### **Supplementary Information**

## Heterogeneous Bionic Enzymes Photoinduced Oxygen Catalyzed RAFT Polymerization

Hongjie Yang,<sup>†, a</sup> Zhen Lu,<sup>†, b, c</sup> Xiaoling Fu,<sup>a</sup> Qiuyu Li,<sup>a</sup> Yulai Zhao,<sup>a, b, d</sup> Longqiang

Xiao,\*, a, b, d Linxi Hou\*, a, b, d

- <sup>a.</sup> Department of Materials-Oriented Chemical Engineering, School of Chemical Engineering, Fuzhou University, Fuzhou 350116, P. R. China.
- b. Qingyuan Innovation Laboratory, Quanzhou 362801, P. R. China.
- c. College of Chemistry, Fuzhou university, Fuzhou 350116, P. R. China.
- <sup>d.</sup> Fujian Key Laboratory of Advanced Manufacturing Technology of Specialty Chemicals, Fuzhou University, Fuzhou 350116, P. R. China
- <sup>†</sup> These authors contributed equally to this work.

\*Corresponding author, Email: lxhou@fzu.edu.cn, xiaolq@fzu.edu.cn

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### **SI Module 1. Materials**

All used materials and solvents are available from commercial outlets and no further purification is required, except as otherwise noted. The building blocks TFPPy synthesized based on reported works<sup>1</sup>. Poly (ethylene glycol) methyl ether methacrylate (PEGMA<sub>475</sub>,  $M_n$  = 475 g/mol), hydroxypropyl methacrylate (HPMA, 97.0%) were purchased from Aladdin and used directly without aggregation inhibitor removal. Light emitting diode (LED) strips (420-750nm, 13 W m<sup>-1</sup>, 15 mW cm<sup>-2</sup>) were used as the external light source for the experiments, purchased from Philips.

### **SI Module 2. Instrumentation**

Gel permeation chromatography (GPC). The GPC monitoring system is fitted with a Waters 717 plus autosampler, a Waters 1515 isocratic HPLC pump, a Waters 2414 refractive index detector and Shodex K-805, K-804 and K-802.5 columns in tandem. GPC operating parameters: test flow rate: 1.0 mL/min (with THF as eluent), test temperature: 35 °C (both column and detector), calibration protocol: a series of molecular weight polymethylmethacrylate (PMMA) standards. Samples are drawn from the reaction mass at expected time intervals using a 2 mL disposable syringe and filtered through a filter to obtain a clarified sample, and the parameters (number average molecular weight ( $M_n$ ) and molecular weight distribution ( $M_w/M_n$ )) of the polymer samples are determined by a GPC detection system. The monomer conversion ( $\alpha$ ) of the samples can be calculated from the corresponding peak areas of the <sup>1</sup>H NMR spectra.

**CHI 660e electrochemical workstation.** Photoelectrochemical measurements of TFPPyazine-COF was made on CHI 660e electrochemical workstation which has standard three-electrode electrochemical cell with working electrode, platinum plate as counter electrode, saturated Ag/AgCl electrode as reference electrode and sodium sulfate solution (0.2 M) as electrolyte.

The prepared working electrode: 5 mg of TFPPy-azine-COF powder was blended with 2.0 mL of ethanol and 20  $\mu$ L of Nafio solution and sonicated for 30 min. Afterwards, 10  $\mu$ L of the mixture was dropwise placed on the surface of an FTO glass plate with an area of 1 × 1 cm<sup>2</sup> and placed in air to dry.

