Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information

Fabrication and photocatalytic activity of graphitic-C_3N_4 quantum dot-decorated basic zinc carbonate prepared by co-precipitation method

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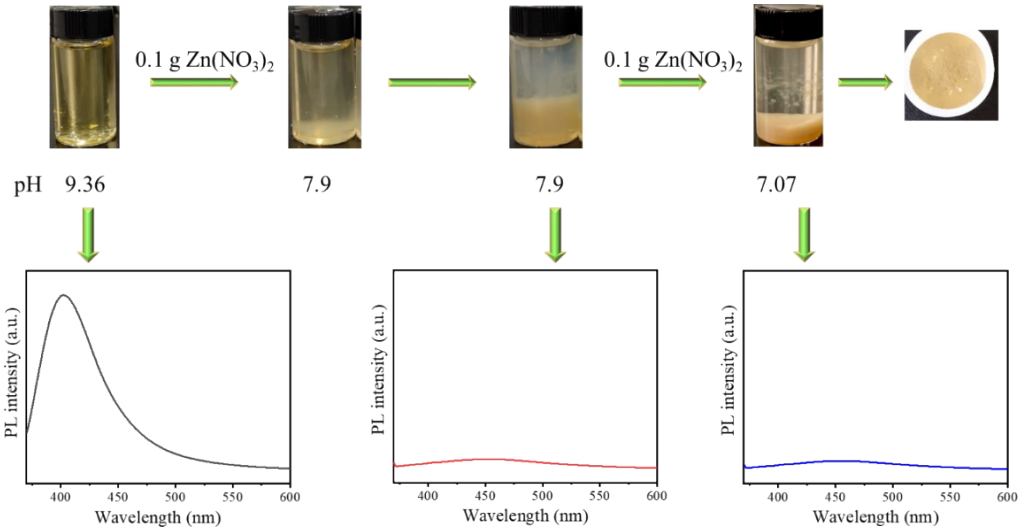

Fig. S1 Photos of preparation of CNQD/BZC

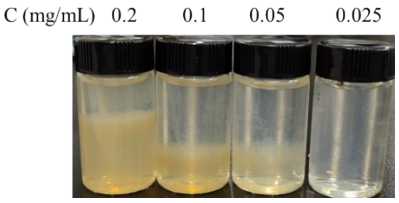

Fig. S2 Effect of concentration of CNQDs

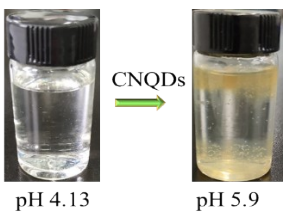

Fig. S3 Preparation of CNQD/BZC from saturated solution of zinc nitrate

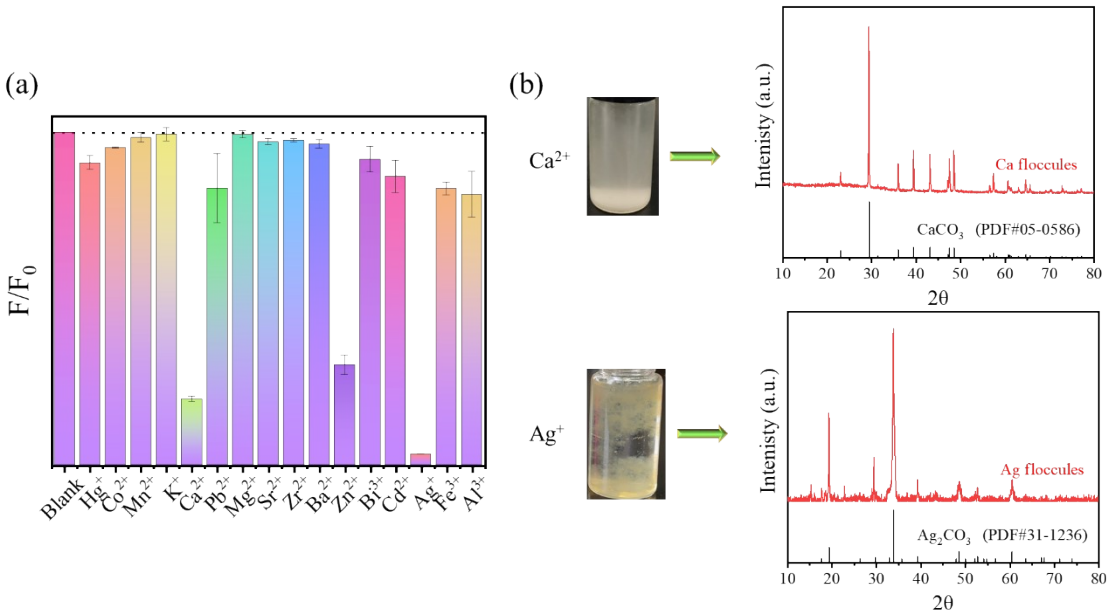

Fig. S4 (a) Fluorescence responses of CNQDs in the presence of different metal ion (24 μM) or calcium hydroxide saturated solution; (b) XRD patterns of floccules

