

Supplementary Information

Carbon Quantum Dots Prepared with Chitosan for Synthesis of CQDs/AuNPs for Iodine Ions Detection

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Test method for deacetylation degree of chitosan:

The degree of deacetylation (DD) of chitosan was determined by titration as follows:

0.20 g vacuum-dried sample was dispersed in 20 mL, 0.1 mol/L HCl and then titrated with 0.1 mol/L NaOH. The pH value and corresponding volume of NaOH solution was recorded and a titration curve was plotted. This plot had two inflection points, where the corresponding volumes were recorded as V1 and V2. The DD value was calculated according to the following equation

$$\text{Degree of deacetylation (DD)} = ((V2-V1) \times c \times 0.016) / (0.094 \times W) \quad (1)$$

Where c is the concentration of NaOH solution, and W is the sample weight (g).

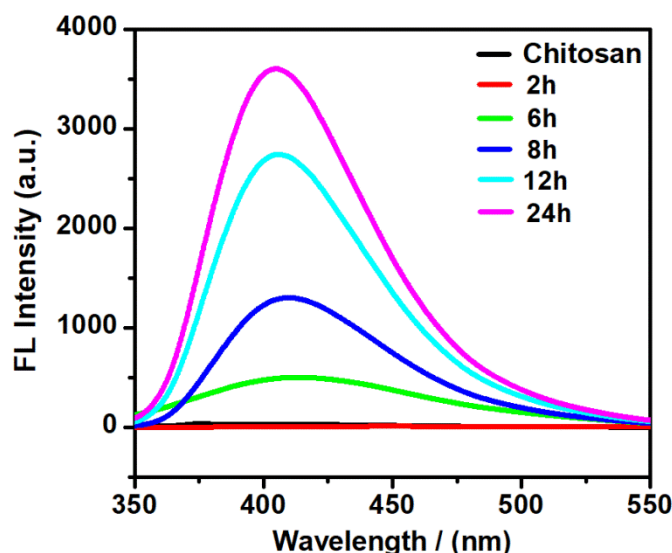


Figure S1 Fluorescence emission spectra of CQDs obtained by chitosan hydrothermal carbonization with different times (at a maximum excitation wavelength of 330 nm).

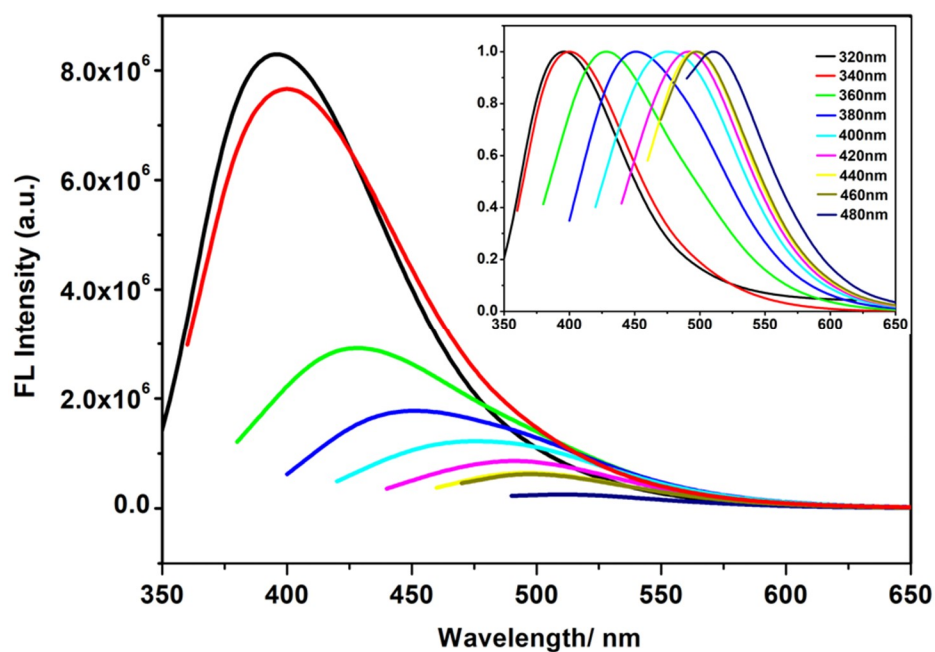


Figure S2 Fluorescence emission spectra of the CQDs obtained under excitations from 280 to 480 nm with 20 nm interval. Inset: Normalized Fluorescence emission spectra.