**Characterization.** <sup>1</sup>H NMR (500 MHz) and <sup>13</sup>C NMR spectra were documented on a Bruker Advance III. Powder X-ray diffraction (PXRD) investigations were made on Empyrean DY1602. Fourier transform infrared (FT-IR) spectra were recorded by Thermo Scientific Nicolet i5. Solid diffuse reflectance ultraviolet-visible spectra (UV-vis DRS) were gathered by a Varian Cary 300 UV-Vis spectrophotometer. The specific surface area and pore size distribution of the products were surveyed on an Autosorb-iQ analyzer (Quantachrome). The synthesized photocatalysts were characterized morphologically using a Hitachi S-5500 field emission scanning electron microscope (FE-SEM). Mass spectra were logged on an Agilent 6224 Accurate Mass TOF LC/MS spectrometer.

Superoxide anion radical ( $O_2^{-}$ ) measurements. A 1 mL reaction mixture consisting of 0.5 mg/mL TFPPy-azine-COF ( $O_2^{-}$  generator) and 2 mM p-benzoquinone (BQ) ( $O_2^{-}$  trapper) in H<sub>2</sub>O were added into a glass cuvette (1 mm pathlength) and sealed with a rubber septum. The mixture was irradiated under LED light (13 W m<sup>-1</sup>, 15 mW cm<sup>-2</sup>) and the absorbance at  $\lambda = 245$  nm was recorded by UV-vis spectrophotometer at the indicated times.

Hydroxyl radical (OH<sup>•</sup>) measurements. A 1 mL reaction mixture consisting of 0.5 mg/mL TFPPy-azine-COF (OH<sup>•</sup> generator) and 2 mM Methylene blue (MB) (OH<sup>•</sup> trapper) in H<sub>2</sub>O were added into a glass cuvette (1 mm pathlength) and sealed with a rubber septum. The mixture was irradiated under LED light (13 W m<sup>-1</sup>, 15 mW cm<sup>-2</sup>) and the absorbance at  $\lambda = 664$  nm was recorded by UV-vis spectrophotometer at the indicated times.

### SI Module 3. Procedure of PCs synthesis

### 3.1 Synthesis of TFPPy<sup>1</sup>



1,3,6,8-tetrabromopyrene (1 g, 1.98 mmol), 4-benzoylphenylboronic acid (1.89 g, 12.6 mmol),  $K_2CO_3$  (2.16 g, 15.6 mmol) and Pd(PPh\_3)<sub>4</sub> (0.15 g, 0.14 mmol) were added into the mixture of 1,4dioxane (60 mL) and water (5 mL). The mixture was degassed for 30 min and then refluxed under  $N_2$  atmosphere for 3 days. The formed precipitate was filtered off to get crude product and washed with water and acetone. Finally, CHCl<sub>3</sub> was used to extract the obtained product and then removed

under reduced pressure. The final product was obtained as yellow solid. <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>):  $\delta$  10.16 (s, 4 H), 8.18 (s, 4H), 8.08 (d, J = 8.1 Hz, 8H), 8.04 (s, 2H), 7.87 (d, J = 8.0 Hz, 8H).

### 3.2 Synthesis of TFPPy-azine-COF<sup>1</sup>



Typically, TFPPy (15.0 mg, 0.024 mmol) and anhydrous hydrazine (1.94  $\mu$ L, 0.06 mmol) were introduced into Schlenk tube, and then o-dichlorobenzene (1.9 mL), n-butanol (0.1 mL) and acetic acid (0.2 mL, 6M) served as catalyst were added. The tube was flash frozen using liquid nitrogen and then gone through freeze-pump-thaw for three times and heated at 120 °C for 3 days to afford yellow precipitate. The product was washed with THF and soxhlet extraction with THF overnight. And the crude solid was dried under vacuum to give the final product TFPPy-azine-COF (~75%).

### SI Module 4. Normalization procedure for RAFT polymerization

### 4.1 Normalization procedure for OH'-RAFT (non-deoxygenation)

PEGMA<sub>475</sub> (1 mL, 2.3 mmol), CPADB (6.3 mg, 0.023 mmol), H<sub>2</sub>O (1 mL), PC (10 mg), and TEA (32  $\mu$ L, 0.23 mmol, 10 eq.) were added to a 3 mL glass vial completely exposed to air. The mixture was irradiated under white LED light (13 W m<sup>-1</sup>, 15 mW cm<sup>-2</sup>) at room temperature. Samples were taken at timed intervals and characterized by GPC analysis to give the number average molecular weight ( $M_n$ ) and molecular weight dispersity ( $M_w/M_n$ ).

