Supplementary information for

Facile synthesis of single atom-dispersed silver-modified ultrathin g-C_3N_4 hybrid for the enhanced visible-light photocatalytic degradation of sulfamethazine with peroxymonosulfate

Fengliang Wang,[a] Yingfei Wang,[a] Yanyan Li,[b] Xuhui Cui,[b] Qianxin Zhang,[a] Zhijie Xie,[a] Haijin Liu,[c] Yiping Feng,[a] Wenying Lv,[a] and Guoguang Liu*[a]

[a]School of Environmental Science and Engineering, Institute of Environmental Health and Pollution Control, Guangdong University of Technology, Guangzhou, 510006, China

[b]Department of chemistry, School of basic medicine, Xinxiang Medical University, Xinxiang 453003, China

[c]School of Environment, Henan Normal University, Key Laboratory for Yellow River and Huaihe River Water Environment and Pollution Control, Xinxiang 453007, P. R. China.

* Corresponding Author: Guoguang Liu, E-mail: liugg615@163.com, Phone: +86-20-39322547, Fax: +86-20-39322548

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TEXTS

Text S1. Determination of concentration of SMT

The residual concentration of SMT was analyzed on a Shimadzu LC 20A high performance liquid chromatography (HPLC, Japan) equipped with a SPD-M20A diode array detector. Analytical separation was performed by a C18 reversed-phase column (Zorbax Eclipse, 4.6 × 250 mm, 5 μm). The isocratic elution consisted of 20 % acetonitrile and 80 % water with a flow rate of 1 $mL \cdot min^{-1}$. The detection wavelength was set as 266 nm.

Text S2. Identification of photocatalytic by-products

Samples for SMT degradation products characterization were concentrated by an HLB cartridge (6 mL, 500 mg, Waters Oasis) through solid phase extraction (SPE) process. The by-products of SMT was carried out on an Agilent 1100 series HPLC coupled to a 6410 triple quadrupole mass spectrometer (Agilent Technologies, USA). Separation was accomplished using an Agilent C18 column (5 μm, 4.6 x 150 mm). Elution was performed at a flow rate of 1 mL min-1 with water as eluent A and acetonitrile containing as eluent B, employing a linear gradient from 10% B to 60% B in 0 – 20 min, 60% B to 100% B in the next 2 min. Mass spectral analysis was conducted in positive mode using an electrospray ionization (ESI) source with the following ion source parameters: scan range of *m/z* = 100-600; fragmentor and capillary voltage were 3.5 kV and 125 V; Nebulizer pressure was 40 psi. Once a potential product was identified, product ion scan MS/MS was performed for structure elucidation.

TABLES

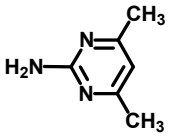
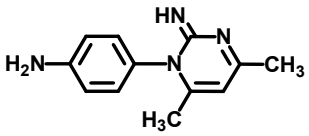
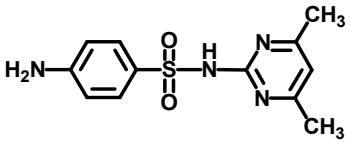
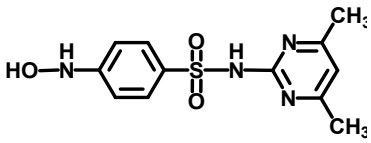
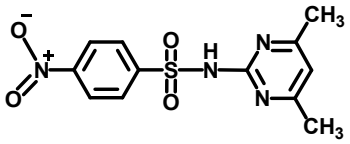
Table S1. Primary properties of water samples.

Parameter	Unit	Pearl River water	WWTP effluent water	South China Sea water
pH	-	7.08	6.93	8.17
UV_{254}	-	0.049	0.0588	0.0103
UV_{400}	-	0.0052	0.0078	0.0022
TOC	mg/l	2.796	4.309	0.2266
Na^{+} [a]	ppm	15.65	36.91	10100
K^{+} [a]	ppm	4.4	10.59	374
Cu^{2+} [a]	ppb	1.04	/	44.07
Mg^{2+} [a]	ppm	3.84	6.38	1340
Al^{3+} [a]	ppb	6.11	8.29	3.12
Cl^{-} [b]	ppm	15.61	51.35	18451.87
HCO_3^{-}	ppm	4.87	2.77	5.46
SO_4^{2-} [b]	ppm	27.25	40.26	2541.96

[a] Detected by ICP-MS.

[b] Detected by anions-ion chromatography.

Table S2. LC-MS/MS mass spectrometry pieces information and proposed structure of photocatalytic products of SMT.

