Supporting information

Carbon nitride nanoparticles as ultrasensitive fluorescent probe for the detection of α-glucosidase activity and inhibitor screening

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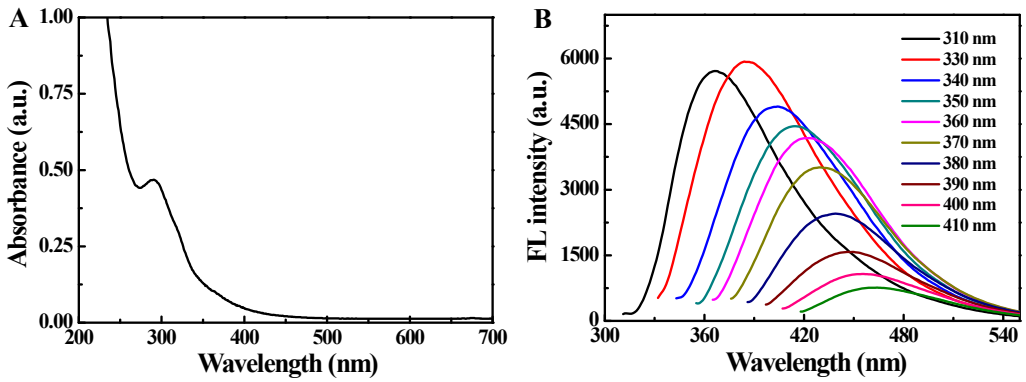

Fig. S1 (A) UV–vis absorption spectra of CNNPs. (B) Fluorescence emission spectra under different excitation wavelengths.

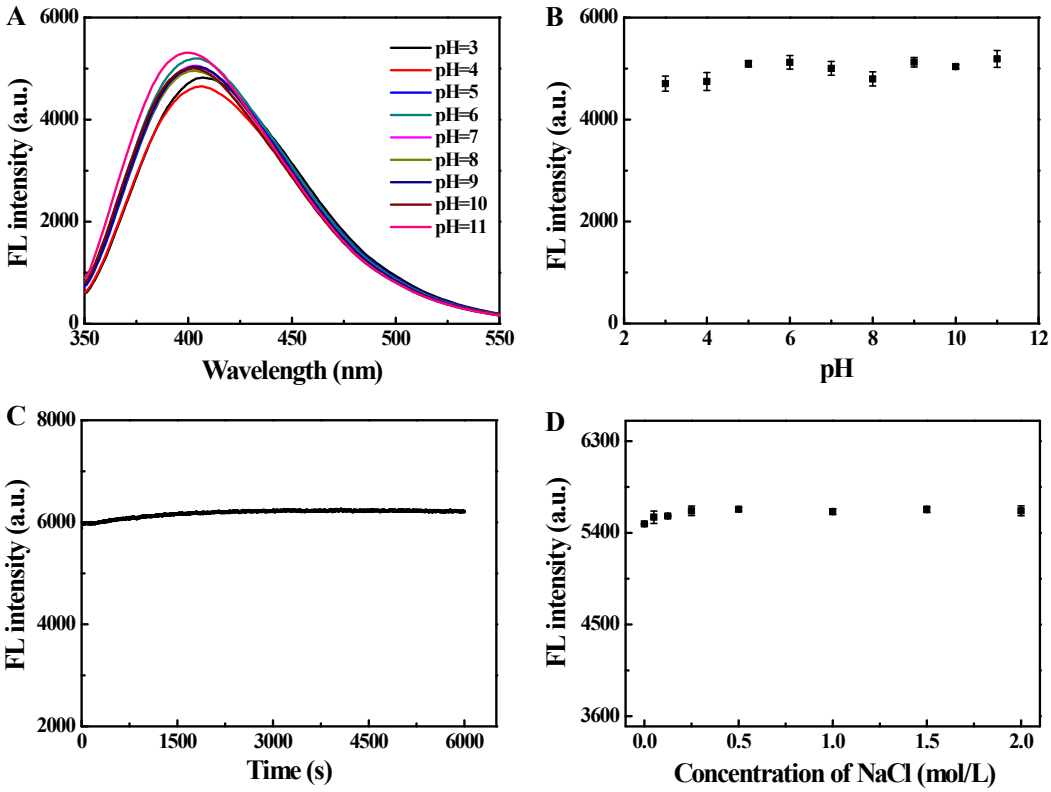

Fig. S2 (A) The fluorescence emission spectra of CNNPs under different pH conditions. The FL intensity of CNNPs as the function of pH (B), Xe-lamp irradiation time (C) and ionic strength (D).