### 4.2 Normalization procedure for PET-RAFT (deoxygenation)

PEGMA<sub>475</sub> (1 mL, 2.3 mmol), CPADB (6.3 mg, 0.023 mmol),  $H_2O$  (1 mL), PC (10 mg), and TEA (32  $\mu$ L, 0.23 mmol, 10 eq.) were added to a 3 mL glass vial equipped with a rubber stopper.

The glass vial was wrapped with aluminium foil and purged with nitrogen for 15 minutes at 0 °C. The mixture was irradiated under white LED light (13 W m<sup>-1</sup>, 15 mW cm<sup>-2</sup>) at room temperature. Samples were taken at timed intervals and characterized by GPC analysis to give the number average molecular weight ( $M_n$ ) and molecular weight dispersity ( $M_w/M_n$ ).

# 4.3 Normalization procedure for radical scavenging OH-RAFT polymerization

PEGMA<sub>475</sub> (1 mL, 2.3 mmol), CPADB (6.3 mg, 0.023 mmol), H<sub>2</sub>O (1 mL), PC (10 mg), TEA (32  $\mu$ L, 0.23 mmol, 10 eq.) and scavenger (MB or BQ) were added to a 3 mL glass vial completely exposed to air. The mixture was irradiated under white LED light (13 W m<sup>-1</sup>, 15 mW cm<sup>-2</sup>) at room temperature. Samples were taken at timed intervals and characterized by GPC analysis to give the number average molecular weight ( $M_n$ ) and molecular weight dispersity ( $M_w/M_n$ ).

### 4.4 Normalization procedure for switching light experiment

PEGMA<sub>475</sub> (1 mL, 2.3 mmol), CPADB (12.6 mg, 0.046 mmol), H<sub>2</sub>O (1 mL), PC (10 mg), and TEA (64  $\mu$ L, 0.46 mmol, 10 eq.) were added to a 3 mL glass vial completely exposed to air. At a predetermined time point, the LEDs are turned off and GPC assay specimens are acquired and left in a dark environment for a period of time. Subsequently, the same GPC assay specimen is obtained before turning on the LED and illuminated for a period of time, and so forth.

### 4.5 Normalization procedure for chain extension experiment

PEGMA<sub>475</sub> (1 mL, 2.3 mmol), CPADB (12.6 mg, 0.046 mmol), H<sub>2</sub>O (1 mL), PC (10 mg), and TEA (64  $\mu$ L, 0.46 mmol, 10 eq.) were added to a 3 mL glass vial completely exposed to air. After achieving monomer conversion over 90%, polymers synthesized with DP = 150 were used for in /situ chain extension experiments. The second monomer was added to the vial and irradiated by LED. After 5 h, Samples were taken and characterized by GPC analysis to give the number average molecular weight ( $M_n$ ) and molecular weight dispersity ( $M_w/M_n$ ).

### 4.6 Normalization procedure for recycle experiment

PEGMA<sub>475</sub> (1 mL, 2.3 mmol), CPADB (12.6 mg, 0.046 mmol), H<sub>2</sub>O (1 mL), PC (10 mg), and TEA (64  $\mu$ L, 0.46 mmol, 10 eq.) were added to a 3 mL glass vial completely exposed to air. PC previously involved in aqueous RAFT polymerization of PEGMA<sub>475</sub> was recovered by simple centrifugation then washed with THF, dried, and reused to mediate a new aqueous RAFT polymerization of PEGMA<sub>475</sub> using the optimal experimental conditions.

