Supporting Information

Oxygen self-enriched single-component "black carbon nitride" for near-infrared phototheranostics

*Yuxin Huang [a], Yanan Tian [a], Jie Shu [b], Fu Wang, [a] *, and Xunbin Wei [c,d,e] *,*

[a]School of Environmental Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, China

[b]Analysis and Testing Center, Soochow University, 199 Renai Road, Suzhou, 215123, China

[c] Biomedical Engineering Department, Peking University, Beijing, 100081, China

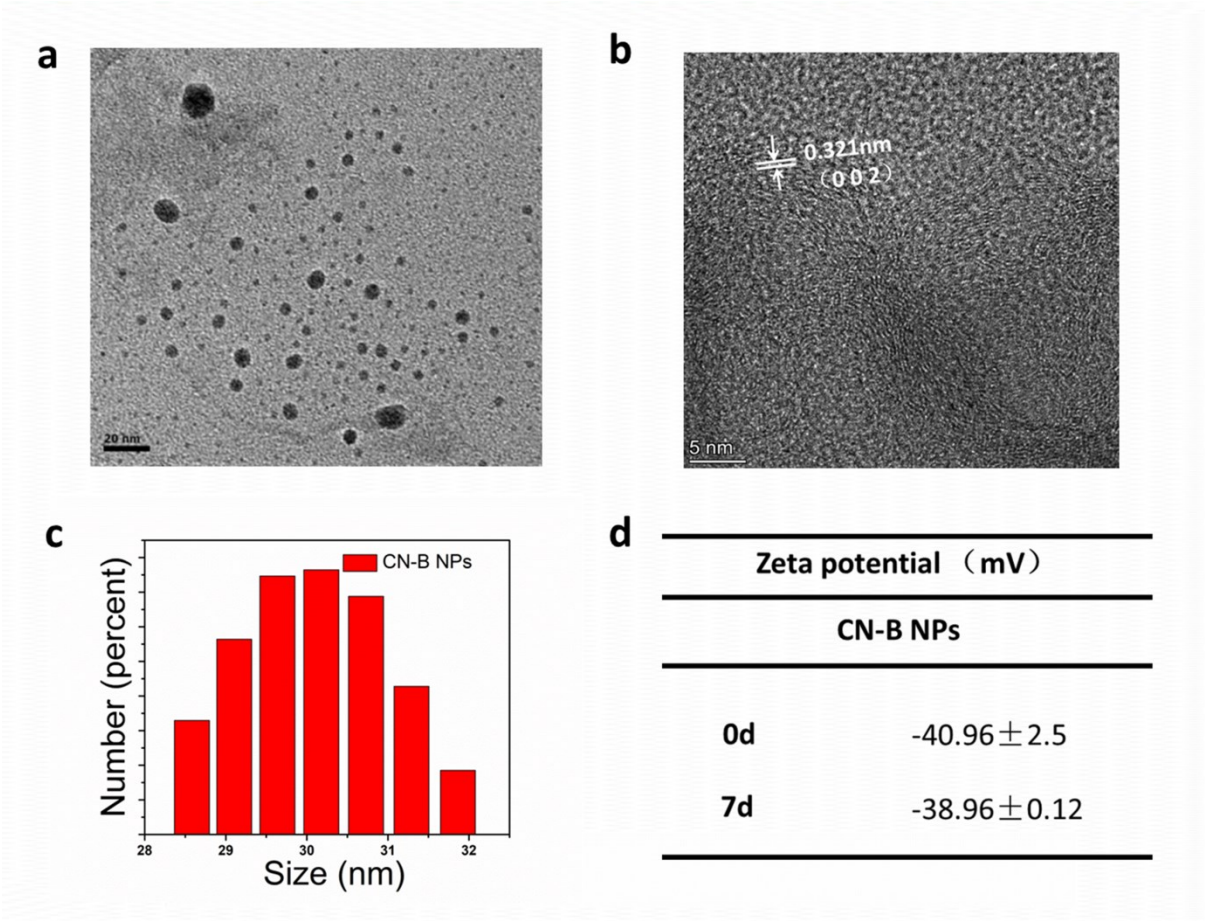
[d]Key Laboratory of Carcinogenesis and Translational Research (Ministry of Education/Beijing) , Peking University Cancer Hospital & Institute, Beijing, 100142, China

