Supporting Information

Core-shell TiO_2@C nano-architecture: facile synthesis, enhanced visible phtocatalytic performance and electrochemical capacitance

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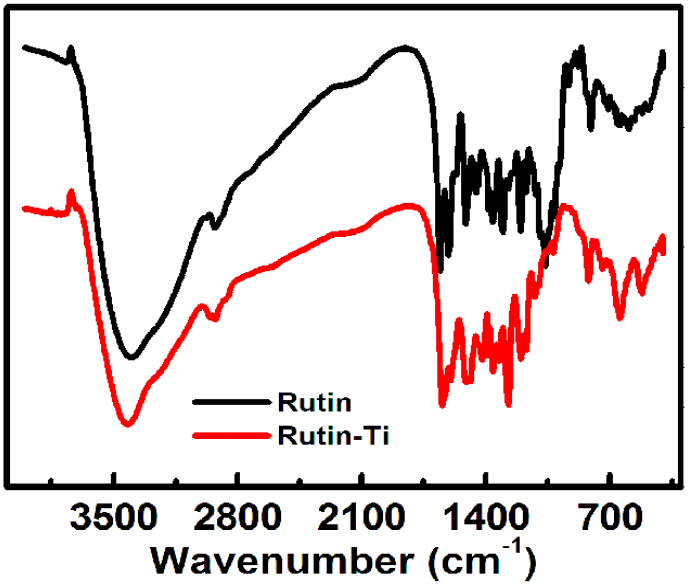

Fig. S1 FT-IR spectra of the Rutin and Rutin-Ti as indicated

Table S1 Assignments of the IR bands of Rutin and Rutin-Ti

Compound	ν(C=O) /cm^{-1}	ν(C-O-C) /cm^{-1}	ν(C=C) /cm^{-1}	ν(Ti-O)[1] /cm^{-1}	ν(Ti-O)[2] /cm^{-1}
Rutin	1655 [1-3]	1295 [1-3]	1599 [1-3]		
Rutin-Ti	1638	1273	1601	638[4]	499[5]

Note: ν(Ti-O)[1] and ν(Ti-O)[2] corresponding to the Ti-O stretching bend associated with titanium glycolate or amorphous materials, and the anatase TiO_2, respectively.

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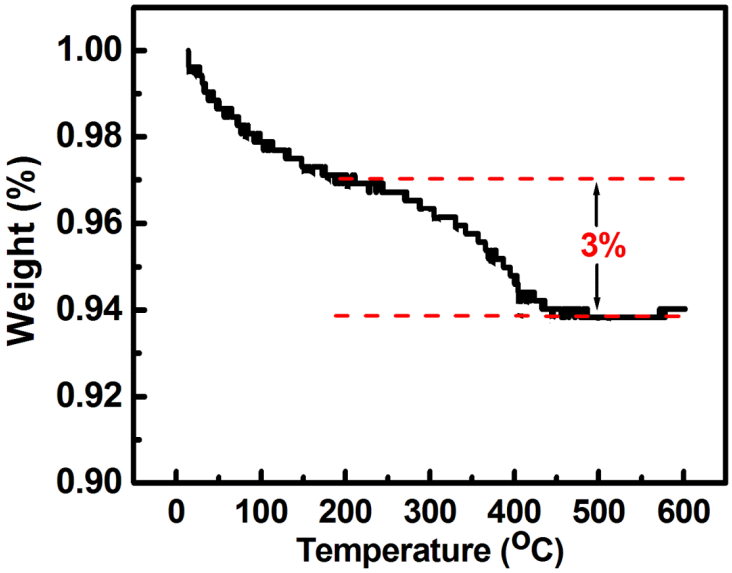

Fig. S2 TG data of the core-shell TiO_2@C sample

Thermal behavior of the core-shell TiO_2@C nanohybrids was investigated by thermogravimetric (TG) analysis (Fig. S2). As shown in Fig. S2, the mass loss below ~200 ºC should be the loss of superficial water loss, and chemically, bond water in the sample. And the loss above 200 ºC should be ascribed to the decomposition and loss of amorphous carbon in the nanohybrid. And the content of carbon in the nanohybrid is estimated to be ~3 wt.% for the core-shell nanohybrids.

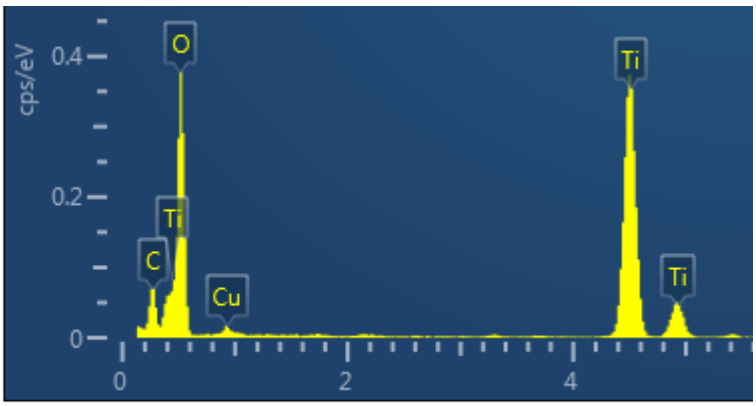

Fig. S3 EDX spectrum of the core-shell TiO_2@C sample

As noted in Fig. S3, the Ti, O and C co-exist in the as-fabricated core-shell TiO_2@C nanohybrid.

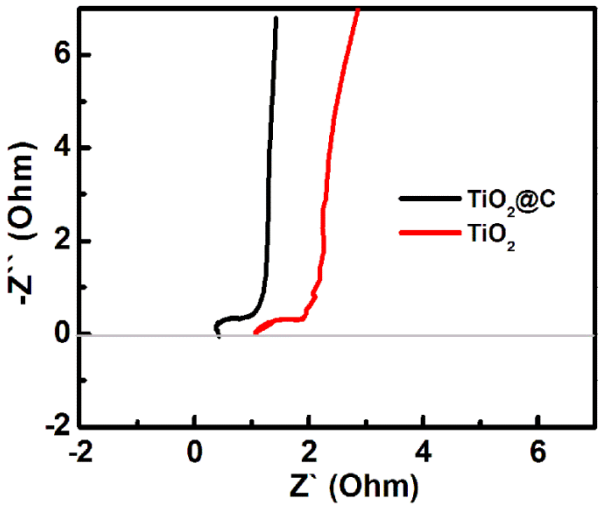

Fig. S4 EIS spectra of the TiO_2 and TiO_2@C electrodes as indicated

The intersection of the plot at the X-axis represents solution resistance (R_s), which includes the following three terms: the resistance of the Na_2SO_4 aqueous solution, the intrinsic resistance of the electroactive materials themselves and the contact resistance at the interface between electroactive materials and current collector. As seen from the inset, R_s can be found to be only ~0.4 Ohm, smaller than that of the TiO_2 (~1.2 Ohm), revealling the good electronic conductivity of the as-resulted TiO_2@C electrode. And at the high-medium frequency region, a semicircle can be found and the diameter stands for the charge-transfer resistance (R_{ct}) in the electrochemical process. And the R_{ct} is calculated as ~0.6 and ~1.3 Ohm for the core-shell TiO_2@C and TiO_2, respectively, indicating the smaller charge-transfer resistence of the TiO_2@C in the electrochemical process.