### SI Module 5. Characterization detail of TFPPy-azine-COF



Scheme S1. (a) The reported enzyme-catalyzed RAFT protocol, (b) the enzyme-like RAFT protocol proposed in this work.



Figure S1. (a) FT-IR spectrum of starting materials and TFPPy-azine-COF. (b) <sup>13</sup>C CP-MAS solidstate NMR spectrum of TFPPy-azine-COF.



Figure S2. (a) SEM image SEM image. (b), (c) and (d) EDS mapping of TFPPy-azine-COF.



Figure S3. (a)  $N_2$  adsorption-desorption isothermal (blue line represents the adsorption process, red line represents the process of desorption) and (b) pore-width distribution (blue line) and pore volume (purple line) of TFPPy-azine-COF.



Figure S4. Tauc plots obtained with Kubelka-Munk functions and linear fits of optical band gaps.





Figure S5. ROS detection spectrum. (a) Time-resolved adsorption spectrum of BQ with the addition of different amount of TEA (1 eq. =  $3.2 \ \mu$ L) in aerobic condition under white LED irradiation ( $\lambda$  = 420 -750 nm). UV-vis spectra of the BQ solution with a serious of TEA concentration (1 eq. =  $3.2 \ \mu$ L) in aerobic condition under white light irradiation, (b) 0 eq. TEA, (c) 2 eq. TEA, (d) 5 eq. TEA and (e) 10 eq. TEA.



Figure S6. ROS detection spectrum. (a) Time-resolved adsorption spectrum of MB with the addition of different amount of TEA (1 eq. =  $3.2 \ \mu$ L) in aerobic condition under white LED irradiation ( $\lambda$  = 420 -750 nm). UV-vis spectra of the MB solution with a serious of TEA concentration (1 eq. =  $3.2 \ \mu$ L) in aerobic condition under white light irradiation, (b) 0 eq. TEA, (c) 2 eq. TEA, (d) 5 eq. TEA and (e) 10 eq. TEA.

# SI Module 7. Evaluation of TFPPy-azine-COF photopolymerization performance

### 7.1 Polymerization variable control experiments

In this section, the effects of five variables including PC, CPADB, TEA, H<sub>2</sub>O and oxygen on polymerization are discussed in detail to help us better understand OH•-RAFT protocols.

### 7.1.1 Controlled experiments with fixed oxygen

entry <sup>a</sup>	scavenger	[PEGMA <sub>475</sub> ]: [CPADB]:	m <sub>Cat.</sub>	Т	M <sub>n,GPC</sub> <sup>b</sup>	$M_{n,th}^{c}$	$\alpha^{d}$	$M_w/M_n^{\ b}$
		[TEA]: [scavenger]	(mg)	(h)	(kg mol <sup>-1</sup> )	(kg mol <sup>-1</sup> )	(%)	
1	100:1:10	H <sub>2</sub> O	10	5	24.2	44.0	92.7	1.18
2	100:1:0	H <sub>2</sub> O	10	10	14.1	16.9	35.6	1.23
3	100:0:0	H <sub>2</sub> O	10	15	551.1	9.2	19.3	2.04
4	100:0:10	H <sub>2</sub> O	10	5	58.9	0.9	1.79	1.74
5	100:1:10	H <sub>2</sub> O	0	15	-	-	-	-
6	100:1:10	DMAc	10	15	-	-	-	-
7	100:1:10	EtOH	10	15	-	-	-	-
8	100:1:10	MeCN	10	15	-	-	-	-
9	100:1:10	Dioxane	10	15	-	-	-	-
10	100:1:10	H <sub>2</sub> O/ Dioxane(v/v=90/10)	10	5	15.6	36.7	77.2	1.14
11	100:1:10	H <sub>2</sub> O/ Dioxane(v/v=50/50)	10	5	10.1	17.9	37.6	1.23
12	100:0:0	Dioxane	10	15	-	-	-	-
13	100:1:10	Dioxane	0	15	-	-	-	-
14	100:1:0	Dioxane	10	15	-	-	-	-
15	100:0:10	Dioxane	10	15	-	-	-	-

Table S1. Results of RAFT polymerization of PEGMA<sub>475</sub> using TFPPy-azine-COF as photocatalyst under air condition.

