Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Regulating the Interfacial Charge Separation between MoS_2 QDs and Sea-Urchin Graphitic Carbon Nitride for Deep Photodegradation of Tetracycline under Visible Light

Xingyu Zhan, Hao Zhang, Yunxiong Zeng,* Jingcai Xu, Ao Jin, Xingqin Wang, Jing Li, Yanting Yang, Bo Hong*

College of Materials and Chemistry, Zhejiang Province Key Laboratory of Magnetic Materials, China Jiliang University, Hangzhou 310018, People's Republic of China

Corresponding author: Assist. Prof. Yunxiong Zeng

College of Materials and Chemistry, Zhejiang Province Key Laboratory of Magnetic Materials, China Jiliang University, Hangzhou 310018, People's Republic of China

Tel: +86-571-86835781

Email address: yxzeng@cjlu.edu.cn

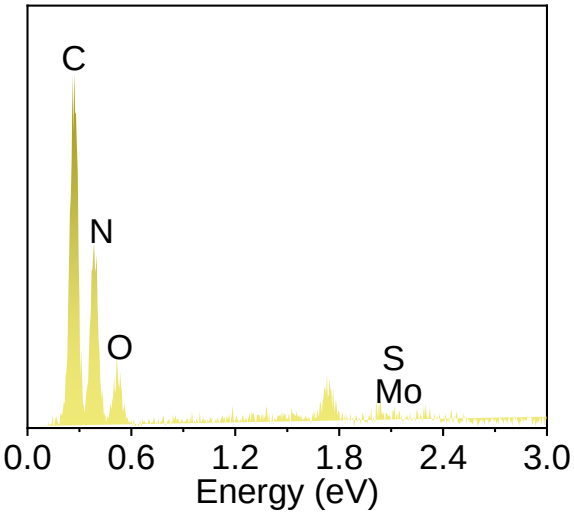

Fig. S1 EDS result of 5%MSUCN.

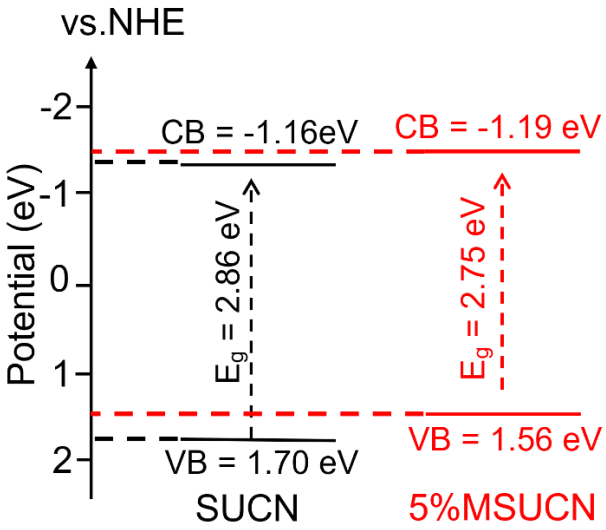

Fig. S2 The energy level distribution of SUCN and 5%MSUCN.

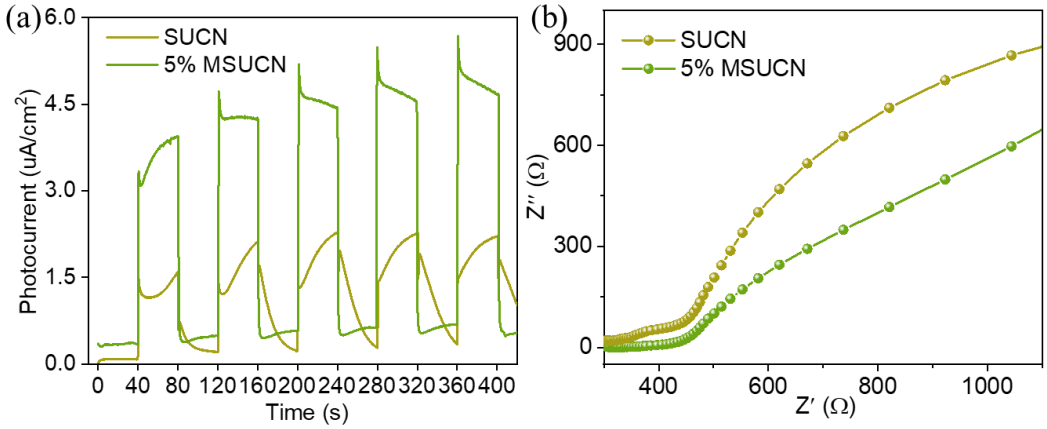

Fig. S3 (a) Transit photocurrent as a function of time, (b) A.C. EIS plot of SUCN and 5% MSUCN.