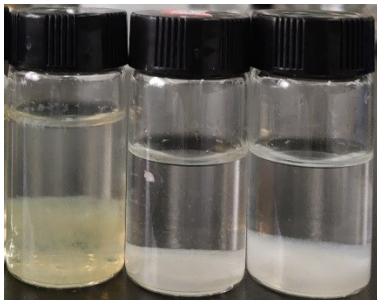

Fig. S5 Digital photo of different carbon source with urea after adding $Zn(NO_3)_2$ (from left to right: citric acid, propanedioic acid, and glutaric acid)

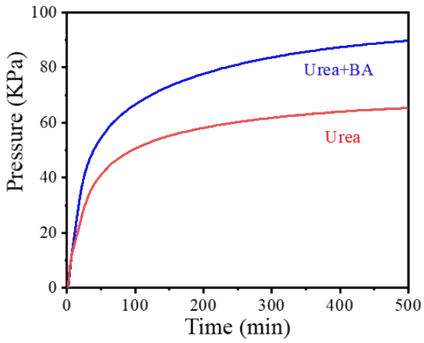

Fig. S6 Time dependence of the gas pressure under the temperature of 453K (the fitting curves of the decomposition rate versus time was determined by the P versus T curves measured by DVST)

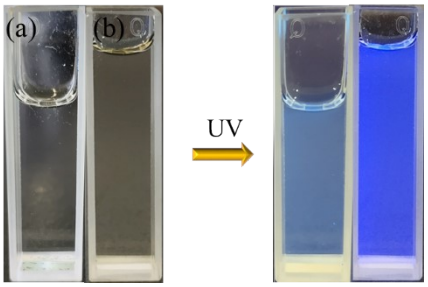

Fig. S7 Photos of CNQDs synthesized form (a) urea, (b) urea and BA (1:0.1) under daylight (left) and UV light (right)

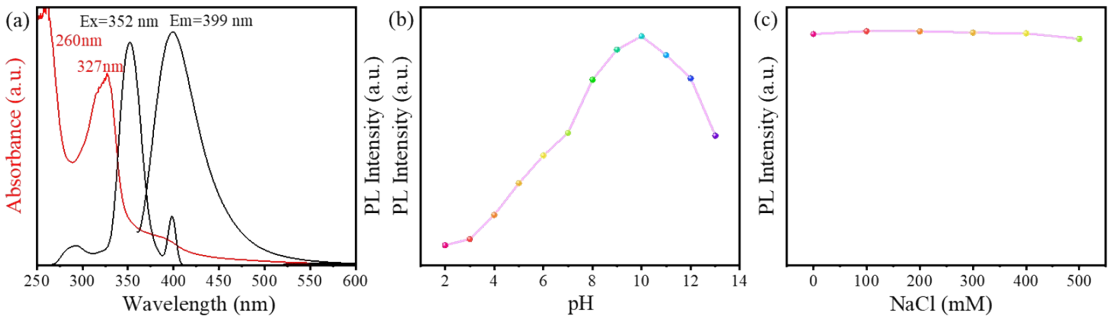

Fig. S8 (a) Absorbance, excitation, and emission spectra of CNQDs; PL intensities of CNQDs (b) in different pH values, and (c) in ionic strength