<sup>a</sup> Reaction was performed at room temperature with white LED irradiation (13 W m<sup>-1</sup>, 15 mW cm<sup>-2</sup>). <sup>b</sup> Molecular weight and molecular weight distribution  $(M_w/M_n)$  were determined by GPC analysis (THF as eluent) calibrated with PMMA standards. <sup>c</sup>  $M_{n,th} =$  MW (initiator) + MW (monomer) × Conv. × ([monomer]/[initiator]), where MW means molecular weight. <sup>d</sup> Monomer conversion was determined by <sup>1</sup>H NMR (see Figure S12).

(i). In case of polymerization process with  $H_2O$  as reaction medium (entries 1-5):

Note 1. The conversion rate increases with the increase of TEA dosage. Attributed to the characteristic of TEA electron sacrificial agent, which is able to trap the holes of PC and accelerate the rate of charge separation thus enhancing the surface polymerization reaction.

Note 2. under RAFT-free, TEA-free conditions, is due to the radical polymerization initiated by hydroxyl radicals generated by the oxidation of water by the holes of COF under photoexcitation (as shown in Scheme S2).

Note 3. in the absence of RAFT, with TEA conditions, the polymerization follows a free radical polymerization initiated by hydroxyl radicals.

Note 4. In the absence of COF, in the presence of RAFT, and in the presence of TEA conditions, polymerization should not proceed.



Scheme S2. Illustration of uncontrollable monomer radical polymerization executed by hydroxyl radicals

(ii). In case of polymerization process with various content or without  $H_2O$  as reaction medium (entries 6-15):

Note 5. that polymerization does not proceed at all under water-free conditions, illustrating the importance of the presence of water for successful polymerization.

Note 6. the importance of water is further illustrated by adjusting the water content, the greater the water content, the greater the amount of hydroxyl radicals produced by the system and the faster the rate of polymerization.

### 7.1.2 Controlled experiments of oxygen removal

Table S2. Results of RAFT polymerization of PEGMA<sub>475</sub> using **TFPPy-azine-COF** as photocatalyst under  $N_2$  condition.

entry <sup>a</sup>	scavenger	[PEGMA <sub>475</sub> ]: [CPADB]:	m <sub>Cat.</sub>	Т	M <sub>n,GPC</sub> <sup>b</sup>	$\mathbf{M}_{n,th}^{\mathbf{c}}$	$\alpha^d$	$M_w/M_n^{\ b}$
		[TEA]: [scavenger]	(mg)	(h)	(kg mol <sup>-1</sup> )	(kg mol <sup>-1</sup> )	(%)	
1	100:1:10	H <sub>2</sub> O	10	5	32.4	43.5	91.5	1.17
2	100:1:5	H <sub>2</sub> O	10	5	20.0	35.2	74.1	1.16
3	100:1:0	H <sub>2</sub> O	10	5	21.9	31.5	66.3	1.13
4	100:1:10	H <sub>2</sub> O	0	10	13.8	41.0	86.3	1.14
5	100:0:10	H <sub>2</sub> O	10	5	36.1	2.7	5.6	1.21
6	100:0:0	H <sub>2</sub> O	10	15	506.3	2.1	4.4	2.06
7	100:1:10	DMAc	10	10	29.8	31.6	66.5	1.26
8	100:1:10	EtOH	10	10	8.3	6.8	14.4	1.20
9	100:1:10	MeCN	10	10	20.5	18.7	39.3	1.2
10	100:1:10	Dioxane	10	10	7.2	4.4	9.3	1.17
11	100:0:0	Dioxane	10	15	-	-	-	-
12	100:0:10	Dioxane	10	10	57.2	0.9	1.9	1.21

