Supporting information

Mesoporous Titanium Dioxide Coating on Gold Modified Silica Nanotubes: A Tube-in-Tube Titanium Nanostructure for Visible-Light Photocatalyst

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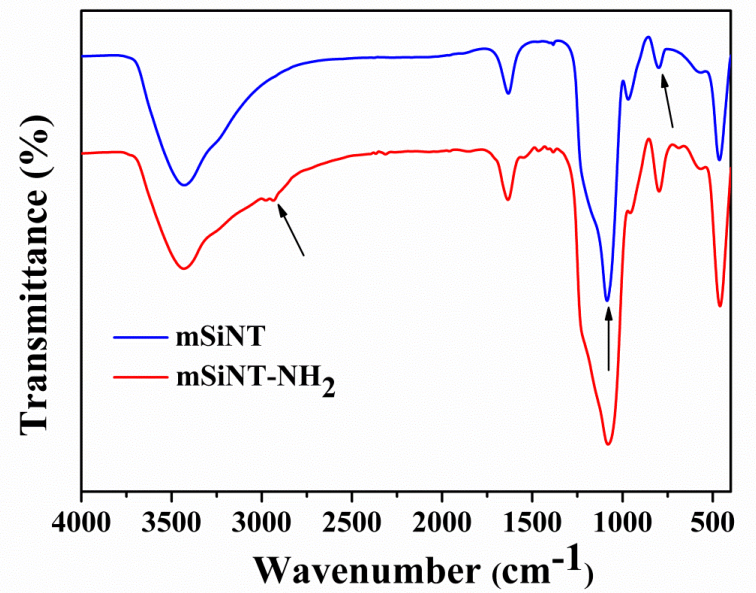

Fig. S1 FT-IR spectra of the mSiNTs before and after surface modification with 3-APTES, wherein, the absorption bands at 800 and 1081 cm^{-1} were assigned to the ν_s(Si–O–Si) and ν_{as}(Si–O–Si) vibrations, respectively, and the new peaks at 2925 cm^{-1} correspond to $–CH_2$-group of aminopropyl from 3-APTES molecules.

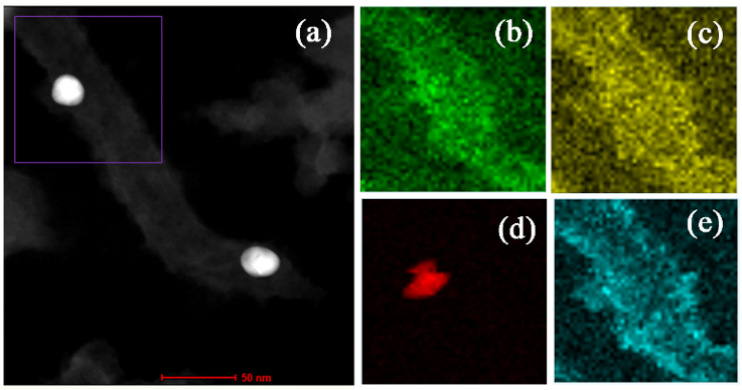

Fig. S2 (a) High angle annular dark field-scanning transmission electron microscopy (HAADF-STEM) image and mapping results of the elements (b) Si, (c) O, (d) Au, and (e) Ti for the boxed area of (a).

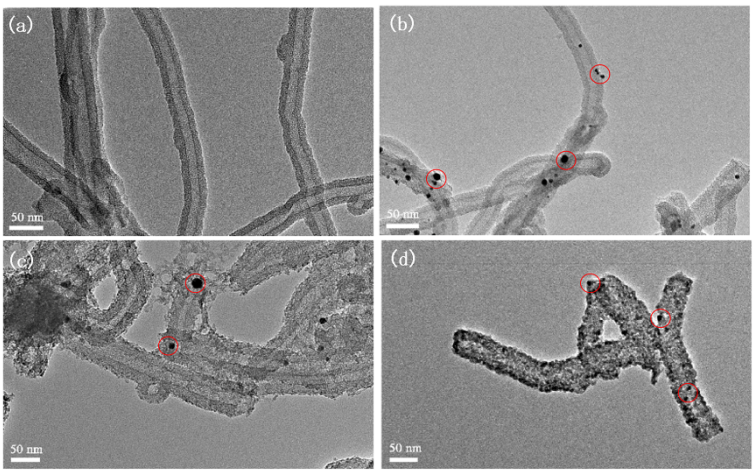

Fig. S3 TEM images of (a) mSiNTs, (b) mSiNTs-N/Au, (c) mSiNTs-N/Au@TiO_2, (d) mSiNTs-N/Au@TiO_2, to illustrate the distribution of Au NPs.