[e]State Key Laboratory of Oncogenes and Related Genes, Shanghai Cancer Institute, Med-X Research Institute and School of Biomedical Engineering, Shanghai Jiao Tong University, 1954 Huashan Road, Shanghai 200030, China

*Corresponding Authors

Professor Fu Wang, E-mail: wangfu@sjtu.edu.cn

Professor Xunbin Wei, E-mail: xwei01@sjtu.edu.cn



Zeta potential （mV）	
CN-B NPs	
0d	-40.96±2.5
7d	-38.96±0.12

Figure S1. (a) TEM image of CN-B NPs. (b) HRTEM image of CN-B NPs. (c) hydrodynamic diameter of CN-B NPs. (d) zeta potential of CN-B NPs.

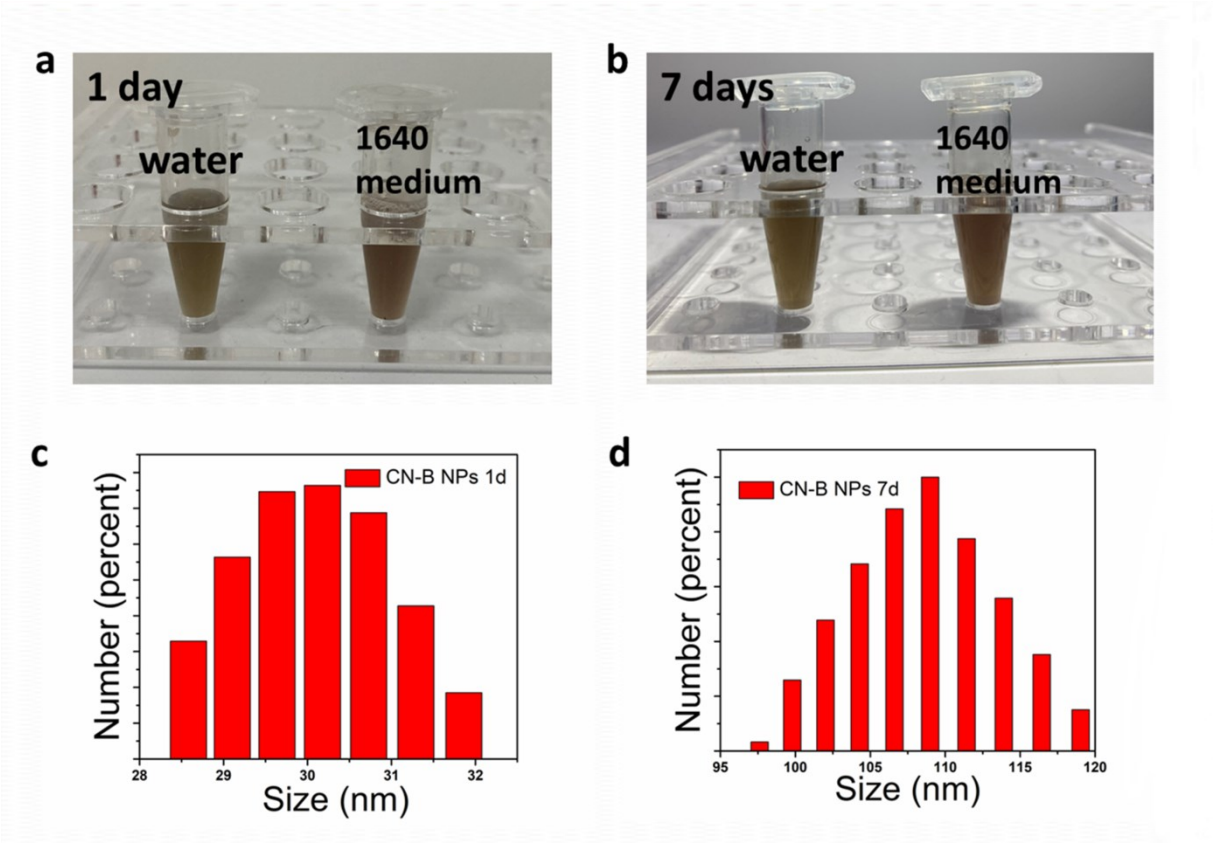


Figure S2. (a) (b) CN-B NPs in aqueous solution and CN-B NPs in 1640 medium solution on the first day and the seventh day, respectively. (c) (d) size distribution of CN-B NPs in aqueous solution on the first day and the seventh day, respectively.