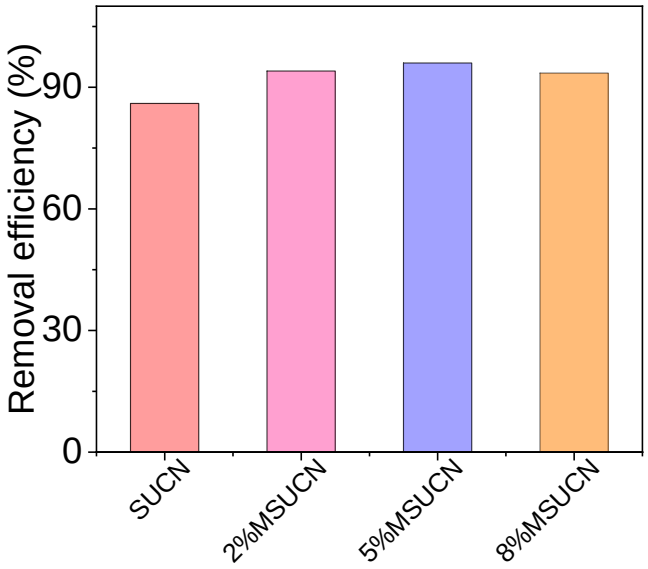

Fig. S4 Removal efficiency of TC over various samples under visible irradiation (λ≥400 nm).

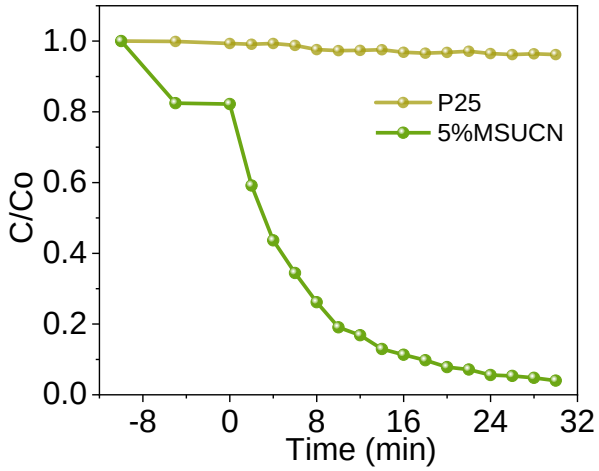

Fig. S5 Photodegradation of TC over P25 and 5%MSUCN under visible irradiation (λ≥400 nm).

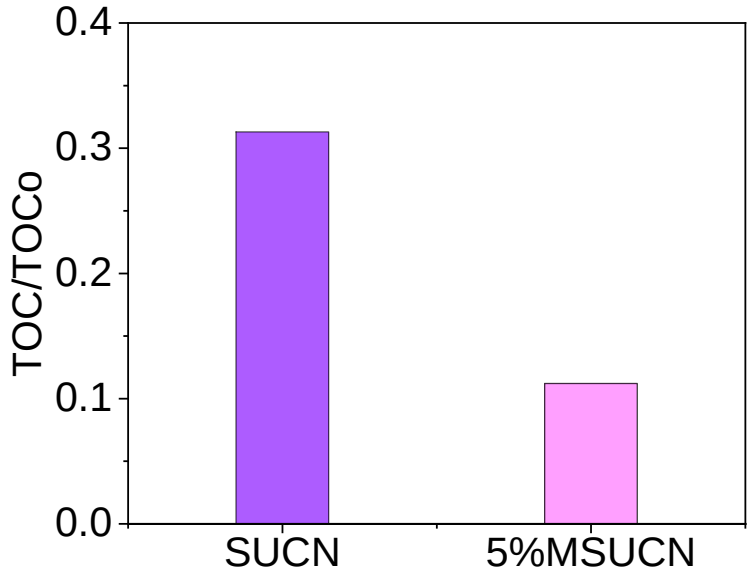

Fig. S6 TOC/TOCo ratio of residual suspension after SUCN and 5%MSUCN photodegradation, respectively.

