nanomaterials

# Supplementary Materials

# Aerobic Oil-Phase Cyclic Magnetic Adsorption to Synthesize 1D $Fe_2O_3$@$TiO_2$ Nanotube Composites for Enhanced Visible-Light Photocatalytic Degradation

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**S1 FTIR spectra of the synthesized samples**

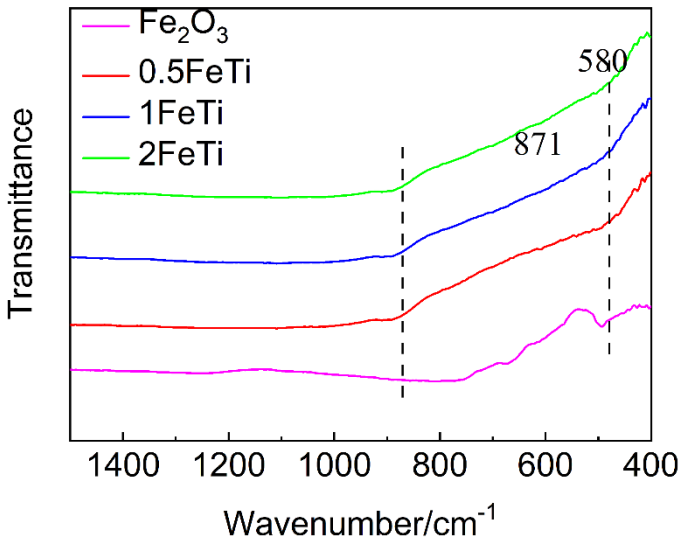


**Figure S1.** FTIR spectra of 0.5FeTi (red), 1FeTi (blue), 2FeTi (green) and $Fe_2O_3$ (magenta).

Note: The peaks at 871 $cm^{-1}$ and 580 $cm^{-1}$ were attributed to the stretching vibration of the Ti–O and the stretching vibration of Fe–O, respectively. Besides, a weak fluctuation appearing at 580 $cm^{-1}$ is observed in 0.5FeTi, 1FeTi and 2FeTi, which also confirms the successful deposition of $Fe_2O_3$.

