## **Supplementary Information (SI)**

for

## A photocatalytic degradation strategy of PPCPs by heptazine

## based CN organic polymer(OCN) under visible light

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Text

Text S1. Photoanode preparation: Indium tin oxide (ITO) glass was initially obtained through sequential rinsing with acetone, distilled water, and ethanol in an ultrasonic cleaner for 30 min.. Subsequently, 1.0 mg of the photocatalyst was well dispersed in 0.5 ml ethanol with 10  $\mu$ l Nafion under ultrasonic treatment for 30 min.. Afterward, the above suspension was deposited dropwise onto an ITO glass surface with uniformly exposed area of 1 × 1 cm<sup>2</sup>. Following drying overnight in an oven, the electrodes were sintered at 60°C in N<sub>2</sub> for 2 h to improve adhesion.

Text S2. Determination of concentration of PPCPs. The concentration of PPCPs was analyzed via Waters alliance e2695-2998 high performance liquid chromatography (HPLC, USA), which was equipped with a C18 reversed-phase column (XBridge,  $4.6 \times 250$  mm, 5 µm).

**Text S3. Intermediates Identification by UPLC-Q-TOF MS.** A solid phase extraction (SPE) process using an HLB cartridge (6 mL, 500 mg, Waters Oasis) was initially conducted to concentrate the IDM sample.

The photocatalytic degradation intermediates of IDM were identified by aultraperformance liquid chromatography coupled with hybrid quadrupole time-of-flight mass spectrometry (UPLC-Q-TOF MS, Agilent Technologies, USA). Separation was accomplished using an Echipse Plus C18 column RRHD (1.8  $\mu$ m, 2.1 x 50 mm) and a Porosheel 120 EC-C18 (2.7  $\mu$ m, 3.0 x 100 mm). Elution was performed at a flow rate of 1 mL min<sup>-1</sup> with water that contained 0.2 % (v/v) formic acid as eluent A, and methanol as eluent B; employing a gradient of from 30 % B to 70 % B in 20 min., and 80% B to 100 % in the following 10 min.. Mass spectral analysis was conducted in negative mode.

Text S3. Intermediates Identification by GC-MS. Reaction products were also identified using a 7890B gas chromatograph coupled to a 5977B mass spectrometry with an electron impact (EI) (GC-MS, Agilent 7890B-5977B, USA).Products were separated using a capillary column of HP-5ms (30 m x 250  $\mu$ m i.d x 0.25  $\mu$ m film, Agilent). 1  $\mu$ L of sample was injected in pulsed splitless mode with an injector temperature of 280 °C, The oven temperature program was as following: started at

110 °C, held for 1 min, then 10 °C min<sup>-1</sup> to 310 °C, finally kept for 20 min. The carrier gas was helium with 99.999% purity at constant flow of 1.0 mL min<sup>-1</sup>. MS quad temperatures, ion source and transfer line temperature were set to 150 °C, 230 °C and 290 °C, respectively. reaction products were scanned from massed 50 to 600 m/z. N-Methyl-N-(trimethylsilyl)trifluoroacetamide, as a derivatization reagents, were employed during optimization of GC-MS analysis.



Figure S1. The XPS C1S, N1S, and O1S of the g-C<sub>3</sub>N<sub>4</sub> and OCN polymer.

Table S1: Fluorescence decay	<i>parameters</i>	of $g-C_3N_4$ or	OCN fit	t of the decay
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Sample	τ1	τ2	τ3	$\mathbf{A}_{1}$	$\mathbf{A}_2$	A <sub>3</sub>	x <sup>2</sup>	Average lifetime(τ)/ns
g-C <sub>3</sub> N <sub>4</sub>	0.3657	2.3240	9.4014	0.067(14.41%)	0.033(45.53%)	0.007(40.06%)	1.098	4.826
OCN	0.2573	1.9037	8.2248	0.089(15.84%)	0.035(45.93%)	0.007(38.23%)	1.132	4.121



Figure S2.The Kubelka–Munk formula(a) and Mott–Schottky plots of g-C<sub>3</sub>N<sub>4</sub>(b) and





Figure S3. The  $N_2$  adsorption–desorption isotherms of OCN and g-C<sub>3</sub>N<sub>4</sub>. (Inset: Pore size distributions of OCN and g-C<sub>3</sub>N<sub>4</sub>)



spectrum of OCN before and after 4 cycles photocatalytic experiments(b).

Quencher	<b>RSs Quencher</b>	Kobs (min <sup>-1</sup> )	Inhibition rate (%)
No	-	0.158	0
Na <sub>2</sub> C <sub>2</sub> O <sub>4</sub>	$h^+$	0.009	94.30
ТМРО	•O <sub>2</sub> -	0.012	92.41
IPA	·OH	0.126	20.25
NaN <sub>3</sub>	$^{1}\text{O}_{2} \text{ and } \cdot \text{OH}$	0.025	84.18

Table S2: Kinetic rate constant of IDM degradation with the addition different scavengers.



Figure S5. Fragment chart analyses of IDM and its by-products by GC/MS.





Figure S6. Fragment chart analyses of the UPLC-Q-TOF MS secondary ion mass spectrometry of the IDM and its by-products.



Figure S7. (a) TEMP spin-trapping ESR spectra recorded for  ${}^{1}O_{2}$  in the OCN systems (under  $\lambda >$ 420 nm irradiation). (b) Comparison of H<sub>2</sub>O<sub>2</sub> generation in the g-C<sub>3</sub>N<sub>4</sub> and OCN systems under the same photocatalytic conditions.