Electronic Supplementary Material (ESI) for RSC Advances.

Renewable biomass derived porous BCN nanosheets and their adsorption and photocatalytic activities for decontamination of organic pollutants

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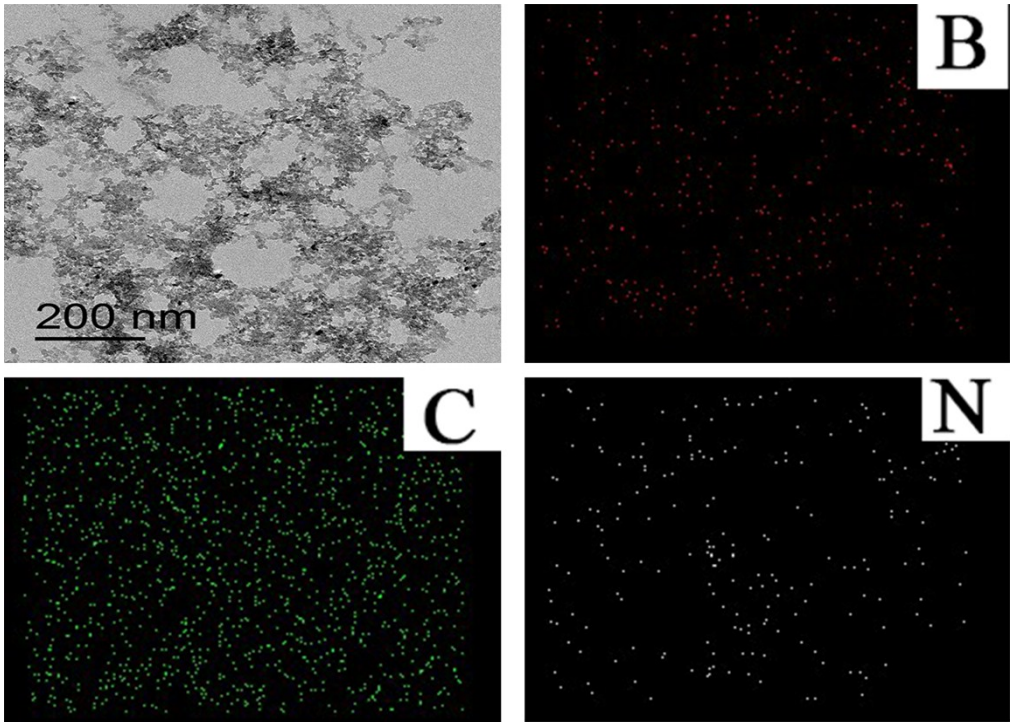
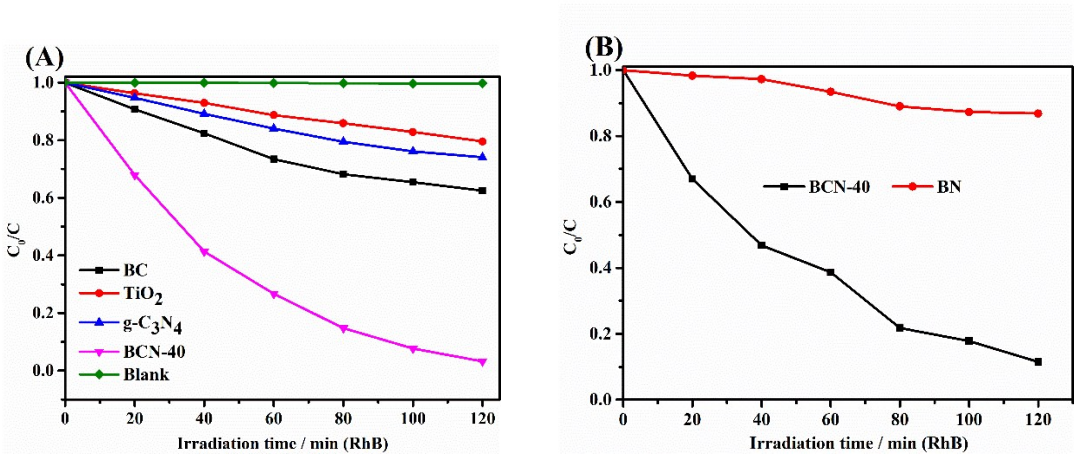
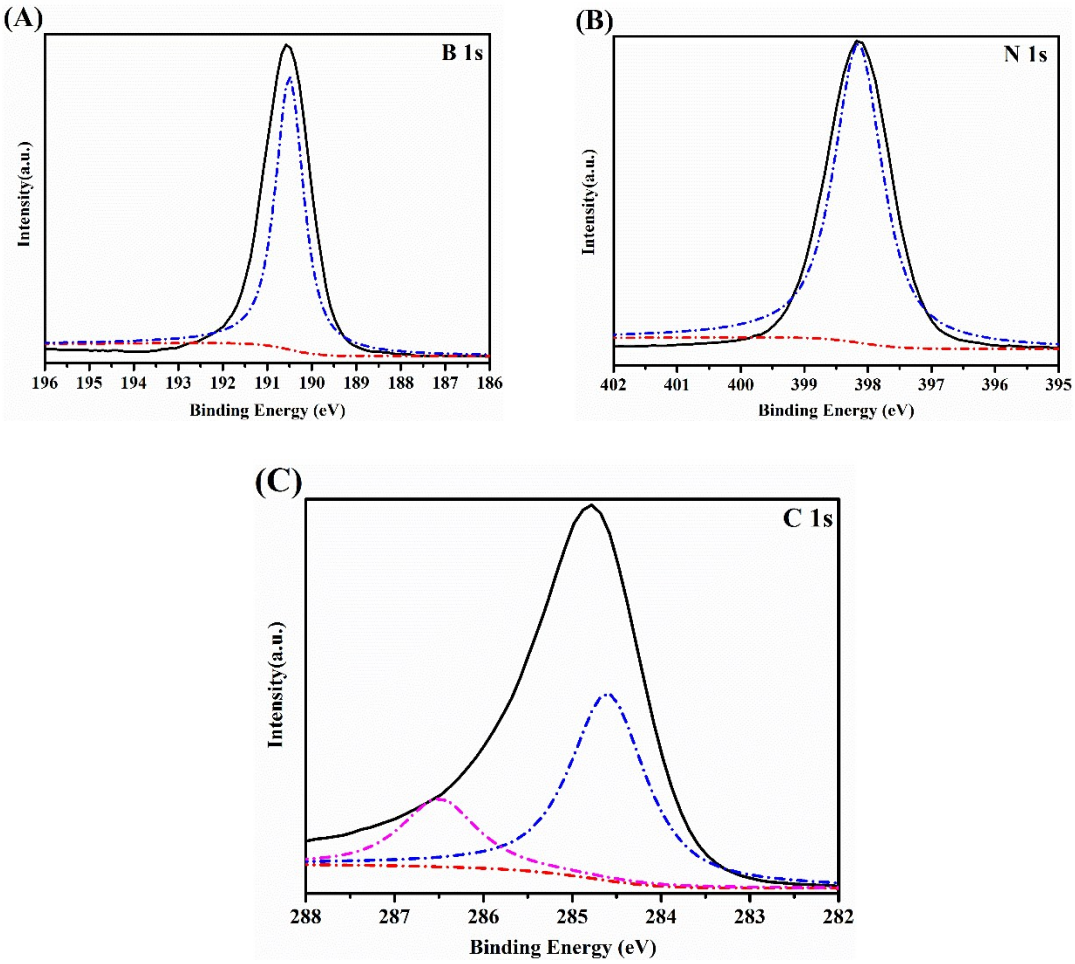
SUPPORTING INFORMATION



