

SUPPLEMENTARY INFORMATION

**Diethylenetriamine-Assisted In-Situ Synthesis of TiO₂
nanoparticles on Carbon Nanotube with Well-Defined
Structure and Enhanced Photocatalytic Performance**

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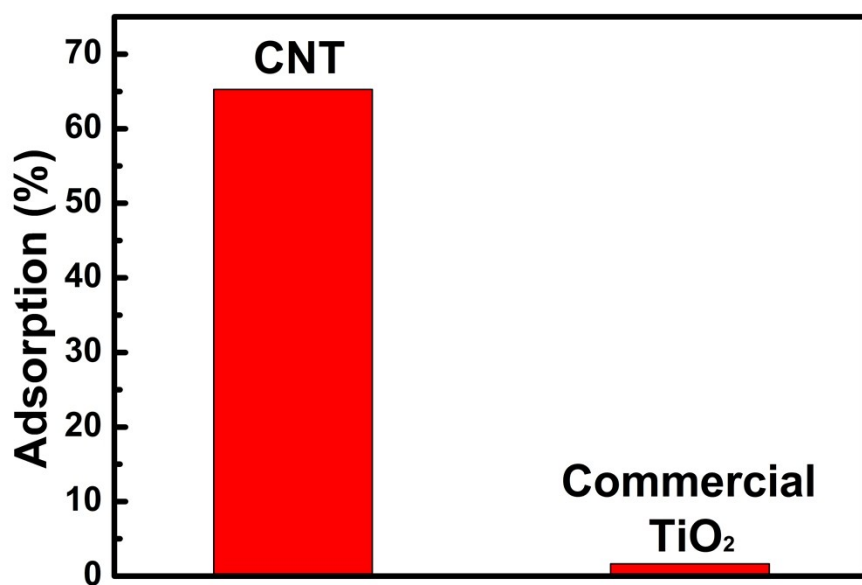


Figure S1. Adsorption capacity of CNT or commercial TiO₂ to MB aqueous solution

Note: 10 mg CNT or commercial TiO₂ was dispersed in 40 mL MB (20 mg/L) aqueous solution and magnetically stirred for 30 min in dark.

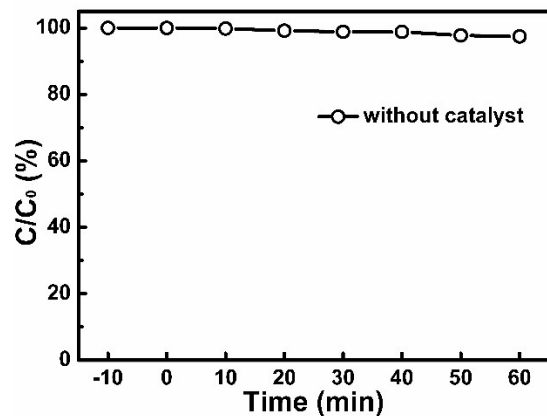


Figure S2. The photodegradation of MB without catalyst.