<sup>a</sup> Reaction was performed at room temperature with white LED irradiation (13 W m<sup>-1</sup>, 15 mW cm<sup>-2</sup>). <sup>b</sup> Molecular

weight and molecular weight distribution  $(M_w/M_n)$  were determined by GPC analysis (THF as eluent) calibrated with PMMA standards. <sup>c</sup>  $M_{n,th} = MW$  (initiator) + MW (monomer) × Conv. × ([monomer]/[initiator]), where MW means molecular weight. <sup>d</sup> Monomer conversion was determined by <sup>1</sup>H NMR (see Figure S11).

(i). In case of polymerization process with H<sub>2</sub>O as reaction medium (entries 1-6):

Note 1. The polymerization proceeded successfully under COF-free conditions, but slower than the COF-catalyzed efficiency, and the possible mechanism is shown in Scheme S3. Polymerization based on TEA-catalyzed RAFT was reported to have some oxygen tolerance, but the inability to be fully placed in an air atmosphere was attributed to bursting by excess oxygen.

Note 2. Free radical polymerization initiated by TEA radicals in the absence of RAFT and in the presence of TEA conditions.

(ii). In case of polymerization process with various content or without H<sub>2</sub>O as reaction medium
(entries 6-15):

Note 3. Under nitrogen atmosphere, polymerization follows PET-RAFT protocol and H<sub>2</sub>O is not necessary. And the large polarity of the solvent facilitates the stabilization of photogenerated carriers thus having more efficient catalytic activity.



Scheme S3. illustration of RAFT polymerization and uncontrollable monomer radical polymerization performed by triethylamine radicals.



Scheme S4 Diagram of different polymerization protocols in different gas media.

### 7.1.3 Radical scavenging polymerization experiments

**Table S3.** Results of the photo-RAFT of PEGMA475 using TFPPy-azine-COF as photocatalystunder full air condition with radical scavenger in aqueous.

entry <sup>a</sup>	scavenger	[PEGMA <sub>475</sub> ]: [CPADB]:	m <sub>Cat.</sub>	Т	M <sub>n,GPC</sub> <sup>b</sup>	$\mathbf{M}_{n,th}^{\mathbf{c}}$	$\alpha^{d}$	$M_w/M_n{}^b$
		[TEA]: [scavenger]	(mg)	(h)	(kg mol <sup>-1</sup> )	(kg mol <sup>-1</sup> )	(%)	
1	MB	100:1:10:0.5	10	24	-	-	-	-
2	MB	100:1:10:0.1	10	5	22.5	14.6	64.8	1.24
3	MB	100:1:10:0.05	10	5	23.1	17.5	75.9	1.19
4	MB	100:1:0:0.05	10	5	4.4	0.6	12.4	1.21
5	BQ	100:1:10:2	10	24	-	-	-	-
6 <sup>e</sup>	BQ	100:1:10:1	10	24	25.5	39.9	84.0	1.17
7	BQ	100:1:10:1	10	24	8.4	1.3	15.9	1.36
8	BQ	100:1:10:0.5	10	24	38.4	35.5	92.5	1.30
9	BQ	100:1:0:0.5	10	24	14.1	6.6	46.5	1.25
10	BQ	100:1:10:0.05	10	10	19.3	16.7	86.3	1.25
11	BQ	100:1:0:0.05	10	10	21.2	17.2	81.3	1.34

<sup>a</sup> Reaction was performed at room temperature with white LED irradiation (13 W m<sup>-1</sup>, 15 mW cm<sup>-2</sup>). <sup>b</sup> Molecular weight and molecular weight distribution ( $M_w/M_n$ ) were determined by GPC analysis (THF as eluent) calibrated with PMMA standards. <sup>c</sup>  $M_{n,th} =$  MW (initiator) + MW (monomer) × Conv. × ([monomer]/[initiator]), where MW means molecular weight. <sup>d</sup> Monomer conversion was determined by <sup>1</sup>H NMR (see Figure S12). <sup>e</sup> Under nitrogen condition.