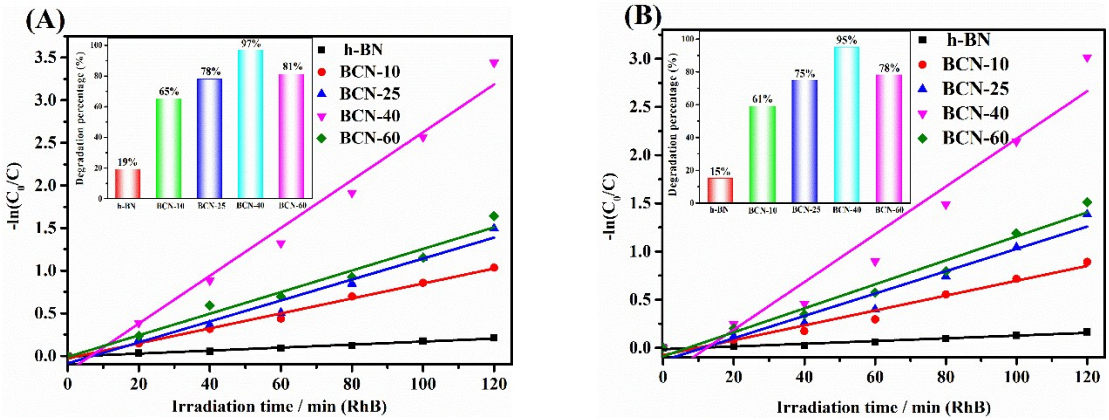
Supplementary Fig. 1 The energy map analyses of BCN-40.



