Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C

Supporting Information

Graphitized Carbon Dots Emitting Strong Green Photoluminescence

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1. XRD spectrum of GCDs

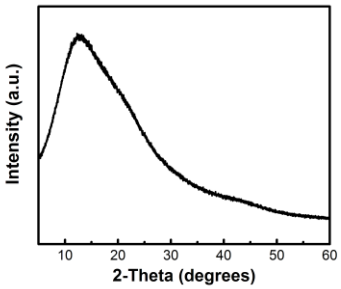

Fig. S1 XRD pattern of GCDs

2. **Effect of pH on the UV-Vis absorption spectra of the GCDs aqueous solution**

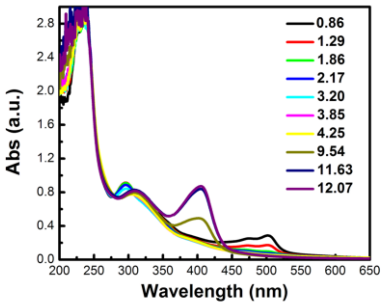

Fig. S2 Effects of pH on the UV-Vis spectra of the GCDs aqueous solution.

3. Quantum Yield (Φ_f) Measurements:

Considering the green emission of GCDs in the range of 500 ~ 600 nm, fluorescein in 0.1 mol/L NaOH aqueous solution was chosen as reference to calculate their relative Φ_f with the following equation:

$$(\Phi_f)_x = (\Phi_f)_{std} (m_x/m_{std})(\eta_x^2/\eta_{std}^2)$$

Where subscripts of x and std denoted test and standard, Φ_f is the relative fluorescence quantum yield; m is the gradient from the plot of the integrated fluorescence intensity vs the absorbance at the excitation wavelength; η is the refractive index of solvent. The procedures in detail could be found in the "A Guide to Recording Fluorescence Quantum Yields"[1] and reference 2.

To avoid the effect of re-absorption on the calculation of relative Φ_f, the absorbance of GCDs and fluorescein were controlled to be smaller than 0.05 at the excitation wavelength. Fluorescein standard solution was freshly prepared just before use.

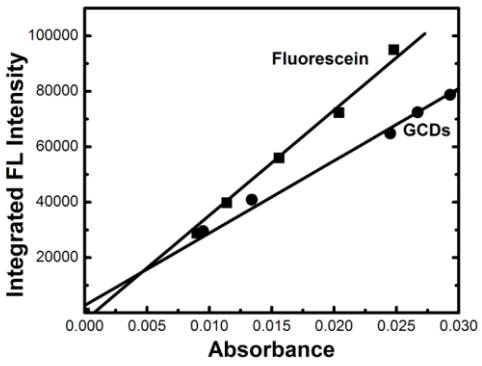

Fig. S3 Linear plots of integrated fluorescence intensities vs absorbance at 490 nm.

Table S1 Relative Φ_f of GCDs at 490 nm

sample	m	r	$(\Phi_f)_x$ (%)
Fluorescein in 0.1 mol/L NaOH solution	3.80×10^6	0.994	90 η_x ~1.33, η_{std} ~ 1.33
GCDs in aqueous solution	2.61×10^6	0.997	62%

4. Relative fluorescence intensity of GCDs in HCl aqueous solutions

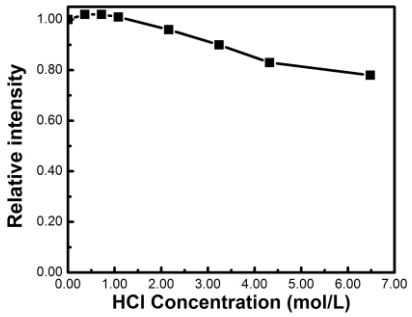

Fig. S4 the relationship of relative fluorescent intensities of GCDs and the concentration of HCl (excitation wavelength: 490 nm)