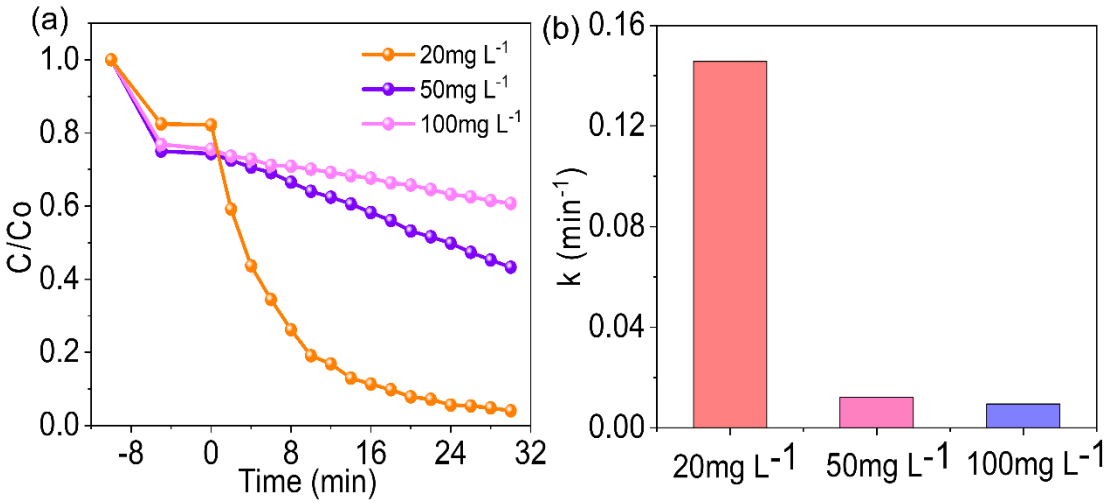

Fig. S7 (a) Degradation of TC with different initial concentrations, (b) pseudo-first-order kinetic constant.

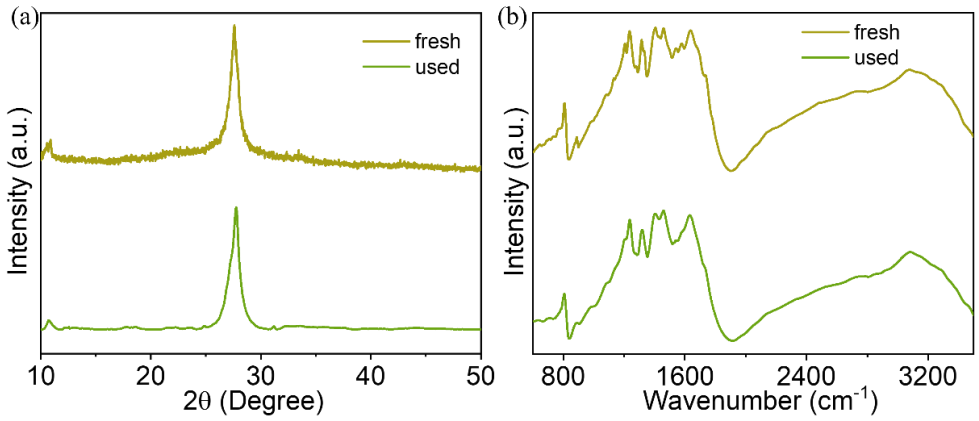

Fig. S8 (a) XRD and (b) FT-IR of used and fresh 5% MSUCN.