Supplementary Fig. 2 (A) Comparison Photodegradation of RhB with different semiconductor photocatalysts under UV light resource and (B) degradation of phenol under visible light resource. Conditions: catalysts (0.05 g), RhB (0.02 g/L), 25 °C.



Supplementary Fig. 3 XPS spectra of the BN and BC materials. (A) Core-level B 1s. (B) Core-level N 1s. B 1s and N 1s spectra show main binding energies of 190.5 eV, and 398.2 eV, respectively. (C) The Core-level C 1s of BC, which the main binding energies are 284.6 eV and 286.5 eV.



Supplementary Fig. 4 First-order kinetics for RhB with photocatalysts under different light resource, (A): UV light and (B): visible light. Conditions: catalysts (0.05g), RhB (0.02g/L), 25 °C.

Supplementary Table. 1 The BET surface areas of samples

Entry	Samples	Specific surface area S_{BET} (m^2/g)	Total pore volume (cm^3/g)	Average pore Radius(Å)
1	BC	19.01	0.01	11.25
2	h-BN	2.99	0.005	35.31
3	BCN-10	94.27	0.07	14.71
4	BCN-25	158.83	0.10	12.16
5	BCN-40	189.96	0.12	12.29

Supplementary Table. 2 Zeta potential of BC, porous BCN nanosheets and h-BN.

Samples / Zata (mA)	BC	BCN-10	BCN-25	BCN-40	BCN-60	h-BN
1	-36.2	-60.7	-52.3	-45.4	-37.9	-83.7
2	-38.8	-43.2	-48.7	-39.6	-38.6	-40.3
3	-36.9	-51.2	-47.5	-42.8	-43.4	-41.1
Average	-37.3	-51.7	-49.5	-41.9	-39.9	-55.0

Supplementary Table. 3 Kinetic features of the photocatalysts

Organic dyes	Catalysts	Rate constant (min^{-1})	R^2
RhB UV light	h-BN	0.00176	0.99416
	BCN-10	0.00877	0.99699
	BCN-25	0.01229	0.98717
	BCN-40	0.02805	0.9910
	BCN-60	0.01266	0..9872
RhB Visible light	h-BN	0.00141	0.98401
	BCN-10	0.00772	0.98527
	BCN-25	0.01159	0.97762
	BCN-40	0.02476	0.97301
	BCN-60	0.01245	0.9868

Supplementary Table. 4 Comparison with others semiconductor photocatalysts in the literature.

Photocatalyst	Pollutant	Time (min)	Removal (%)	Light source	Reference
ZnO	RhB	50	65	300 W HgL	46
TaON	RhB	80	34	300 W XL	47
BiOCl	RhB	120	45.3	500 W XL	48
b-PEN	RhB	60	14	300 W XL	49
$AgVO_3$	RhB	60	22	UV-vis	50
$MoSe_2$	RhB	80	7.3	SSI	51
TiO_2	RhB	120	40	SSI	52
NiO	RhB	200	33	UV-vis	53
TNSs	RhB	70	68	UV-vis	54
Ag_3VO_4	RhB	6	65	Visible light	55