

## Supporting Information

### **Core-shell TiO<sub>2</sub>@C ultralong nanotubes with enhanced adsorption for antibiotics**

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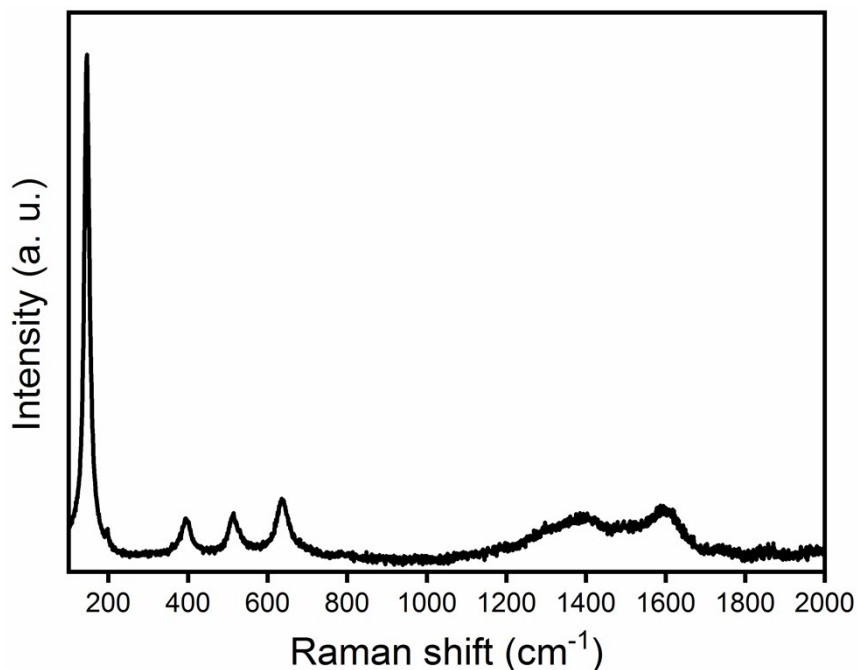


Fig. S1 The Raman spectrum of TiO<sub>2</sub>@C

The Raman spectrum of TiO<sub>2</sub>@C is shown in Fig. S1, there are five anatase phase TiO<sub>2</sub> feature peaks at 145, 198, 394, 514, 635 cm<sup>-1</sup>, respectively.<sup>1</sup> Moreover, the G band at ~1600 cm<sup>-1</sup> reflects the in-plane vibration of sp<sup>2</sup> carbon atoms, while the D band at ~1386 cm<sup>-1</sup> represents a defect induced Raman feature peak of carbon-based material, implying the non-perfect crystalline structure of the carbon shell.<sup>2</sup> The peak intensity ratio between G band and D band ( $I_G/I_D$ ) is 1.1796, indicating that carbon defect structure in the carbon structure is relatively small and the dominant component in the carbon structures is the sp<sup>2</sup>.

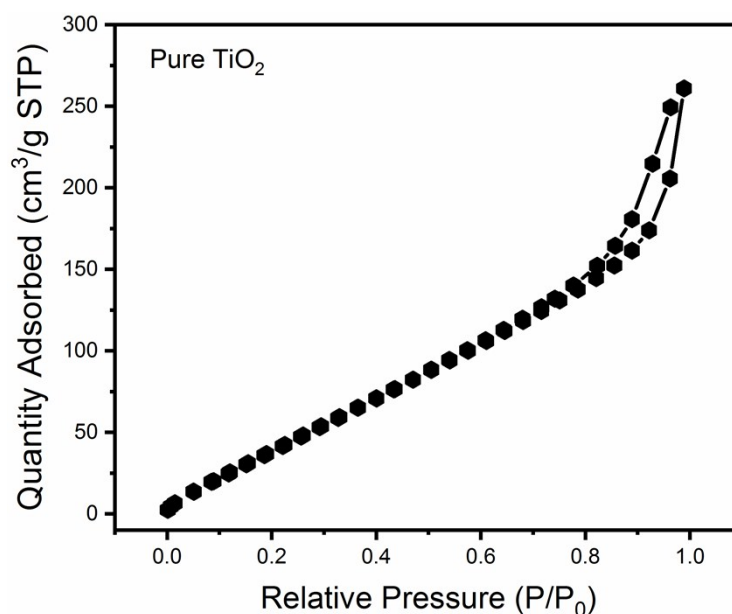


Fig. S2 The N<sub>2</sub> adsorption-desorption isotherm of TiO<sub>2</sub> nanotubes, the BET Surface Area is 302.18 m<sup>2</sup> g<sup>-1</sup>, and it is lower than TiO<sub>2</sub>@C composite.