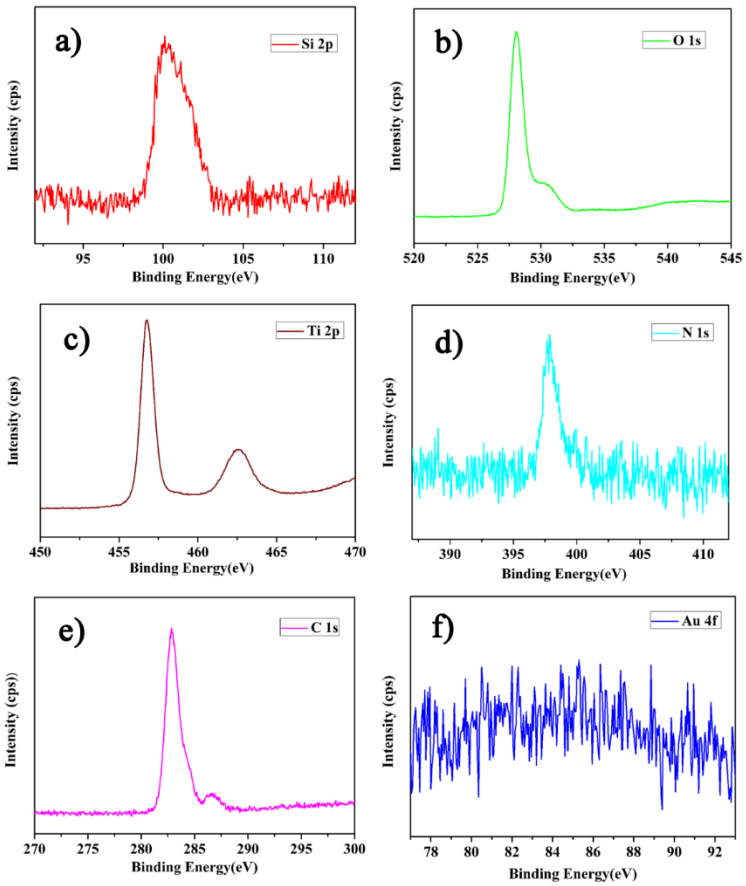

Fig. S4 XPS measurements for the as-obtained mSiNTs-N/Au@TiO_2 photocatalyst: a) Si 2p, b) O 1s, c)Ti 2p, d) N 1s, e) C 1s and f) Au 4f.

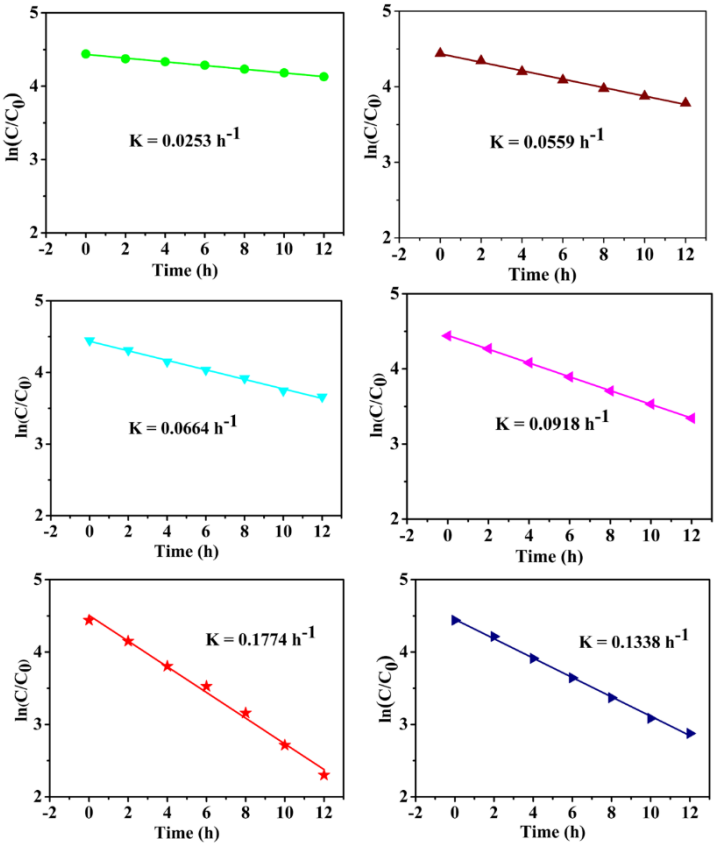

Fig. S5 Kinetic curve for the degrading RhB catalyzed by mSiNTs@TiO_2 (●), mSiNTs-N@TiO_2 (▲), mSiNTs-N/$Au_{0.02\%}$@TiO_2 (▼), mSiNTs-N/$Au_{0.04\%}$@TiO_2 (♦), mSiNTs-N/$Au_{0.06\%}$@TiO_2 (★), mSiNTs-N/$Au_{0.08\%}$@TiO_2 (◆).