Supporting Information

Optimized Sensitivity in Copper(II) Ion Detection: Sustainable Fabrication of Fluorescence Red-Shifted Graphene Quantum Dots via Electron-Withdrawing Modulation

Weitao Li [1,2], Qian Niu [1,2], Xinglong Pang [3,4], Shang Li [1,2], Yang Liu [1,2], Boyu Li [1,2], Shuangyan Li [1], Lei Wang [1,*], Huazhang Guo [3,*] and Liang Wang [3]

[1] Textile and Garment Industry of Research Institute, Zhongyuan University of Technology,
Zhengzhou 450007, China; liweitao@zut.edu.cn (W.L.); 2022117681@zut.edu.cn (Q.N.);
lishang@zut.edu.cn (S.L.); 2023117779@zut.edu.cn (Y.L.); boyu_li@126.com (B.L.);
shuangyanli@126.com (S.L.)
[2] Zhengzhou Key Laboratory of Smart Fabrics & Flexible Electronics Technology, Zhongyuan University of Technology, Zhengzhou 451191, China
[3] Institute of Nanochemistry and Nanobiology, School of Environmental and Chemical Engineering,
Shanghai University, 99 Shangda Road, Shanghai 200444, China; pangxinglong@tsinghua-zj.edu.cn (X.P.); wangl@shu.edu.cn (L.W.)
[4] Department of Environment, Yangtze Delta Region Institute of Tsinghua University, Jiaxing 314006, China
* Correspondence: wanglei@zut.edu.cn (L.W.); guohuazhang@shu.edu.cn (H.G.)

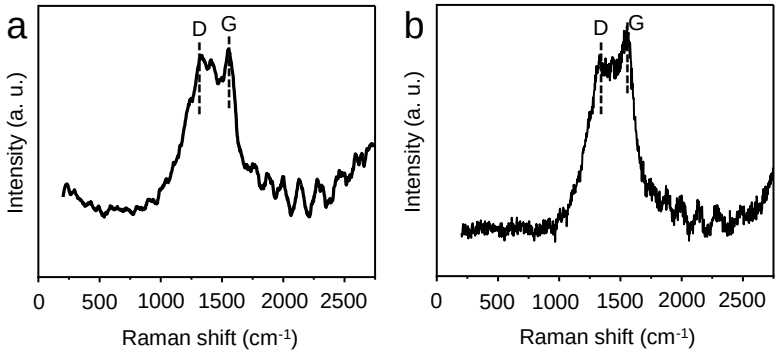


Figure S1. Raman spectra of y-GQDs (a) and c-GQDs (b).

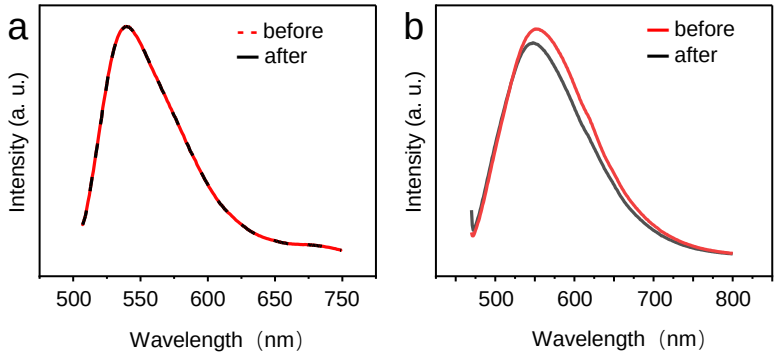


Figure S2. Fluorescence spectra of y-GQDs (a) and c-GQDs (b) before and after thermal stability.

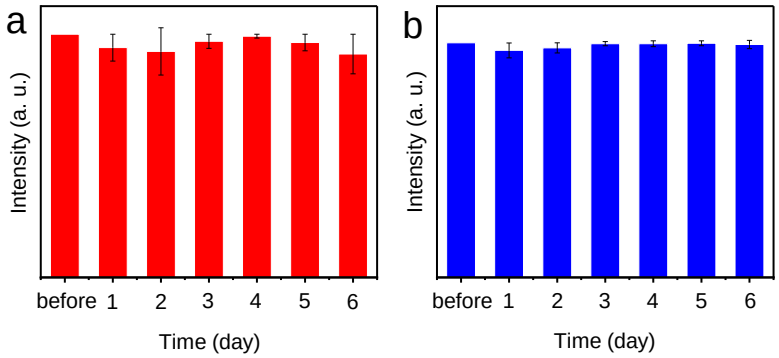


Figure S3. Bar graph of fluorescence peak intensity of y-GQDs (a) and c-GQDs (b) at different times.

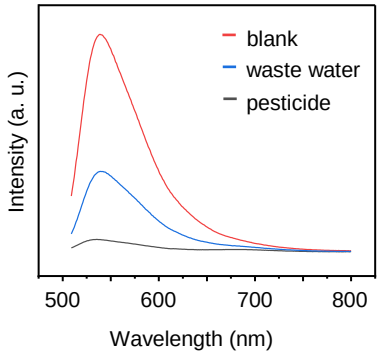


Figure S4. Application of y-GQDs in Environmental Monitoring.

Table S1. XPS measures the element ratios of c-GQDs and y-GQDs in the spectra.

Element	C	N	O
c-GQDs	65.73%	5.82%	28.45%
y-GQDs	70.45%	4.58%	24.97%