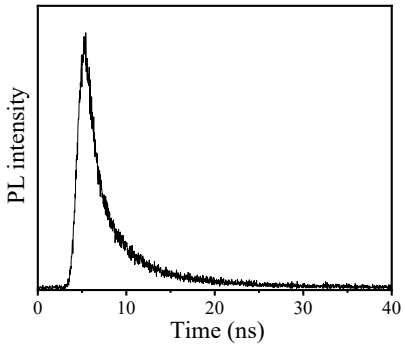

Fig. S9 Time-resolved photoluminescence of CNQDs/BZC

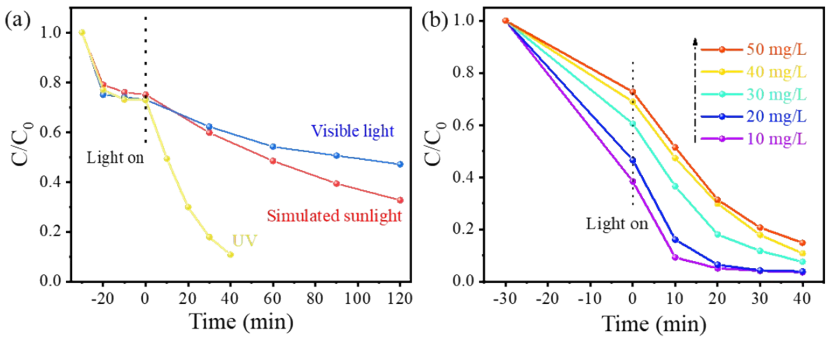

Fig. S10 Degradation of TC solutions (a) under different light sources (50 mg/L), and (b) with different TC concentrations

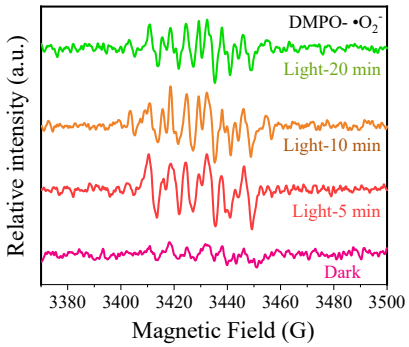

Fig. S11 ESR spectra of DMPO-•O_2^- adduct recorded with of ZnO in the dark and under UV-Vis light irradiation

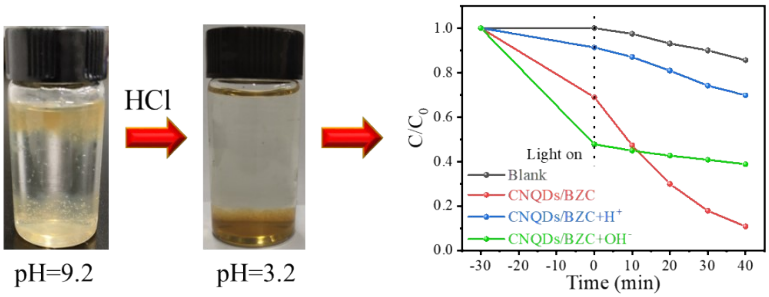

Fig. S12 The role of BZC

Tab. S1 Recently Reported TC Degradation Efficiency of ZnO-Based composites under UV light irradiation

Photocatalyst	$C_{photocatalyst}$ (mg/mL)	The initial concentrations of TC	Degradation time (min)	Degradation efficiency (%)	Refs
CDots/Ag/ZnO	0.3	30 mg/L	60	96	[1]
rGO/ZnO	0.5	10 mg/L	60	95.4	[2]
ZnO rod-ACF		40 mg/L	60	90.7	[3]
Fe/ ZnO	0.5	25 mg/L	60	90	[4]
ZnO/Kaolin	0.2	120 ppm	70	90	[5]
CNQD/BZC	0.4	40 mg/L	40	90	This work
CNQD/BZC	0.4	50 mg/L	50	92	This work

References

[1] Tianren Li, Yinglu Liu, Mingyu Li, Jingjing Jiang, Jiaying Gao, Shuangshi Dong. Fabrication of oxygen defect-rich pencil-like ZnO nanorods with CDots and Ag co-enhanced photocatalytic activity for tetracycline hydrochloride degradation. *Sep. Purif. Technol.*, 2021, 266, 118605.

[2] Ruiqi Gang, Lei Xu, Yi Xia, Libo Zhang, Shixing Wang, Rui Li. Facile One-step production of 2D/2D ZnO/rGO nanocomposites under microwave irradiation for photocatalytic removal of tetracycline. *ACS Omega*, 2021, 6, 3831−3839.

[3] Viet Ha Tran Thi, Byeong-Kyu Lee. Great improvement on tetracycline removal using ZnO rod-activated carbon fiber composite prepared with a facile microwave method. *J. Hazard. Mater.*, 2017, 324: 329-339.

[4] He Xiao, Weibo Zhang, Yicui Wei, Lubin Yu, Lihui Chen. Fabrication of Fe/ZnO composite nanosheets by nanofibrillated cellulose as soft template and photocatalytic degradation for tetracycline. *J. Inorg. Organomet P.*, 2018, 28(3):1299-1304.

[5] Ahed H. Zyoud, Amani Zubi, Samer H. Zyoud, Muath H. Hilal, Shaher Zyoud, Naser Qamhieh, AbdulRazack Hajamohideen, Hikmat S. Hilal. Kaolin-supported ZnO nanoparticle catalysts in self-sensitized tetracycline photodegradation: zero-point charge and pH effects. *Appl. Clay Sci.*, 2019, 182: 105294.