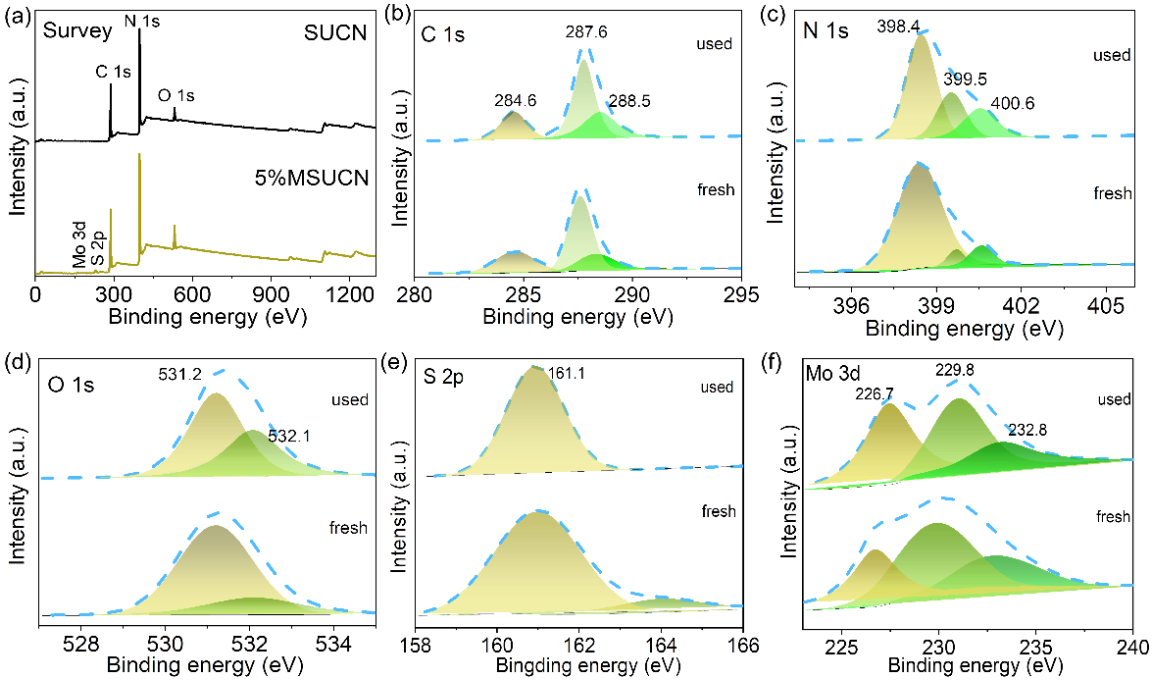

Fig. S9 (a) Full XPS, (b) C 1s, (c) N 1s, (d) O 1s, (e) S 2p and (f) Mo 3d XPS spectra of used and fresh 5% MSUCN.

Table S1 Comparison of different quantum dots (QDs)-modulated CN for TC removal under visible light.

QDs	Light source	Time/min	k (min^{-1})	Removal efficiency	Refs.
C QDs	300W Xe (λ > 420 nm)	60	0.0421	100%	[1]
WO_3 QDs	150W Xe (λ > 420 nm)	180	~	98%	[2]
S-C QDs	300 W Xe (λ > 420 nm)	40	0.0293	79.0%	[3]
Co_3O_4 QDs	300 W Xe (λ > 420 nm)	60	~	97.3%	[4]
BN/Ag QDs	300 W Xe (λ > 420 nm)	60	0.0335	80.5%	[5]
BP QDs	300 W Xe (λ > 420 nm)	60	0.0276	81.1%	[6]
CeO_2/NC QDs	300 W Xe (λ > 420 nm)	60	~	100%	[7]
CeO_2 QDs	300 W Xe (λ > 420 nm)	180	~	64.2%	[8]
A-R QDs	300 W Xe (λ > 420 nm)	120	~	71.8%	[9]
This work	300 W Xe (λ > 400 nm)	30	0.145	96.0%	

References

1 Q. Si, W. Guo, H. Wang, B. Liu, S. Zheng, Q. Zhao, H. Luo, N. Ren and T. Yu, *Applied Catalysis B: Environmental*, 2021, **299**, 120694.

2J. Huang, B. Wang, Z. Hao, Z. Zhou and Y. Qu, *Chemical Engineering Journal*, 2021, **416**, 129109.

3 W. Wang, Z. Zeng, G. Zeng, C. Zhang, R. Xiao, C. Zhou, W. Xiong, Y. Yang, L. Lei, Y. Liu, D. Huang, M. Cheng, Y. Yang, Y. Fu, H. Luo and Y. Zhou, *Chemical Engineering Journal*, 2019, **378**, 122132.

4 S. Dai, L. Xiao, Q. Li, G. Hao, Y. Hu and W. Jiang, *Separation and Purification Technology*, 2022, **297**, 121481.

5 K. Ren, M. Lv, Q. Xie, C. Zhang and H. Shi, *Carbon*, 2022, **186**, 355–366.

6 W. Wang, Q. Niu, G. Zeng, C. Zhang, D. Huang, B. Shao, C. Zhou, Y. Yang, Y. Liu, H. Guo, W. Xiong, L. Lei, S. Liu, H. Yi, S. Chen and X. Tang, *Applied Catalysis B: Environmental*, 2020, **273**, 119051.

7 H. Qi, C. Shi, X. Jiang, M. Teng, Z. Sun, Z. Huang, D. Pan, S. Liu and Z. Guo, *Nanoscale*, 2020, **12**, 19112–19120.

8 Y. Sun, X. Yuan, Y. Wang, W. Zhang, Y. Li, Z. Zhang, J. Su, J. Zhang and S. Hu, *Applied Surface Science*, 2022, **576**, 151901.

9 X. Hu, Y. Yu, D. Chen, W. Xu, J. Fang, Z. Liu, R. Li, L. Yao, J. Qin and Z. Fang, *Chemical Engineering Journal*, 2022, **432**, 134375.