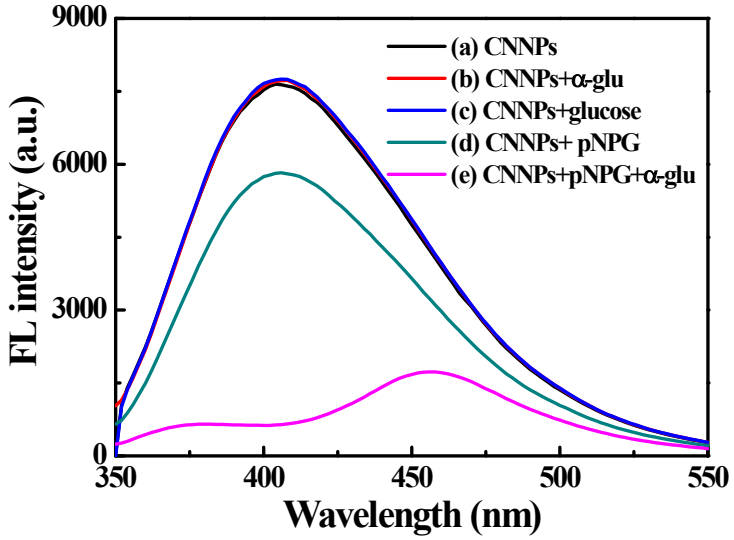

Fig. S3 Changes of fluorescence emission spectra of CNNPs in the presence of different compositions: (a) CNNPs alone, (b) CNNPs and α-glu (100 U/L), (c) CNNPs and glucose (5 mM), (d) CNNPs and pNPG (200 μM), (e) CNNPs, α-glu and pNPG.

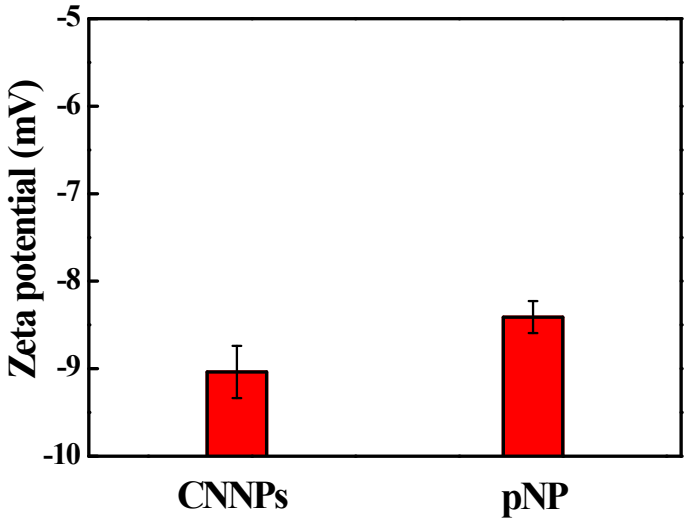

Fig. S4 Zeta potential of CNNPs and pNP at pH 7.0.

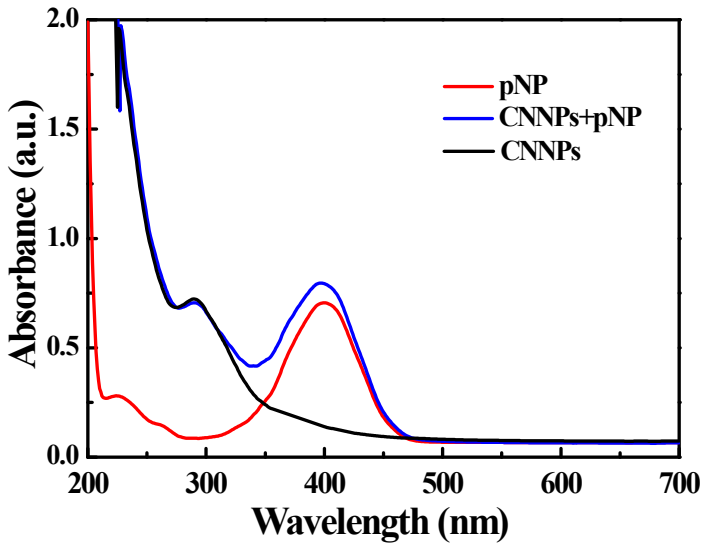

Fig. S5 UV-vis absorption spectra of CNNPs, pNP and CNNPs + pNP.

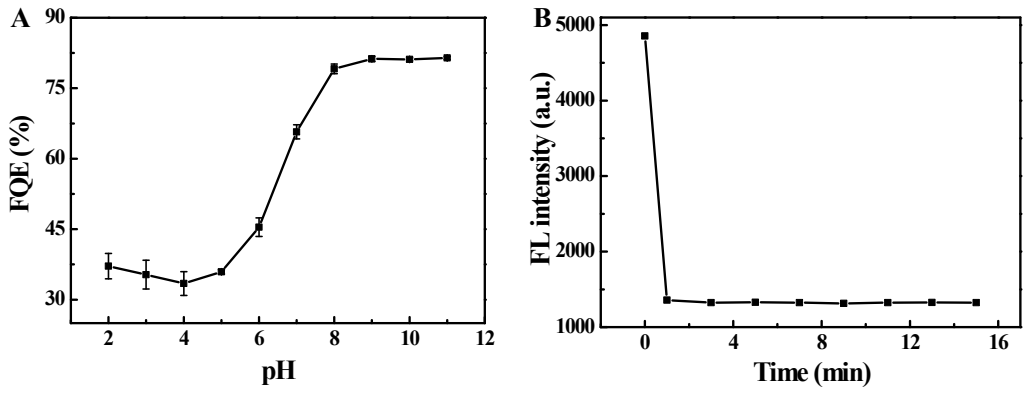

Fig. S6 (A) Fluorescence quenching efficiency (FQE) of pNP (100 μM) for CNNPs versus pH values. (B) FL intensity of CNNPs in the presence of pNP (100 μM) versus incubation time.