Number	Retention Time/min	$[M+H]^+$	Fragment Peaks	Supposed Structure
1	8.5	124	107, 80, 67	
2	10.9	215	198, 173, 158, 93	
3	14.5	279	204, 174, 156, 124	
4	18.1	295	215, 186, 124, 108	
5	19.0	309	263, 245, 186, 175, 123	

FIGURES

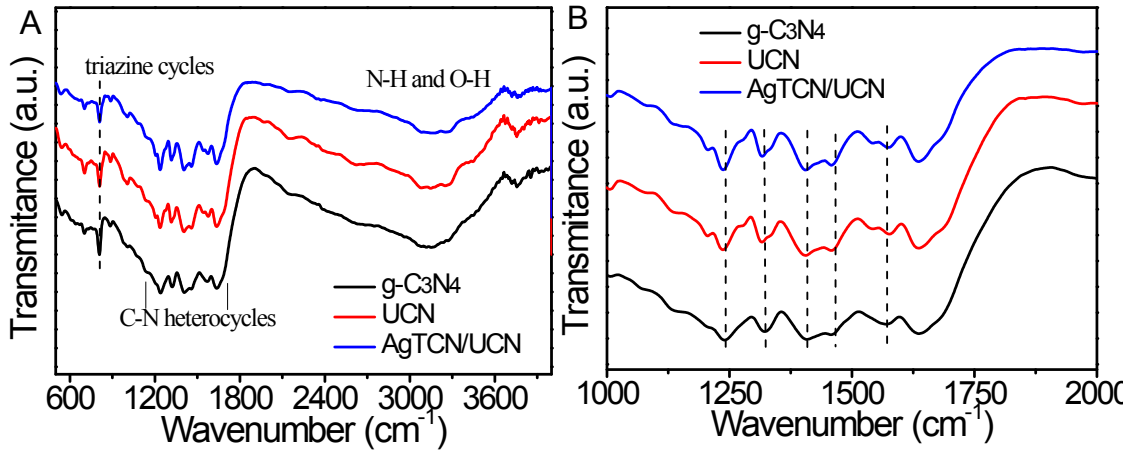


Fig. S1. FT-IR spectrum of AgTCM/UCN.

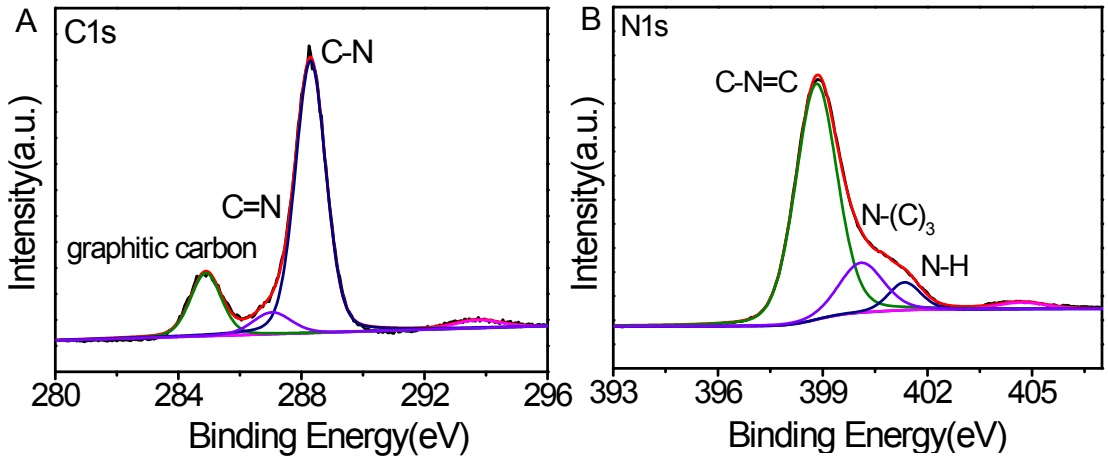


Fig. S2. High-resolution XPS spectra of A) C 1s and B) N 1s of AgTCM/UCN.

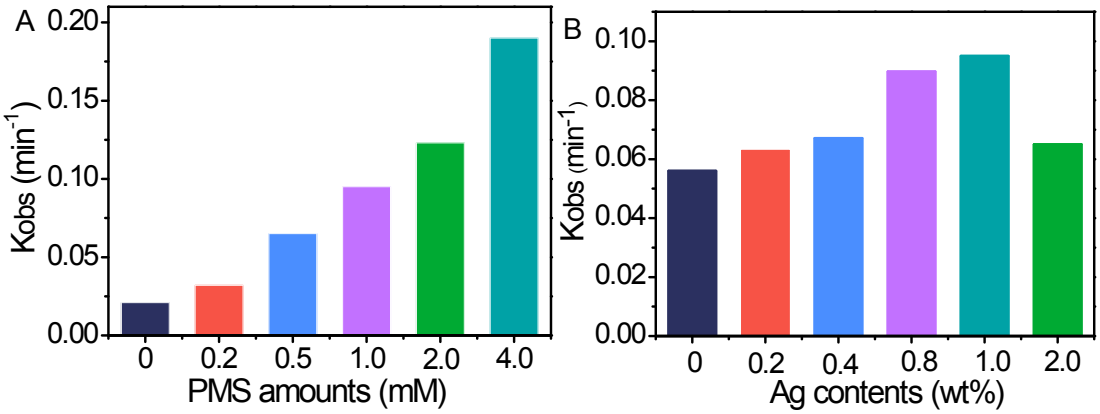


Fig. S3. Kinetic rate constant of SMT over different A) PMS amounts and B) Ag contents.