**S2 $N_2$ adsorption-desorption isotherms**

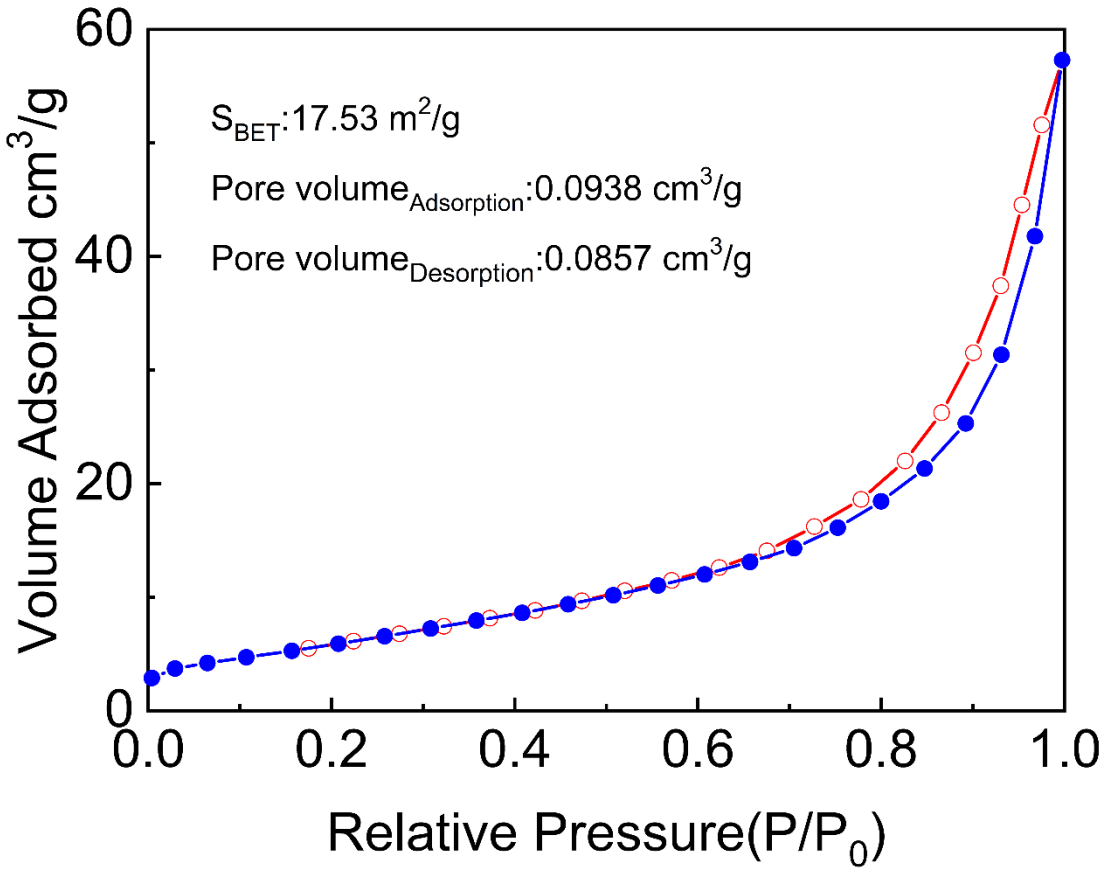


**Figure S2.** Nitrogen adsorption–desorption isotherms and the corresponding pore size distribution curves for TNT.

**S3 Decay curve fitting procedures for the synthesized samples.**

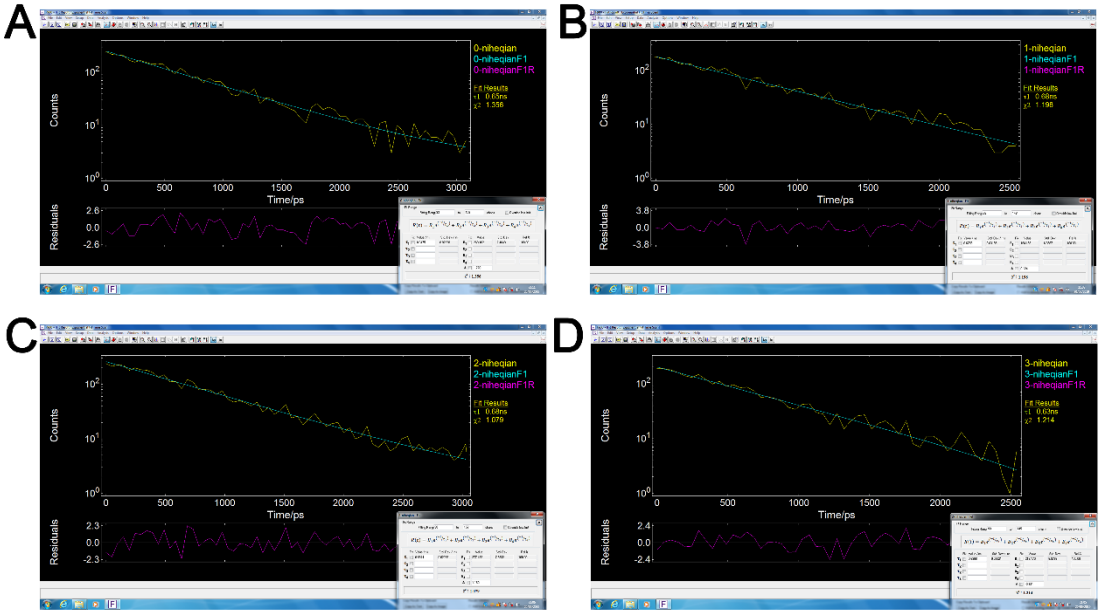


**Figure S3.** Decay curve fitting procedures for 0.5FeTi (**A**), 1FeTi (**B**), 2FeTi (**C**) and $Fe_2O_3$ (**D**).

**S4 Magnetization curve of $Fe_2O_3$**

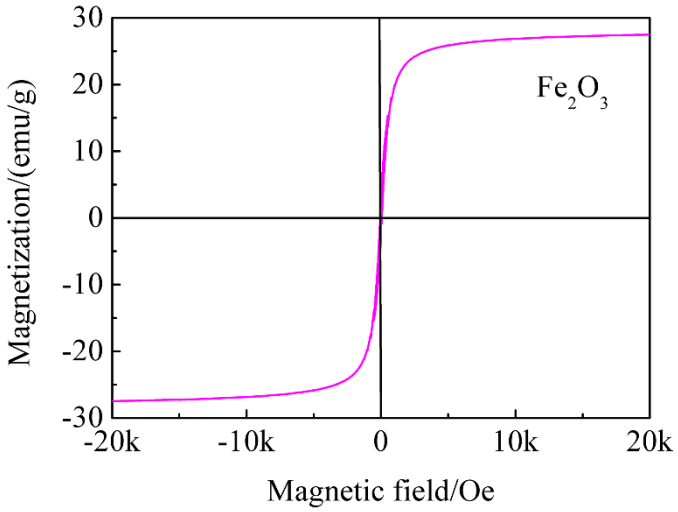


