Electronic Supplementary Information

Facile and Green Synthesis of Highly Fluorescent Nitrogen-doped Carbon Dots from Jackfruit seeds and Its Applications Towards Fluorimetric Detection of Au^{3+} Ions in Aqueous Media and In Vitro Multicolor Cell Imaging

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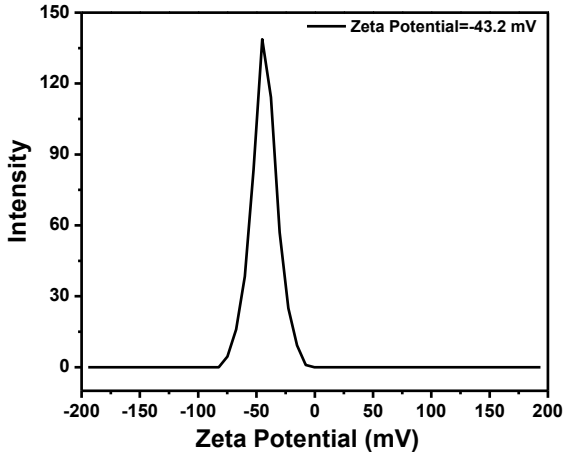

Fig. S1 Zeta potential of the N-CDs,

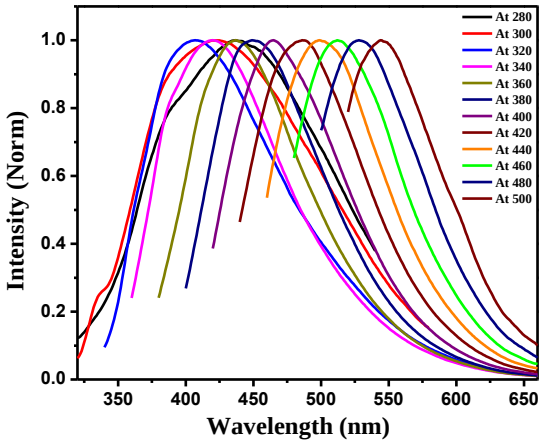

Fig. S2 Normalized PL spectra of N-CDs excited at various wavelengths.

Quantum Yield Calculation (QY)

In the case Quinine sulfate (QS, 0.1N H_2SO_4 as solvent; Known QY=0.54) was chosen as standard. The QY of N-CDs (in water) was calculated by slope method.

From the integrated photoluminescence intensity and the absorbance value [several values (less than 0.1 at excitation wavelength) built the curve] of the samples with that of the references.

The equation is:

$$\mathbf{QY_{sam} = QY_{ref}\,(K_{sam}/K_{ref})(n_{sam}/n_{ref})^2}$$

Where, K is the slope determined by the curves and n is the refractive index. The subscript "ref" refers to the standards and "sam" refers to the unknown samples. For these aqueous solutions, $n_{sam}/n_{ref}=1$.

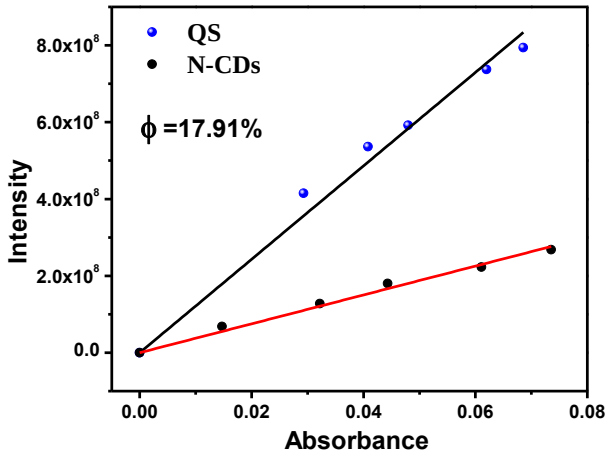

Fig. S3 Slope method for the calculation of fluorescence quantum yield.

Table S1 Slope method for the calculation of fluorescence quantum yield.