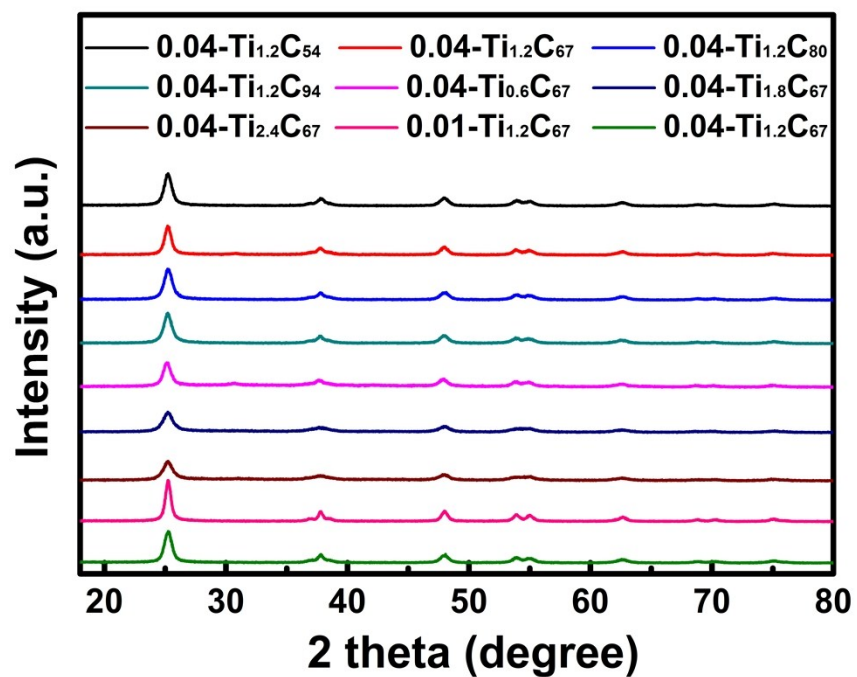


Figure S3. XRD patterns of various CNT/TiO₂ composites.

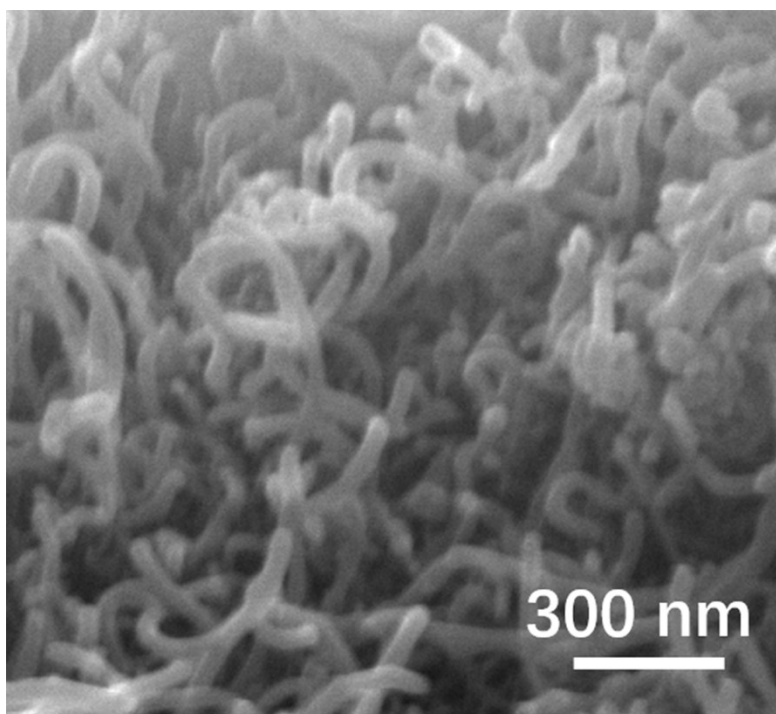


Figure S4. SEM image of CNT.

Table S1. Theoretical compositions of CNT and TiO₂ in different samples and their MB adsorption capacity and apparent kinetic rate constants

Samples	Adding amount of TiO₂ (mg)	Adding amount of CNT (mg)	TiO₂ (wt%)	CNT (wt%)	Adsorption ratio (%)	Reaction constant (min⁻¹)
0.04-Ti _{0.6} C ₆₇	162	67	71	29	16.24	0.0176
0.04-Ti _{1.2} C ₆₇	324	67	83	17	3.27	0.0208
0.04-Ti _{1.8} C ₆₇	486	67	88	12	12.42	0.0153
0.04-Ti _{2.4} C ₆₇	648	67	91	9	13.95	0.0168
0.04-Ti _{1.2} C ₅₄	324	54	86	14	8.96	0.0174
0.04-Ti _{1.2} C ₆₇	324	67	83	17	3.27	0.0208
0.04-Ti _{1.2} C ₈₀	324	80	80	20	14.93	0.0524
0.04-Ti _{1.2} C ₉₄	324	94	78	22	19.21	0.0405
0-Ti _{1.2} C ₆₇	324	67	83	17	15.31	0.0175
0.01-Ti _{1.2} C ₆₇	324	67	83	17	10.32	0.0592
0.02-Ti _{1.2} C ₆₇	324	67	83	17	4.41	0.0653
0.04-Ti _{1.2} C ₆₇	324	67	83	17	3.27	0.0208

