

## Supplementary Information

### Green, simple and large scale synthesis of N-doped graphene quantum dots with uniform edge groups by electrochemical bottom-up synthesis

Linfan Tian <sup>a b d †</sup>, Siwei Yang <sup>c d e †</sup>, Yucheng Yang <sup>b</sup>, Jipeng Li <sup>f</sup>, Yuan Deng <sup>f</sup>, Suyun Tian <sup>b c</sup>, Peng He <sup>c e</sup>, Guqiao Ding <sup>c e \*</sup>, Xiaoming Xie <sup>b c</sup>, Zhongyang Wang <sup>a b \*</sup>

<sup>a</sup> Shanghai Advanced Research Institute, Chinese Academy of Science, Shanghai, 20050 (China)

<sup>b</sup> School of Physical Science and Technology, ShanghaiTech University, Shanghai, 200031 (China)

<sup>c</sup> State Key Laboratory of Functional Materials for Informatics, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Science, Shanghai, 200500, China.

<sup>d</sup> University of Chinese Academy of Sciences, Beijing 100049, China

<sup>e</sup> CAS Center for Excellence in Superconducting Electronics (CENSE), Shanghai 200050, China

<sup>f</sup> Department of Ophthalmology, Shanghai Ninth People's Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, 20011 (China).

† These authors (Linfan Tian and Siwei Yang) contributed equally.

\* Corresponding author: Prof. Zhongyang Wang, wangzy@sari.ac.cn

Prof. Guqiao Ding, gqding@mail.sim.ac.cn.