### 7.2 Molecular weight distribution characterization along with GPC

### trace

### 7.2.1 OH'-RAFT model in air atmosphere



Figure S7. (a) Simple diagram of the polymerization process. (b), (c), (d) GPC normalised molecular weight distribution trace of varing different concentration of TEA with 10 mg TFPPy-azine-COF. (e), (f) GPC normalised molecular weight distribution trace of varing different volume of H<sub>2</sub>O with 10 mg TFPPy-azine-COF. (g)The GPC trace of each corresponding sample revealed that the molecular weight also increased exclusively during light sessions under nitrogen condition.

### 7.2.2 PET-RAFT model in nitrogen atmosphere



Figure S8. (a), (b), (c) GPC normalised molecular weight distribution trace of varing different concentration of TEA with 10 mg TFPPy-azine-COF. (d) Number average molecular weight  $(M_n)$ , molecular weight distribution  $(M_w/M_n)$  vs. conversion at different concentration of TEA with the ratio [PEGMA<sub>475</sub>]: [CPADB] = 100: 1. (e)The GPC trace of each corresponding sample revealed that the molecular weight also increased exclusively during light sessions under nitrogen

condition. (f) GPC normalised molecular weight distribution traces of micro-initiators and block copolymer ([HPMA]: [macro-SCS]: [TEA]= 150: 1: 10, TFPPy-azine-COF 10 mg in nitrogen condition).

## 7.2.3 Number average molecular weight $(M_n)$ , molecular weight distribution $(M_w/M_n)$ vs. conversion



Figure S9. Number average molecular weight  $(M_n)$ , molecular weight distribution  $(M_w/M_n)$  vs. conversion (a) at different concentration of TEA, (b) with different types of solvent and (c) with different concent of H<sub>2</sub>O under nitrogen condition. Number average molecular weight  $(M_n)$ , molecular weight distribution  $(M_w/M_n)$  vs. conversion (d) at different concentration of TEA and (e) with different concent of H<sub>2</sub>O under air condition.

### 7.3 Analysis by LC-QTOF-MS



Figure S10. LC-QTOF-MS spectrometry with HPMA (target degrees of polymerization, DP = 15).

### 7.4 Analysis by NMR spectroscopy



Figure S11. <sup>1</sup>H NMR spectrum of obtained crude product in D<sub>2</sub>O ([PEGMA<sub>475</sub>]: [CPADB]: [TEA]= 100: 1: 10, TFPPy-azine-COF 10 mg in nitrogen condition).



Figure S12. <sup>1</sup>H NMR spectrum of obtained crude product in D<sub>2</sub>O ([PEGMA<sub>475</sub>]: [CPADB]: [TEA]= 100: 1: 10, TFPPy-azine-COF 10 mg in air condition).



Figure S13. <sup>1</sup>H NMR spectrum of block copolymer obtained under nitrogen condition in MeOD ([HPMA]: [macro-SCS]: [TEA]= 150: 1: 10).



Figure S14. <sup>1</sup>H NMR spectrum of block copolymer obtained under air condition in MeOD ([HPMA]: [macro-SCS]: [TEA]= 150: 1: 10).

### 7.5 Recycle stability evaluation



Figure S15. (a) FT-IR spectra of the TFPPy-azine-COF upon 1-day treatment in different conditions.(b) XRD patterns of TFPPy-azine-COF after 1 day of treatment under different conditions. (c) XRD patterns of TFPPy-azine-COF following 5 rounds.



Figure S16. Recycle experiment using TFPPy-azine-COF as catalysts under air condition. The bars in the graph indicate the final conversion (%) of monomer, while the red stars indicate the  $M_w/M_n$  of the final polymer.

### References

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