**Figure S4.** Magnetization curve of $Fe_2O_3$.

**S5 Degradation curve of pure $TiO_2$ nanotubes**

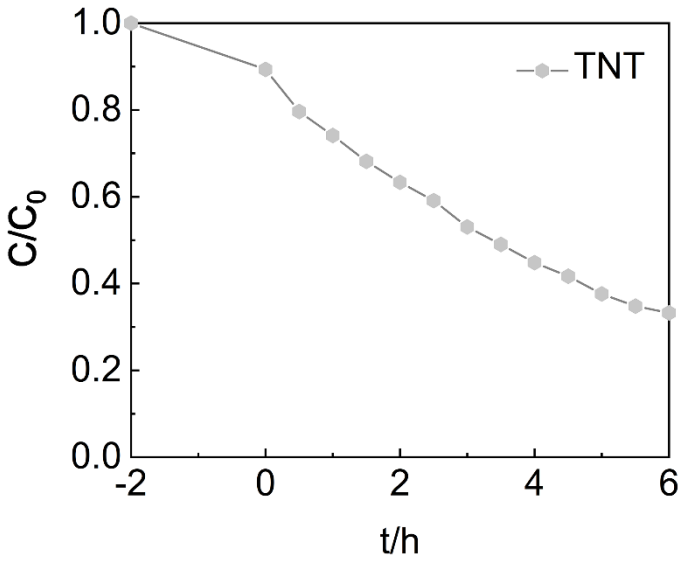


**Figure S5.** Degradation curve of pure $TiO_2$ nanotubes.

**S6 HR-MS spectra**

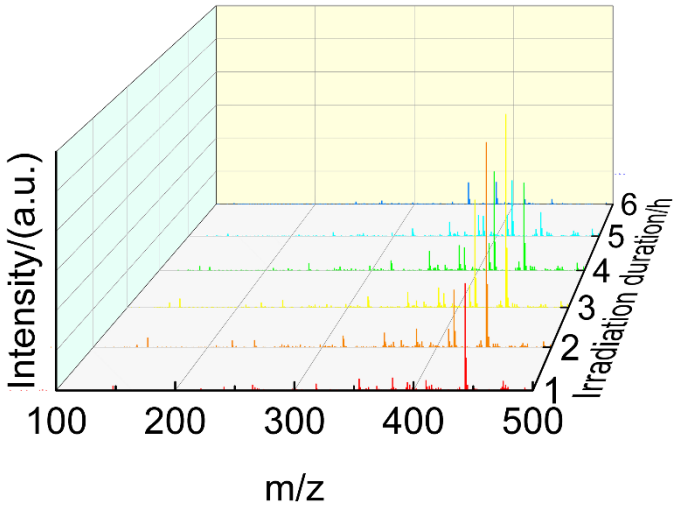


**Figure S6.** HR-MS spectra of samples during photocatalysis of RhB over 1FeTi for 0–6 h.

**S7 XPS full-range spectrum of 1FeTi after photocatalysis**

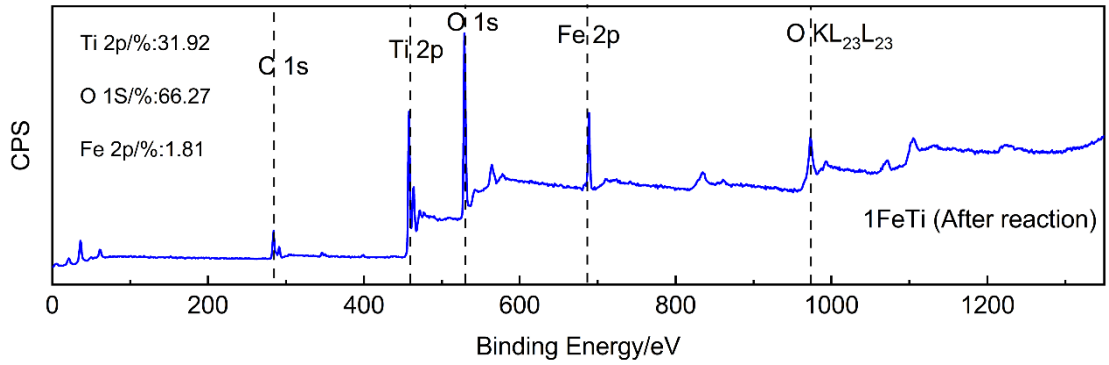


**Figure S7.** XPS full-range spectrum of 1FeTi after photocatalysis.

Note: the loss of iron can be calculated to be 1–1.81/2.09 = 13.4% according to Table 1 and Figure S7.