## Supplementary figures

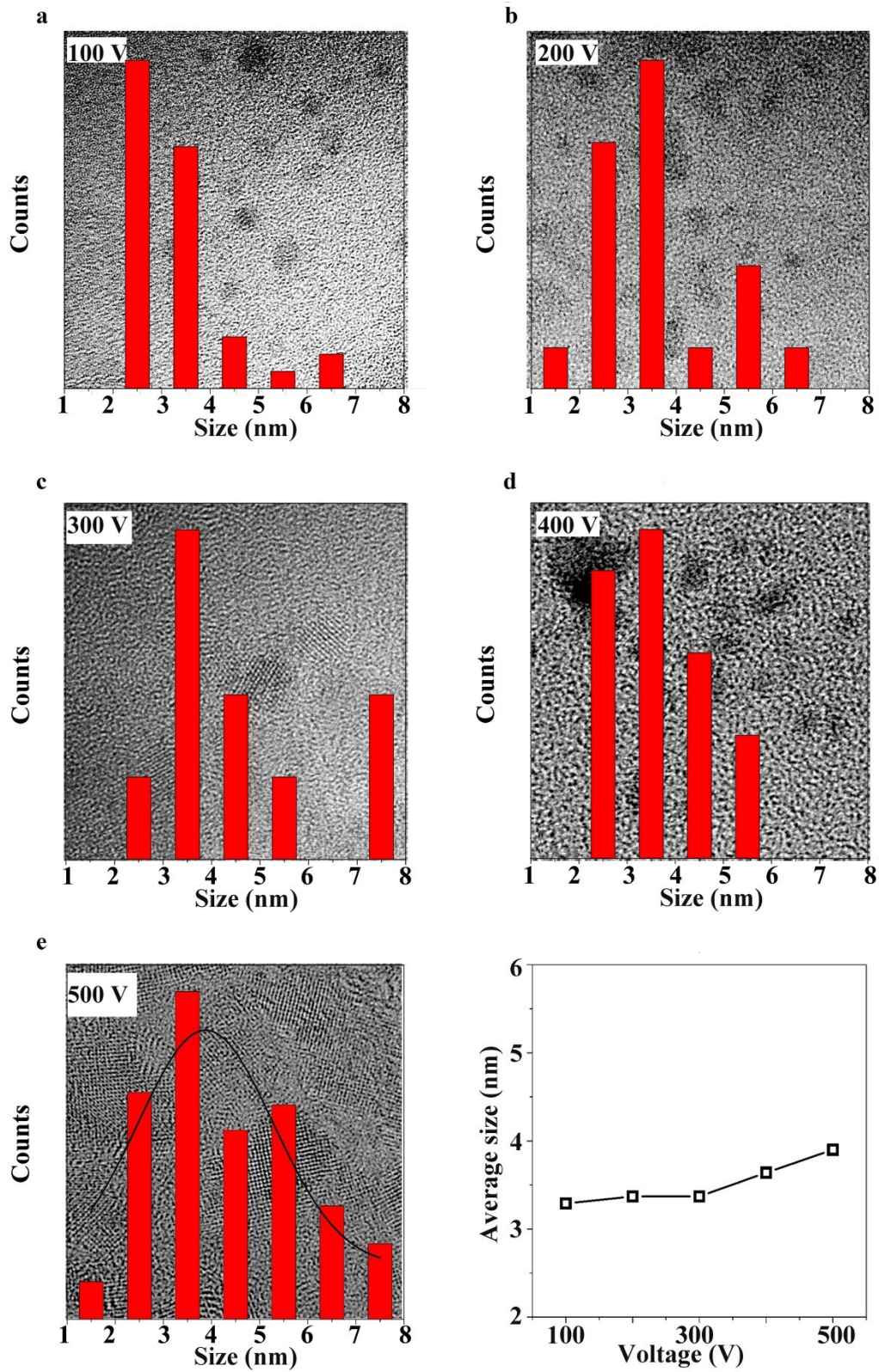


Fig. S1 The sizes of N-GQDs obtained under the different voltages.