Fluorescer	Slope	QY	QY (%)	Reduced R^2
Quinine Sulphate	1.21×10^{10}	0.546	54.60 (Known)	0.99
N-CDs	3.75×10^{9}	0.1791	17.91	0.99

Table S2 Parameters obtained from the fitting of fluorescence decays at various emission wavelengths (λ_{ex}: 375 nm) LED.

S. No	λ_{em}	τ_1 (ns)	τ_2 (ns)	τ_3 (ns)	A_1 (%)	A_2 (%)	A_3 (%)	τ_{Avg} (ns)	χR^2
1	400	0.53	2.47	7.86	18.42	46.69	34.69	1.71	1.02
2	425	0.53	2.57	8.30	16.42	46.18	37.40	1.87	1.06
3	450	0.38	2.40	8.19	12.78	44.19	43.03	1.75	1.19
4	475	0.57	2.65	8.25	13.13	44.27	42.60	2.23	1.21
5	500	0.51	2.57	8.17	12.61	44.67	42.72	2.13	1.07
6	525	0.51	2.50	8.15	13.46	44.40	42.14	2.04	1.15
7	550	0.50	2.48	8.00	15.35	44.71	39.94	1.87	1.24
8	575	0.45	2.36	7.83	16.58	46.25	37.17	1.64	1.14
9	600	0.40	2.27	7.81	18.93	47.07	34.00	1.40	1.20

Table S3. Comparison of CDs with other fluorescence probes reported so far towards the detection of Au^{3+}.

S. No.	Fluorescence Probe	Solvent	LOD	Ref.
1	Rhodamine-based modified polyacrylic acid	0.01 M $TBAPF_6$ in DMSO	11.40 μM	1
2	4-propargylamino-1,8-naphthalimide based probe	PBS buffer (4% C_2H_5OH)	8.44 μM	2
3	Graphene Oxide-Poly(vinyl alcohol) Hybrid material	Water	1.40 μM	3
4	Fluorol Red GK	CH_3CN-HEPES buffer	1.23 μM	4
5	Rhodamine-based modified polyacrylic acid-coated FeNPs	0.01 M $TBAPF_6$ in DMSO	850 nM	1
6	Graphene oxide-poly(vinyl alcohol) Hybrid	Water	700 nM	5
7	Thioamide-phenyl-substituted alkyne	phosphate buffer/C_2H_5OH (3:7, pH 7.0)	390 nM	6
8	Aryl alkyne compound	C_2H_5OH	325 nM	7
9	Rhodamine-alkyne derivative	C_2H_5OH-HEPES buffer (0.01 M, pH 7.4) (1:1, v/v)	320 nM	8
10	Bodipy derivative	PBS buffer (50 % ethanol)	320 nM	9
11	Rhodamine-based semicarbazide	PBS buffer (0.3% DMF)	290 nM	10
12	**N-CDs**	**Water**	**239nM**	**This Work**
13	Thiocoumarin derivative	CH_3CN-acetate buffer solution (1:1, v/v)	111 nM	11
14	Rhodamine-based semicarbazide	PBS buffer (10% CH_3OH)	74 nM	10
15	N-CDs	Water	64 nM	Ref. 40 in the main article
16	1,8-naphthalimide-alkyne conjugate	CH_3OH (5% H_2O v/v)	NA	12
17	CDs	Water	53 nM	Ref. 25 in the main article
18	Rhodamine based probe	PBS buffer (1% CH_3OH)	50 nM	13
19	GQDs	Water	50 nM	Ref. 45 in the main article