5. Photocatalytic degradation of MB

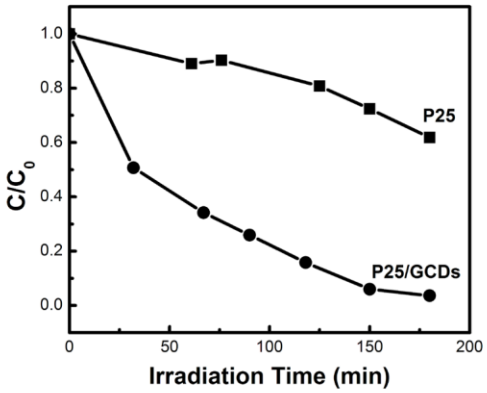

Fig. S5 Under the illumination of visible light, the degradation of MB in the presence of P25 and P25/GCDs composite photocatalyst

6. Effects of synthetic parameters on the optical properties of GCDs prepared

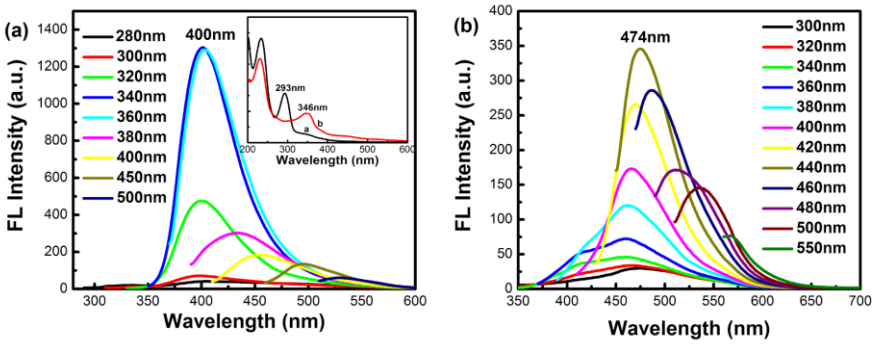

Fig. S6 Fluorescent spectra of the GCDs prepared at 140 °C (a) and room temperature (b) at different excitation wavelength. Curves a and b in the insert were corresponding to the absorption spectrum of the GCDs prepared at 140 °C and room temperature.

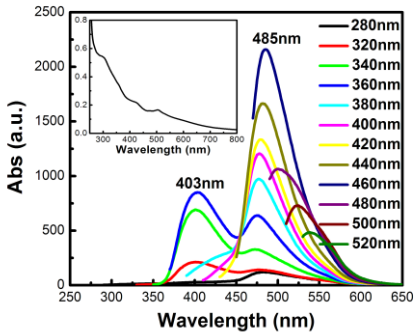

Fig. S7 Fluorescent spectra of the GCDs prepared at 80 °C with a lower concentration of H_2SO_4 (the volume ratio of H_2SO_4 to EG ~ 3.5:5). The insert was the absorption spectrum of GCDs.

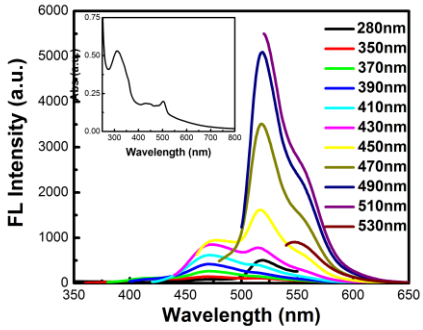

Fig. S8 Fluorescent spectra of the GCDs prepared at 80 °C for 2 hours.

The insert was the corresponding absorption spectrum.

Reference

1. The manual of "A Guide to Recording Fluorescence Quantum Yields" by HORIBA Jobin Yvon IBH Ltd.

2. Bao L.; Zhang Z.-L.; Tian Z.-Q.; Zhang L.; Liu C.; Lin Y.; Qi B.; Pang D.-W. *Adv. Mater.* 2011, **53**, 5801-5806.