10 mM, (c) 15 mM/15 mM and (d) 20 mM/20 mM.