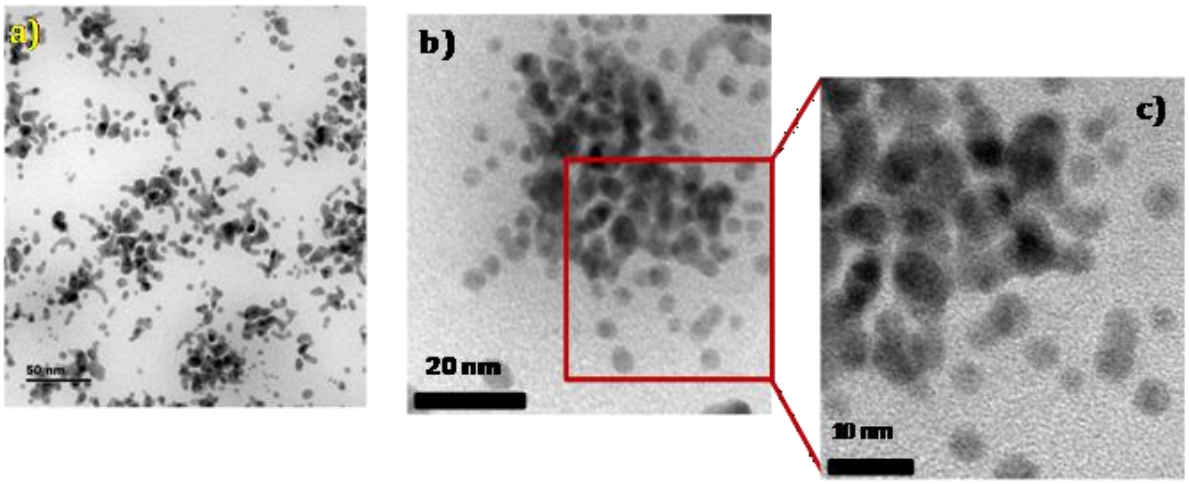

Fig. S4 a-c) TEM image of aggregated N-CDs in the presence of Au^{3+} ions.

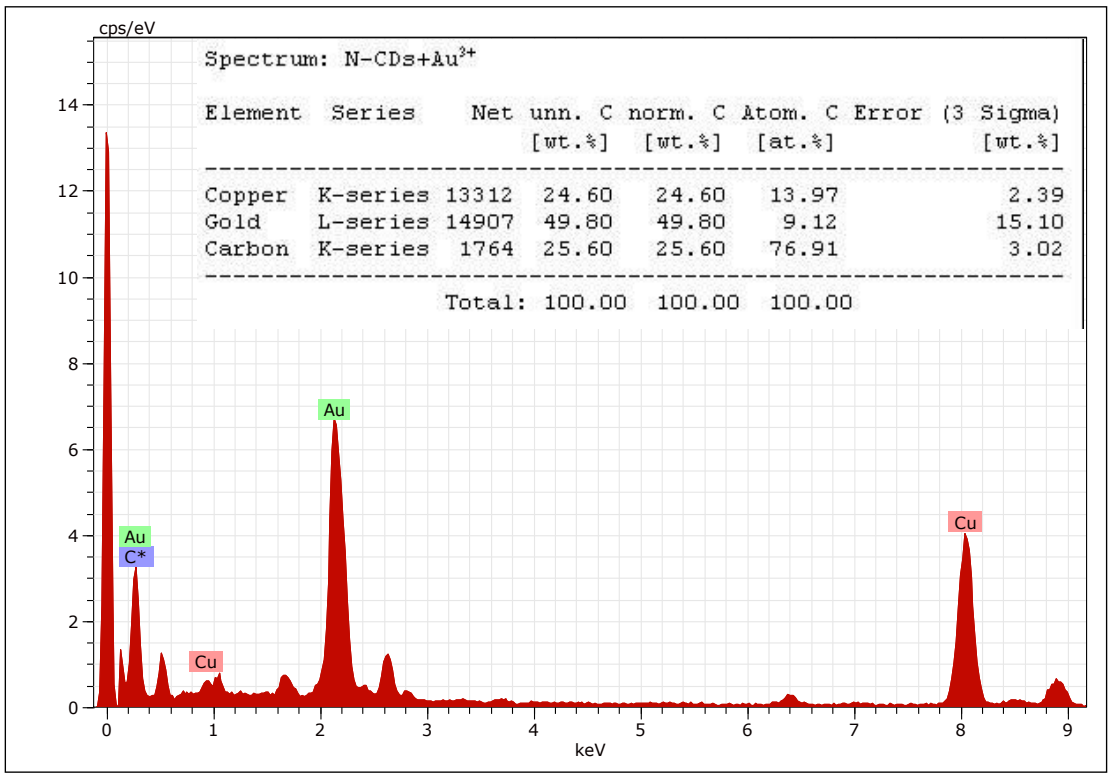

Fig. S5 EDAX spectrum of AuNPs.

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