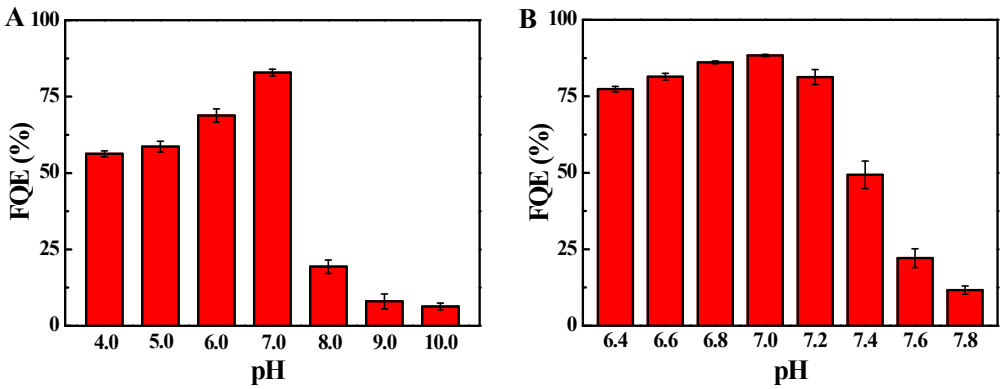

Fig. S7 Fluorescence quenching efficiency (FQE) of CNNPs versus pH values (A) varying from 4.0 to 10.0 and (B) varying from 6.4 to 7.8 in the presence of pNPG (200 μM) and α-glucosidase (100 U/L).

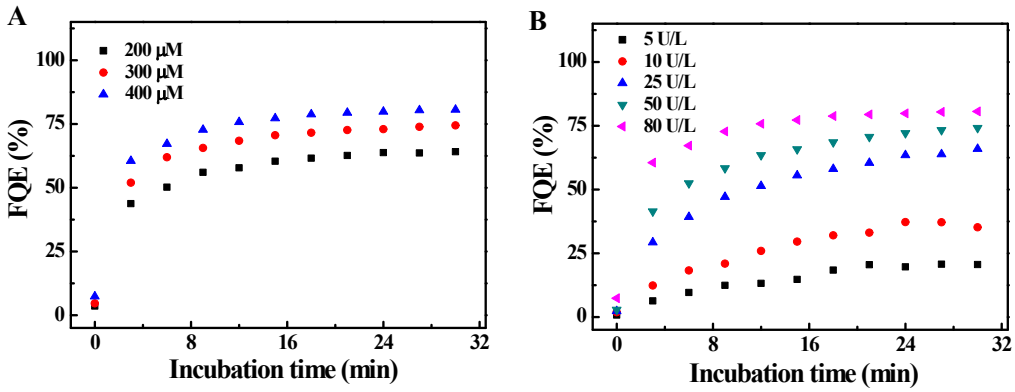

Fig. S8 (A) Fluorescence quenching efficiency (FQE) of CNNPs versus incubation time in the presence of α-glucosidase (80U/L) and different amounts of pNPG (200, 300, 400 μM). (B) Fluorescence quenching efficiency of CNNPs versus incubation time in the presence of pNPG (200 μM) and different concentrations of α-glucosidase (5, 10, 25, 50, 80 U/L).

Table S1. Comparison of the methods for the detection of α-glucosidase.

Methods	Probes	Linear range (U/L)	Detection limit (U/L)	Reference
Colorimetric assay	Gold nanorods	2.5 - 45	0.5	[S1]
Colorimetric assay	Unmodified gold nanoparticles	2.5 - 50	1	[S2]
Colorimetric assay	gold Nanoparticles	50 - 1100	4	[S3]
Electrochemical assay	AuNPs modified with ATP aptamer and pAPG	10 - 1300	5	[S4]
Electrochemical assay	AgNPs/DA and MNPs/ pAPG with PBA/GE	0 - 1100	40	[S5]
Ratiometric fluorescent assay	Dual-color carbon dots	130 - 6700	36	[S6]
Ratiometric Fluorescent assay	MnO_2-OPD	200 - 8000	30	[S7]
Fluorescent assay	F-PDA- CoOOH	2 - 80	1.65	[S8]
Fluorescent assay	SiQDs-MnO_2	20 - 2500	7	[S9]
Fluorescent assay	N, B-CDs	10 - 1000	3	[S10]
Fluorescent assay	PBA-CQDs	1.14 - 17.35	0.33	[S11]
Fluorescent assay	Supramolecular Self-assembly	2.2 - 60	0.66	[S12]
Fluorescent assay	Cationic Conjugated Polymers	10 - 1300	5	[S13]
Fluorescent assay	Carbon nitride nanoparticles	1.25 - 10	0.17	This work

Reference

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