Supporting Information

Enhancement of Mineralization Ability of C$_3$N$_4$ via lower Valence Position by Tetracyanoquinodimethane Organic Semiconductor

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Figure S1 TEM images of pure g-C$_3$N$_4$ (a) TCNQ-C$_3$N$_4$ with TCNQ mass fraction as 1 %, 5 %, 10 %, 20% (b-e) and pure TCNQ (f)
Figure S2 (a) Photocatalytic degradation of phenol and (b) the apparent rate constants over pure g-C$_3$N$_4$ (0%), pure TCNQ (100%) and TCNQ-C$_3$N$_4$ with different TCNQ mass fraction (1 % ~ 50 %) under simulated sunlight irradiation.
Figure S3 Photocatalytic degradation of 2,4-dichlorophenol (a) and bisphenol A (b), (inset) the apparent rate constants over pure g-C$_3$N$_4$ (0%) and 10%-TCNQ-C$_3$N$_4$ under visible light irradiation ($\lambda>420$ nm).
Figure S4 HPLC chromatograms of phenol and after photocatalytic degradation by TCNQ-C$_3$N$_4$ (a) and pure C$_3$N$_4$ for 4 h monitored at 275 nm ([phenol] = 5 ppm, catalyst = 25 mg/50 mL)

Figure S5 IR spectra of g-C$_3$N$_4$, pure TCNQ and TCNQ-C$_3$N$_4$ materials.
Figure S6 Mott-Schottky (MS) plots of pure C$_3$N$_4$ film electrodes at a frequency of 10 Hz and 100 Hz in an aqueous solution of Na$_2$SO$_4$ (0.1 M).

Figure S7 Mott-Schottky (MS) plots of pure TCNQ film electrodes at a frequency of 10 Hz and 100 Hz in an aqueous solution of Na$_2$SO$_4$ (0.1 M).
Figure S8 The valence band spectra of X-ray photoelectron spectroscopy for pure C$_3$N$_4$, 10%-TCNQ-C$_3$N$_4$ and pure TCNQ.
Figure S9 ESR spectra of 10%-TCNQ-C$_3$N$_4$ in dark (a) 10%-TCNQ-C$_3$N$_4$ under visible light irradiation ($\lambda > 420$ nm) in water (b) pure C$_3$N$_4$ in dark (c) and pure C$_3$N$_4$ under visible light irradiation ($\lambda > 420$ nm) in water (d). ★ label as superoxide radicals ◆ label as hydroxy radical.

Figure S10 The plots of photogenerated carriers trapping in the system of photodegradation of phenol by 10%-TCNQ-C$_3$N$_4$ and pure C$_3$N$_4$ under visible light irradiation ($\lambda > 420$ nm)

Figure S11 BET specific surface areas of pure g-C$_3$N$_4$, pure TCNQ and TCNQ-C$_3$N$_4$ with different TCNQ mass fraction.