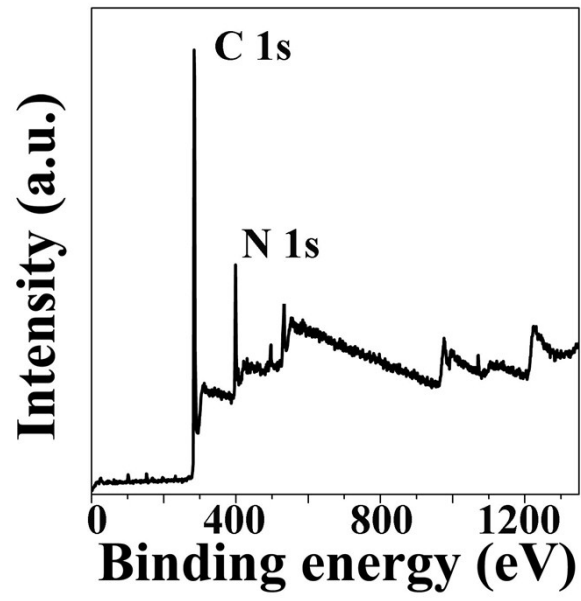


Fig. S2 XRD spectrum of N-GQDs

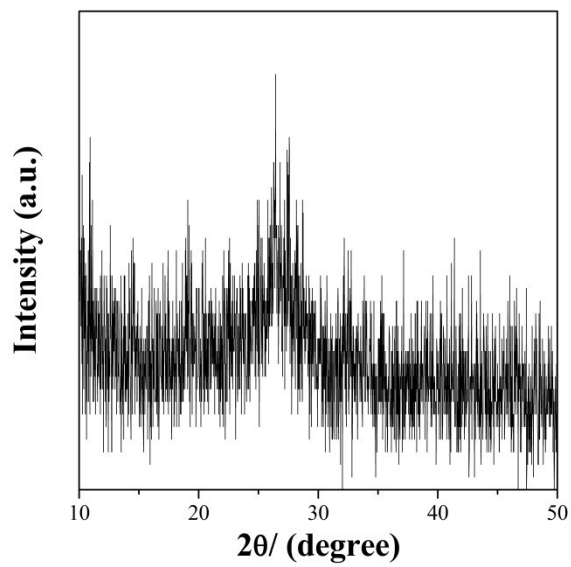
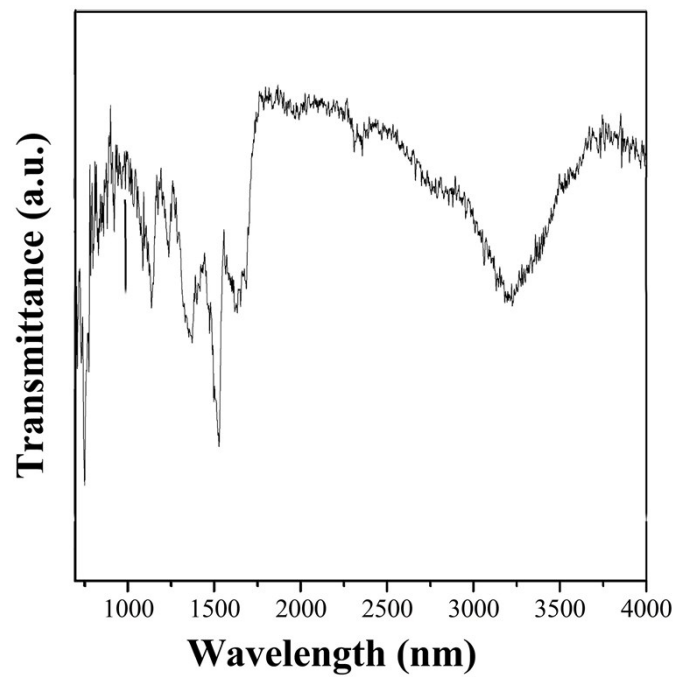
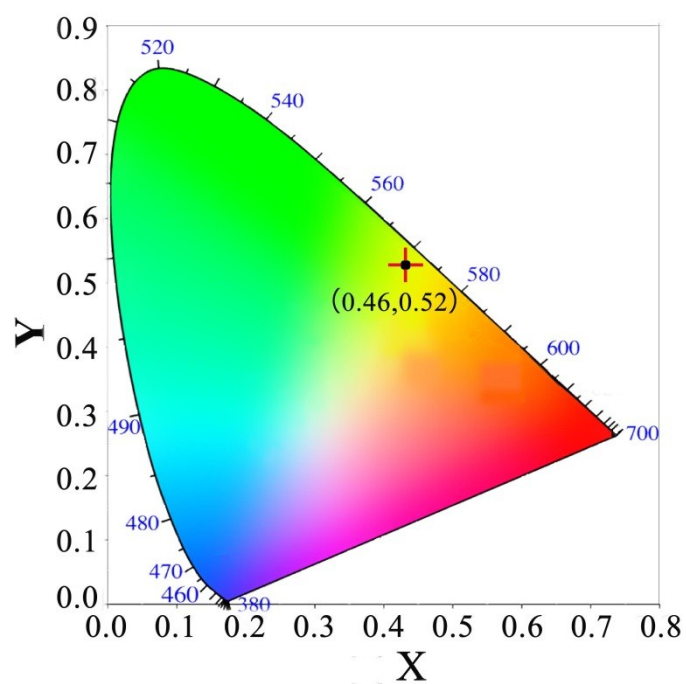