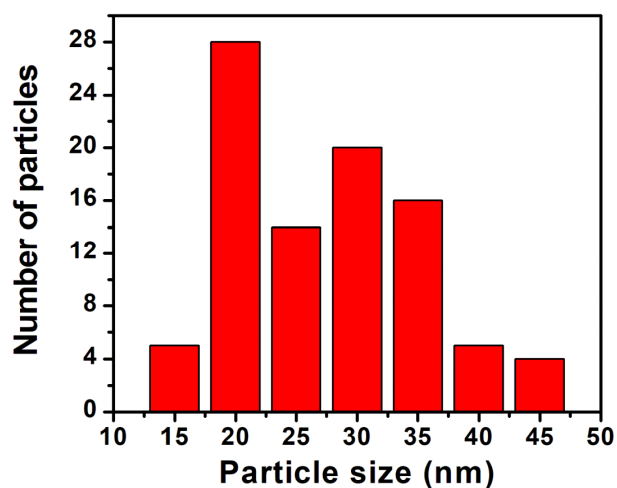


Figure S3 size distribution histogram of CQDs/AuNPs.

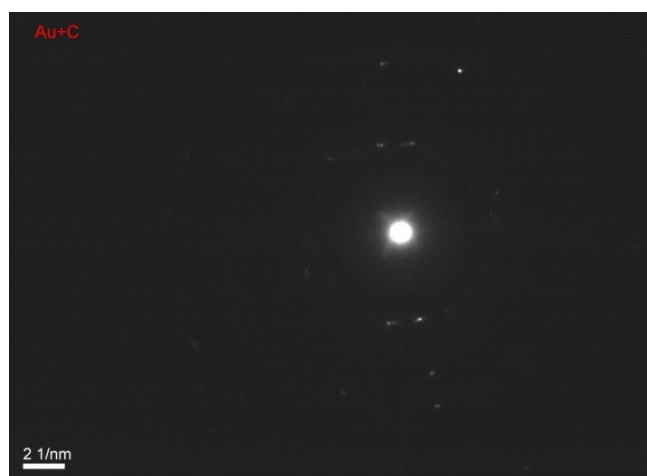


Figure S4 SAED of CQDs/AuNPs.

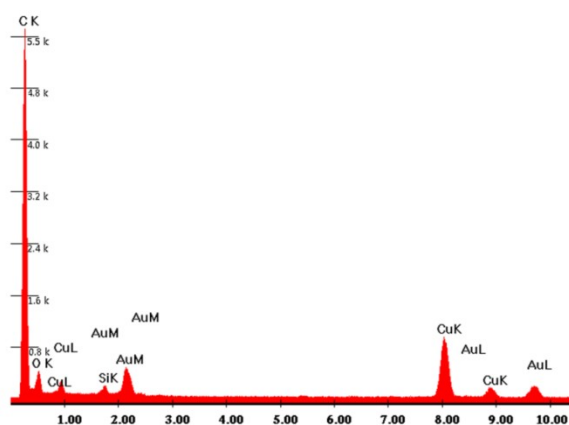


Figure S5 Energy dispersive X-ray spectrum (EDS) of the CQDs/AuNPs showing the peaks for C, O, Cu and Au.

Table S1 Results for the determination of iodide in salt samples (n=3).

Sample	Spiked (μM)	Measured (μM)	Recovery (%)
salt	0	-	-
	5	4.92	98.4
	10	10.74	107.4
	20	21.10	105.5

Table S2 Comparison of the proposed iodide detection method with other reported methods.

Methods	Probe	Linear range/(M)	LOD/(M)	Ref.
Colorimetric	ATTP-AuNPs	5.0×10^{-7} to 6.0×10^{-6}	1.5×10^{-8}	[2]
Fluorescence	N-CQDs	1×10^{-4} to 2.0×10^{-3}	1.0×10^{-5}	[17]
Colorimetric	Cu@Au Nanoparticles	—	5.0×10^{-6}	[S1]
Colorimetric	FCD	—	4.3×10^{-7}	[S2]
Fluorescence				
Turn off and colorimetric	$\text{C}_{20}\text{H}_{20}\text{N}_4\text{O}_5$	6.25×10^{-6} to 3.12×10^{-5}	3×10^{-8}	[S3]
Colorimetric	$\text{C}_{22}\text{H}_{22}\text{N}_4\text{O}_6\text{S}_2$	—	5.31×10^{-6}	[S4]
Fluorescence	FITC-Au nanoparticles	1.0×10^{-7} – 1.0×10^{-6}	5×10^{-8}	[S5]
Colorimetric	silver nanoparticles	6.0×10^{-6} – 8.0×10^{-6}	2.5×10^{-4}	[S6]
Colorimetric	CQDs/AuNPs	2.0×10^{-5} – 4.0×10^{-4}	2.3×10^{-6}	This work

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