Supporting information

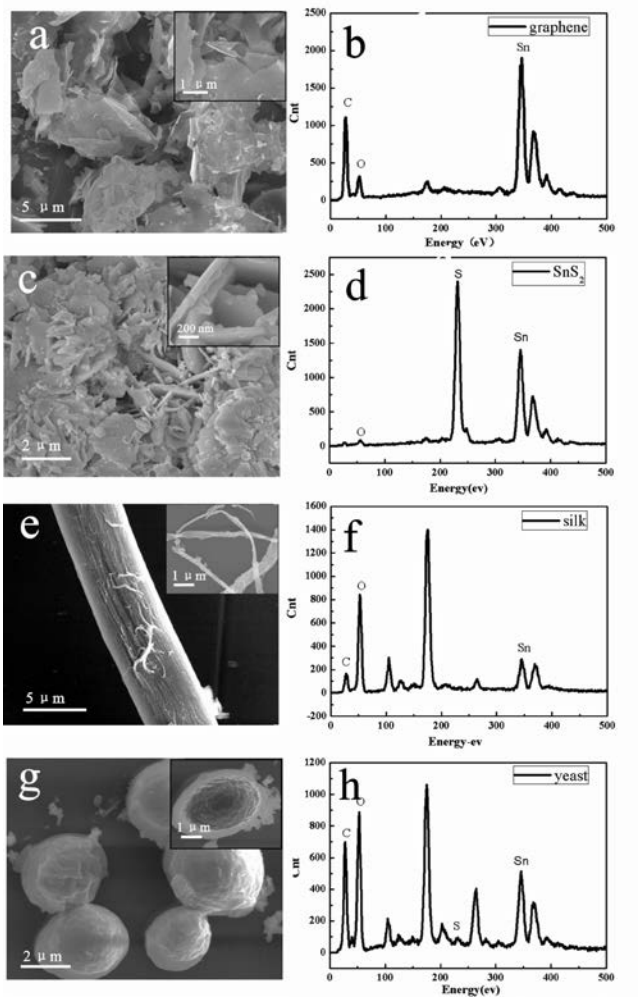

Fig. S1 (a) FSEM image of SnO_2/graphene composite, (b) EDX patterns of SnO_2/graphene composite, (c) FSEM image of SnO_2/SnS_2 composite, (d) EDX patterns of SnO_2/SnS_2 composite, (e) FSEM image of SnO_2/silk composite, (f) EDX patterns of SnO_2/silk composite, (g) FSEM image of SnO_2/yeast composite, (h) EDX patterns of SnO_2/yeast composite.

Fig. S1 (a) presented the representative FSEM image of the SnO_2/grapheme composite, which showed that the graphene platelets were composed of curled nanosheets. The inset in Figure S1 (a) showed no huge SnO_2 nanoparticles were existed on graphene nanosheets, and moreover, there was space between graphene nanosheets. The decorated SnO_2 nanoparticles could act as a spacer to decrease the restacking and increased the stability of individual graphene sheets.

Fig. S1 (c) showed the FSEM image of the SnO_2/ SnS_2 composite. It was clear that SnS_2 were also composed of nanosheets. The inset in Fig. S1 (c) also exhibited that some SnS_2 nanosheets were broken into small pieces during the experimental process, as the SnS_2 nanosheets were brittle.

As shown in Fig. S1(e), the diameter of silk was about 5.4 um, and it was shown that some protein fibers were stripped from the surface of silk after the degumming process and the whole experimental process (the inset in Figure S1(e)), which was also indicated in the TEM part.

Fig. S1 (f) indicated that yeast cells were ellipsoidal. Besides, it was obvious that the cells kept a complete retention of the cell morphology after the as-mentioned process.

From the EDX spectra, we could find that the element spectrum peaks of Sn and O were found in all the obtained composites, which or part of which belongs to SnO_2 nanoparticles. And there was no Cl in the EDX spectra of the obtained composites, which meant $SnCl_2$ was all removed. C and part of O element in Fig. S1 (b) belonged to graphene. S and part of Sn element spectrum peaks in Fig. S1 (d) belonged to tin sulfide. C, O and S element in Fig. S1 (f) and 1 (h) belonged to organics. The other element spectrum peaks shown in S1 (f) and S1 (h) belonged to the glass substrate, because both of them were detected on glass while the material are very thin.

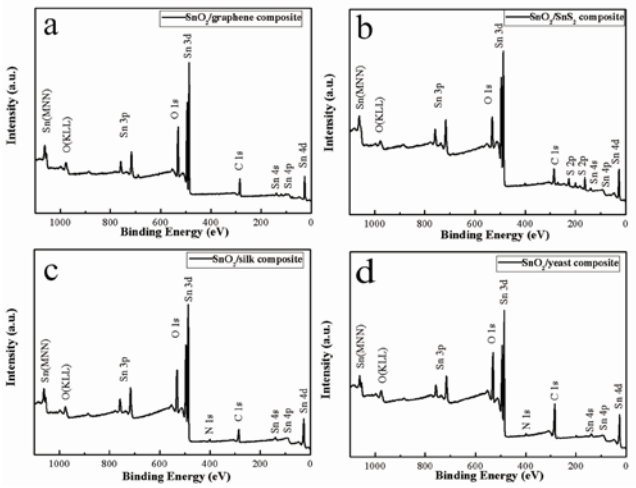

Fig. S2 XPS spectrum of (a) SnO_2/graphene composite, (b) SnO_2/SnS_2 composite, (c) SnO_2/silk composite, (d) SnO_2/yeast composite.

Fig. S2 showed the wide-survey XPS spectra of the composites, which revealed the presence of carbon, oxygen and tin. Except the element existed in substrate material, no other hetero elements were detected, which was in accordance with Figure S1. The result revealed that there was no residual $SnCl_2$ or other impurities in the composites after washing, implying the high purity of the composites.