Fig. S3 XPS spectrum of N-GQDs



**Fig. S4** FT-IR spectrum of N-GQDs



**Fig. S5** The CIE chromaticity coordinates for N-GQD in aqueous solution.

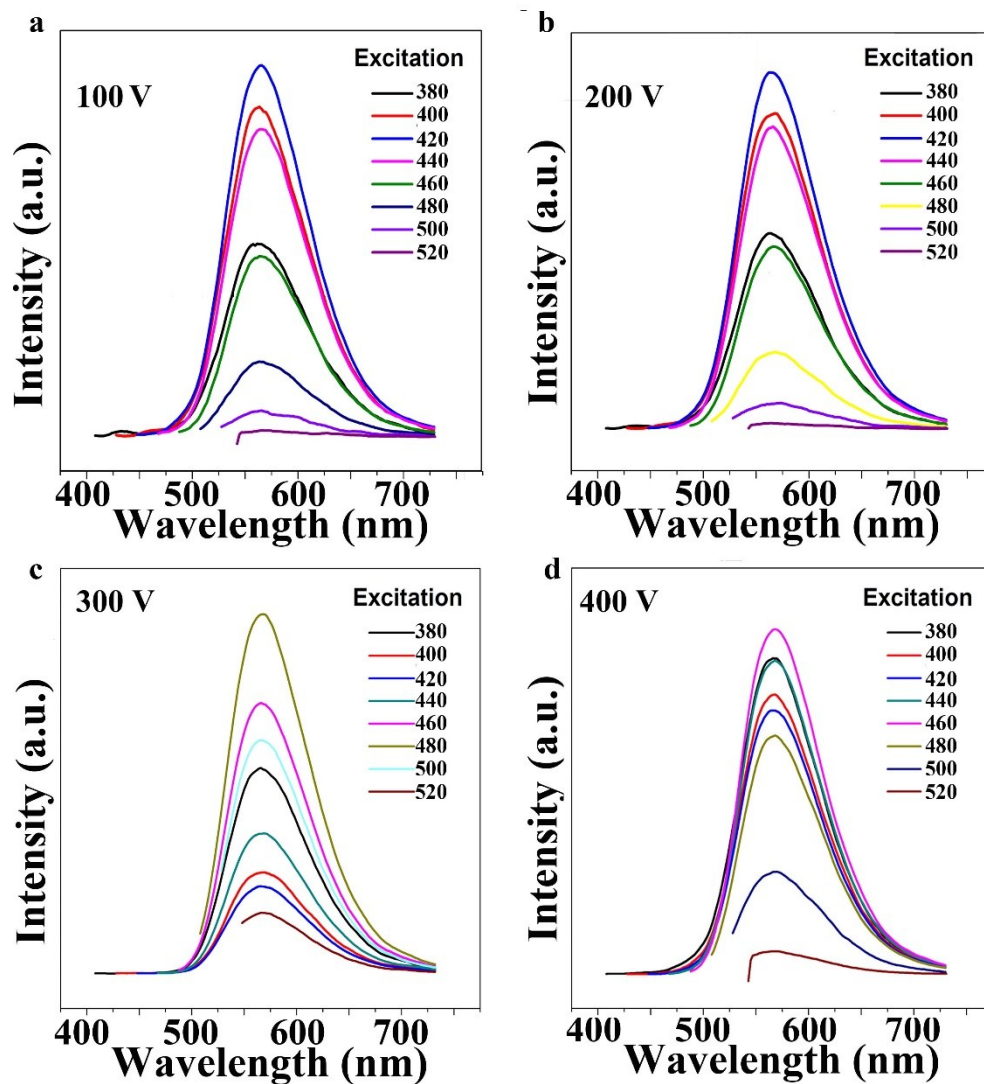
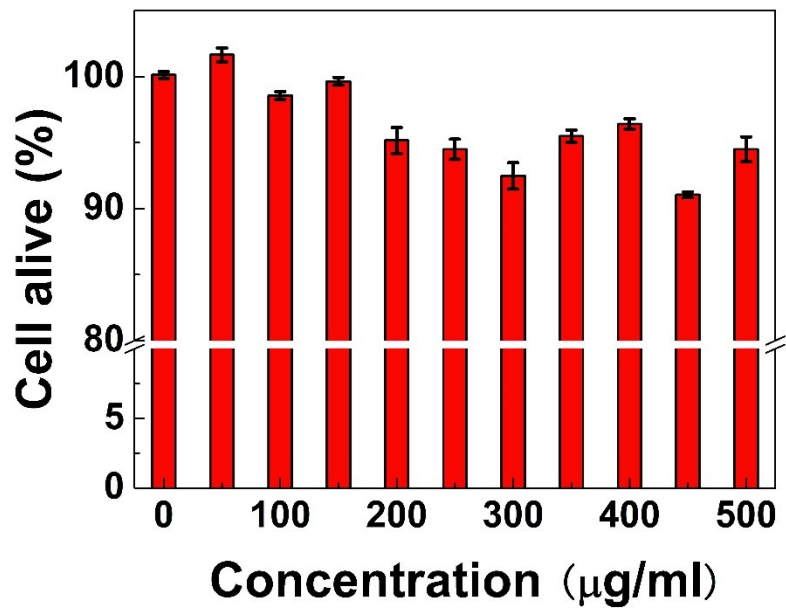


Fig. S6 The variation of PL spectrum of N-GQDs obtained under the different voltages.



**Fig. S7** The metabolic activity of HeLa cells was treated with different concentrations of N-GQDs.