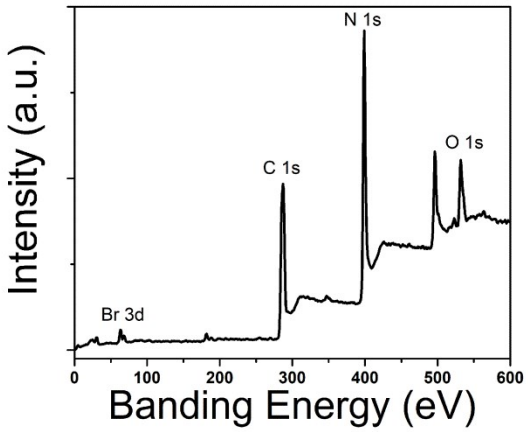


Figure S3. XPS survey spectrum of CN-B NPs.

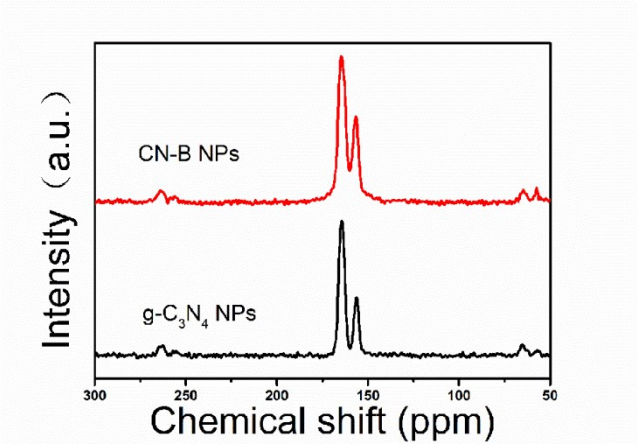


Figure S4. solid state NMR $^{13}C\{^{1}H\}$ spectra of CN-B NPs and g-C_3N_4 NPs.

