SUPPLEMENTARY INFORMATION

Morphology Effect of Polythiophene Catalysts on Photo-degradation of Methylene Blue

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Detailed methods

Synthesis of PTh-1, PTh-2 and PTh-3

All reagents were purchased from Sigma-Aldrich unless otherwise noted and used as received.

PTh-1: Thiophene monomer (0.03 mol) was dissolved in acetonitrile (100 mL) in a 500 mL reaction vessel. Then, ferric chloride (0.12 mol) dissolved in acetonitrile (100 mL) was added dropwise into thiophene solution. The polymerization was allowed to proceed for 24 h at 25 °C with stirring. After the reaction was completed, the mixture was filtered and washed with ethanol and distilled water for 3 times. The solid material was further collected and dried in vacuum at 60 °C for 24 h.

PTh-2: Thiophene monomer (0.03 mol) was dissolved in chloroform (100 mL) in a 500 mL reaction vessel. Then, ferric chloride (0.12 mol) dissolved in acetonitrile (100 mL) was added dropwise into the oovementioned solution at 0 °C for 24 h. After reaction, the mixture was filtered and washed with ethanol and distilled water for 3 times. The
solid material was further collected and dried in vacuum at 60 °C for 24 h.

PTh-3: Thiophene monomer (0.0025 mol) was dissolved in ethanol (50 mL) and chloroform (50 mL) in a 500 mL reaction vessel. Then, ferric chloride (0.01 mol) was dissolved in ethanol (50 mL) and chloroform (50 mL), and was added dropwise into the aforementioned solution at 25 °C for 24 h. After reaction, the mixture was filtered and washed with ethanol and distilled water for 3 times. The solid material was further collected and dried in vacuum at 60 °C for 24 h.

Supplementary Schemes/Figures

Figure S1 The relative radiation power at different wavelength of LED light, and 5000-8300K CCT is chosen in the experiment.
Figure S2 SEM images of PTh synthesized at 0 °C for (a) 4 h, (b) 8 h, (c) 24 h in acetonitrile.
Figure S3 SEM images of PTh synthesized at 0 °C for (a) 4 h, (b) 8 h, (c) 16 h, (d) 24 h in acetonitrile and chloroform.
Figure S4 SEM images of PThs synthesized in acetonitrile with different concentrations of monomer and ferric chloride (a) 0.15 and 0.6 mol/L, (b) 0.0125 and 0.6 mol/L, (c) 0.15 and 0.05 mol/L, (d) 0.0125 and 0.05 mol/L at 25 °C for 24 h.
Figure S5 SEM images of PTh synthesized in chloroform and ethanol for 24 h with different concentrations of monomer and ferric chloride: (a) 0.0125 and 0.05 mol/L, (b) 0.05 and 0.2 mol/L, (c) 0.15 and 0.6 mol/L at 25 °C. SEM images of PTh synthesized at (d) 40 °C and (f) 55 °C comparing with (a).
Figure S6 SEM images of PTh synthesized at (a) 0 °C and (b) 25 °C for 24 h in acetonitrile. SEM images of PTh synthesized at (c) 0 °C and (d) 25 °C for 24 h in acetonitrile and chloroform.