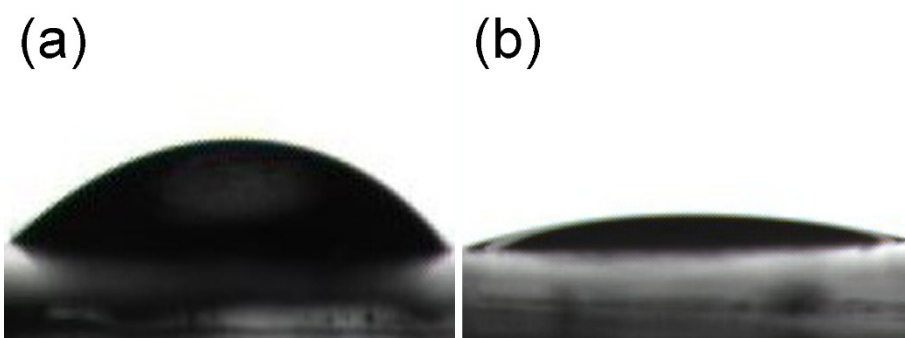


Fig. S3 The contact angles of (a) TiO<sub>2</sub> nanotube of 40.2° (b) and TiO<sub>2</sub>@C of 11.4°

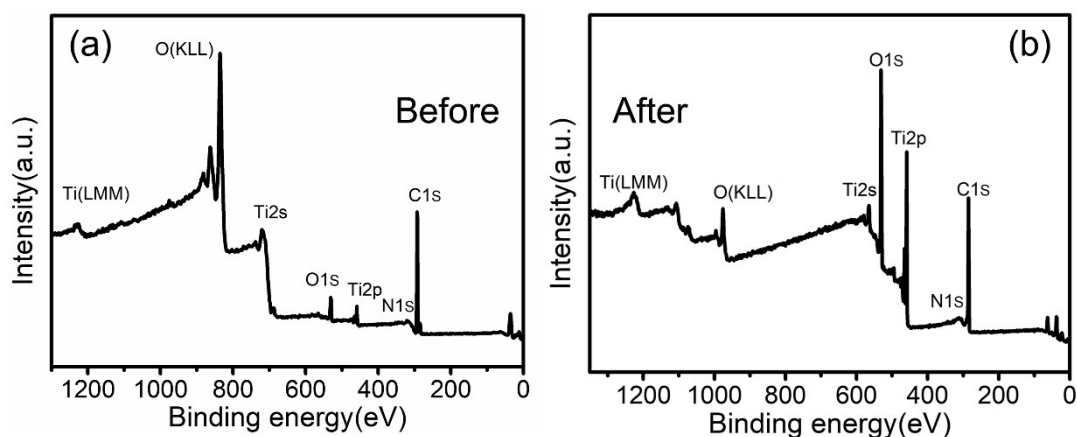


Fig. S4 XPS spectra of the TiO<sub>2</sub>@C before and after the TC antibiotic adsorption.

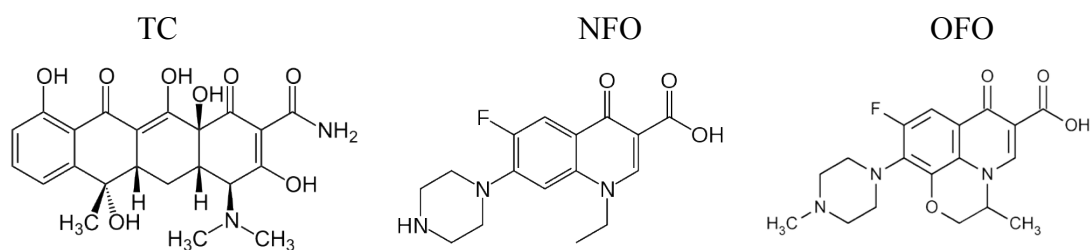


Fig. S5 The chemical structure of TC, NFO and OFO

#### Reference:

- [1] M. Lubas, J. J. Jasinski, M. Sitarz, L. Kurpaska, P. Podsiad, J. Jasinski, *Spectrochim Acta*, 2014, 133, 867-871.
- [2] V. Etacheri, C. Wang, M. J. O'Connell, C. K. Chan, V. G. Pol, *J. Mater. Chem. A*, 2015, 3, 9861-9868.