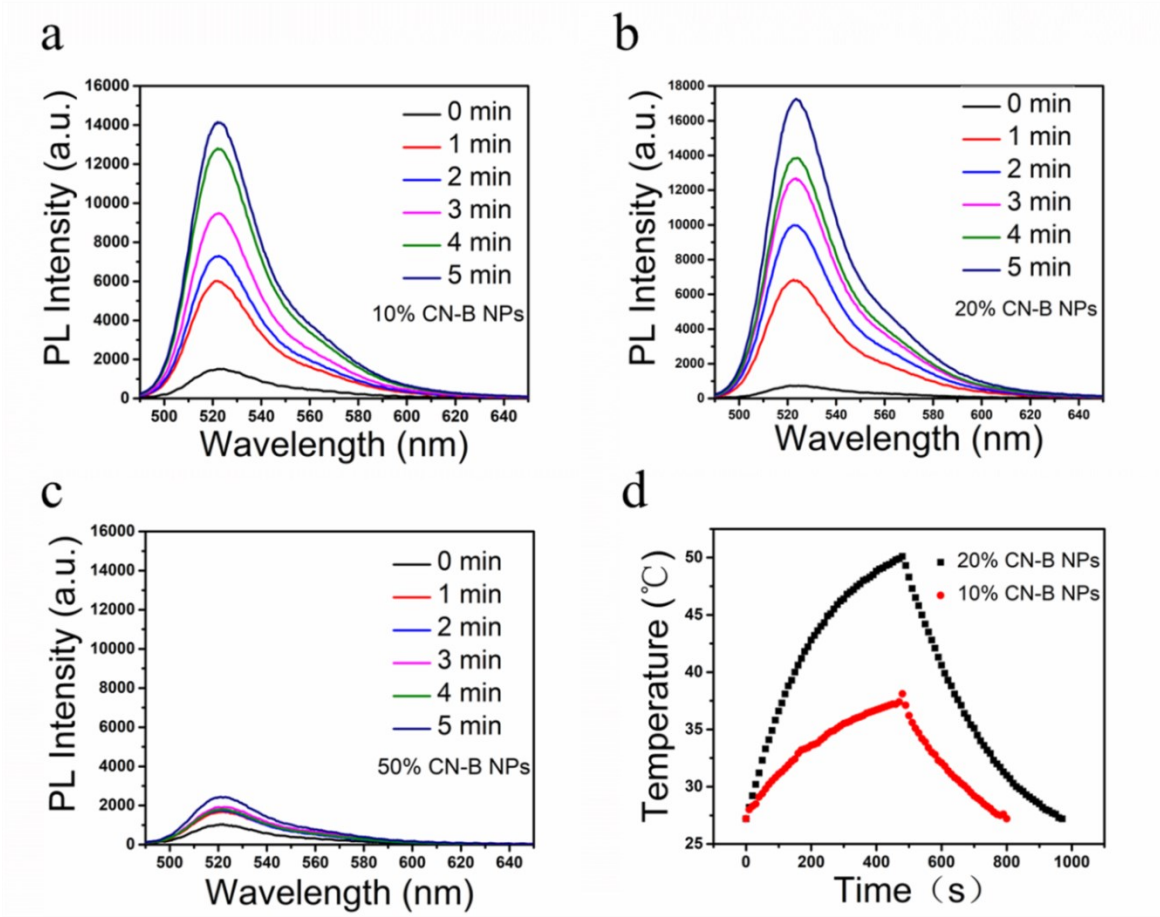


Figure S5. (a) ,(b) and (c) ROS production of 10%, 20% and 50% CN-B NPs,respectively. (d) photothermal effect of 10% and 20% CN-B NPs.

CN-B with different doping ratios (10%, 20% and 50%) can be obtained through one-step thermal copolymerization, where 10%, 20% and 50% refer to the doping amount of Phloxine B added relative to the amount of melamine. As can be seen from the Fig. S5a-S5c, 10% and 20% CN-B NPs have the same ROS generation capacity, while 50% CN-B NPs is weaker. At the same time, we also tested the heat generation capacity of 10% and 20% CN-B NPs, shown in Fih. S5d. Under 808 nm laser irradiation, the heat generation capacity of 20% CN-B NPs is much greater than 10% CN-B NPs and the photothermal conversion efficiency (η) of 20% CN-B NPs was calculated to 36.7%. Therefore, 20% CN-B NPs was used in this study (collectively referred to as CN-B NPs in the article).

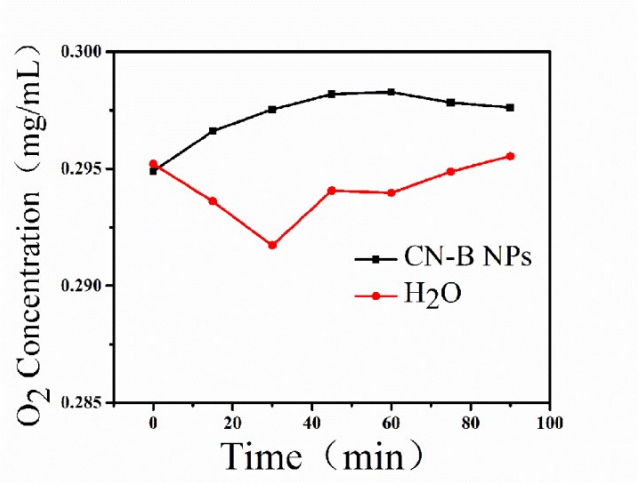


Figure S6. The oxygen release capacity of CN-B NPs and H_2O under 808 nm laser irradiation (1.5 W cm^{-2}).

The catalyst used was 500 mg/100 mL. According to the surface quantum yield (AQY) formula, [1] the quantum yield of CN-B NPs was calculated to be 0.09145%. In addition, the evolution rates of O_2 and H_2 per gram of catalyst were calculated as 0.0568 μmol g^{-1} h^{-1} and 0.1136 μmol g^{-1} h^{-1}, respectively.

References

[1] G. Zhang, L. Lin, G. Li, Y. Zhang, A. Savateev, S. Zafeiratos, X. Wang and M. Antonietti, *Angew. Chem. Int. Ed.* 2018, **57**, 9372.