Table S2. Summary of surface compositions of 0.02-Ti_{1.2}C₆₇ analyzed by XPS

eV	C	area	at. %
284.7	adventitious carbon and sp ² -hybridized carbon from the CNT	31069.1	37.75
285.3	defect-containing sp ³ -hybridized carbons	33685.3	40.92
286.5	C-O	8041.9	9.77
288.9	C-O-Ti	9515.05	11.56
eV	O	area	at. %
529.8	Ti-O-Ti	60887.8	53.54
532.1	Ti-O-C	34197.4	30.07
533.5	O=C or O-C	18640.9	16.39
eV	Ti	area	at. %
458.6	Ti (IV) 2p _{1/2}	49167.1	72.33
464.3	Ti (IV) 2p _{3/2}	18809.2	27.67

Table S3. Summary of surface compositions of 0-Ti_{1.2}C₆₇ analyzed by XPS

eV	C	area	at. %
284.4	adventitious carbon and sp ² -hybridized carbon from the CNT	15828.3	29.37
284.9	defect-containing sp ³ -hybridized carbons	12403.9	23.02
285.8	C-O	23428.1	43.48
289.1	C-O-Ti	2228	4.13
eV	O	area	at. %
529.7	Ti-O-Ti	55508.1	81.76
531.6	Ti-O-C	12381.3	18.24
eV	Ti	area	at. %
458.6	Ti (IV) 2p _{1/2}	45766	66.50
464.3	Ti (IV)2p _{3/2}	23058	33.50

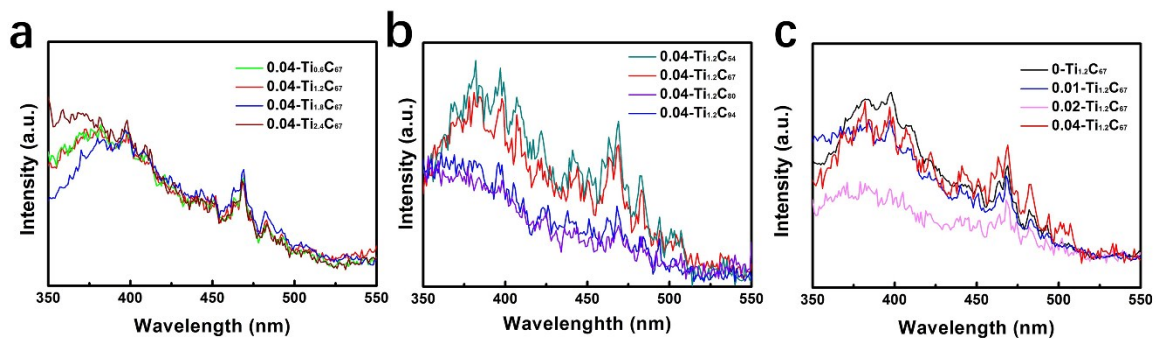


Figure S5. The PL spectra of three groups of samples measured at an excitation wavelength of 294 nm.

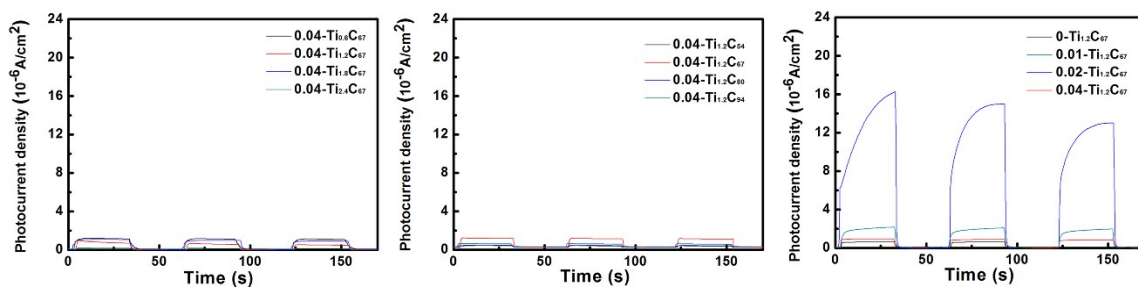


Figure S6. Photocurrent responses for all the samples in 0.1 M Na_2SO_4 solution under UV-light irradiation.