Supporting information of
Adsorption and Visible-Light Photodegradation of
Organic Dyes with TiO$_2$/Conjugated Microporous
Polymer Composites

Jisi Li,${}^a$ Xianhui Wen,${}^a$ Qiujing Zhang${}^a$ and Shijie Ren*${}^a$

${}^a$ College of Polymer Science and Engineering, State Key Laboratory of Polymer Materials Engineering, Sichuan University, Chengdu, 610065, P. R. China.

E-mail: rensj@scu.edu.cn

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**Characterizations**

$^1$H-NMR experiments were obtained on a Bruker 400MHz spectrometer. Element analysis was carried out by an Elementer Vario EL automatic element analyzer. FT-IR spectra were collected as KBr disks using a Nicolet 560 FT-IR spectrometer. Thermogravimetric analysis (TGA) was carried out using a Thermo Nicolet is10 thermal analysis instrument over the temperature ranging from 30 to 800 °C under a nitrogen atmosphere with a heating rate of 20 °C/min. Scanning electron microscopy (SEM) was applied using a Nova NanoSEM450 with an acceleration voltage of 5 kV using the dispersions of ethanol (1 mg ml$^{-1}$) on the silicon wafer. High Resolution transmission electron microscopies (HRTEM) were performed on a Titan G2 60-300, FEI microscope.

**Gas sorption analysis:**

Surface areas and pore size distributions were obtained by nitrogen adsorption and desorption isotherms at 77 K using a BELSORB Max (BEL Japan Inc.) volumetric sorption analyzer. The samples were degassed at 120 °C for 15 h under vacuum (10$^{-5}$ bar) before analysis. The surface areas were calculated in the relative pressure ($P/P_0$) range from 0.05-0.35 using Brunauer-Emmet-Teller (BET) method. Pore size distributions and pore volumes were derived from the nitrogen adsorption branches of the isotherms using the non-local density functional theory (NL-DFT).

**Optical performance test:**

The solid UV-visible absorption spectrum was measured by UV2100 UV-vis spectrophotometer; the liquid UV-visible absorption spectrum was measured by UV3600 UV-vis spectrophotometer of Shimadzu Corporation of Japan. The solid fluorescence spectrum was measured by a Hitachi F-7000 fluorescence spectrophotometer.

**Photocatalytic performances:**

The adsorption amount of MB with different photocatalysts is calculated as:
\[ Q = \frac{(C_0 - C_{eq}) \times V \times M}{m} \]

Where, \( Q \) is the adsorption amount, \( C_0 \) is the initial concentration of MB, \((2.7 \times 10^{-5} \text{ mol L}^{-1})\), \( C_{eq} \) is the concentration of MB when it comes to adsorption equilibrium, \( V \) is the volume of MB aqueous solution (35 mL), \( M \) is molecular weight of MB molecular (319.86 g mol\(^{-1}\)), \( m \) is mass of photocatalyst (26.25 mg).

The photodegradation rate of MB with different photocatalysts is calculated as:

\[ \ln \left( \frac{C}{C_0} \right) = K \times t \]

Where, \( C \) is concentration of MB be taken at interval time, \( C_0 \) is the concentration of MB at “0 min” just before the irradiation of light, \( t \) is the irradiation time, the slope \( K \) is the photodegradation rate.

The removal ratio of MB is calculated as:

\[ D = \frac{A_0 - A_t}{A_0} \times 100\% \]

Where, \( D \) is the removal ratio, \( A_0 \) is the absorbance intensity of the MB before photodegradation test at 664 nm, \( A_t \) is the absorbance intensity of MB after “t” min after the beginning of photodegradation test at 664 nm.
Figure S1. FT-IR spectra of (a) Tr-M and TrCMP, and (b) TiO$_2$ and TrCMP-TiO$_2$ composites with different contents of TrCMP.
Figure S2. Thermogravimetric analysis traces of the materials under a nitrogen atmosphere with a heating rate of 20 °C/min.
Figure S3. SEM images of (a) TiO$_2$, (b) TrCMP, (c) 3% TrCMP-TiO$_2$, (d) 5% TrCMP-TiO$_2$, (e) 10% TrCMP-TiO$_2$ and (f) 20% TrCMP-TiO$_2$.  
Figure S4. HRTEM images of 10% TrCMP-TiO$_2$. 
Figure S5. (a) UV-vis absorption spectra of the materials measured in solid state powders; and (b) photoluminescent spectra of the materials measured in solid state powders ($\lambda_{ex} = 300$ nm).
Figure S6. UV-vis spectra of the MB solution and the eluent of 10% TrCMP-TiO$_2$ dispersion after irradiation for 60 minutes under visible light.
Table S1. Removal ratios of the cycling runs for the photodegradation of MB with 10% TrCMP-TiO$_2$.

| Test         | Adsorption amount (Q) (mg g$^{-1}$) | Photodegradation Rate (min$^{-1}$) | Removal Ratio (D) (%) |
|--------------|-------------------------------------|-----------------------------------|----------------------|
| First Test   | 6.99                                | -0.0359                           | 95.77                |
| Cycle Test 1 | 5.07                                | -0.0314                           | 92.15                |
| Cycle Test 2 | 6.00                                | -0.0284                           | 91.43                |
| Cycle Test 3 | 5.34                                | -0.0317                           | 91.91                |