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Supplementary Information for:

Graphene quantum dots based fluorescent sensor for *anthrax* biomarker detection and its size dependence

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Table S1. FT-IR assignments of (a) GQD, (b) NH_2-GQD and (c) Eu-GQD.

Samples	Wavenumber(cm^{-1})	Assignments
GQD	835	C–H deformation
	1236	C–O–C stretching
	1360	C–O stretching
	1591	C=C aromatic stretching
	1785	C=O stretching
NH_2-GQD	640	N–H bending
	1167, 1255	C–N stretching
Eu-GQD	1035,1092	Tertiary amines C–N stretching
	1312, 1584	Carboxylic acid CO_2 stretching
	3185	N–H stretching

Table S2. Elemental analysis results of (a) GQD, (b) NH_2-GQD and (c) Eu-GQD observed by X-ray photoelectron spectroscopy.

Samples	Elemental atomic percentage (wt%)			
	C	**O**	**N**	**Eu**
GQD	54.78	45.10	0.12	-
NH_2-GQD	52.08	45.28	2.64	-
Eu-GQD	42.24	50.79	2.85	4.12

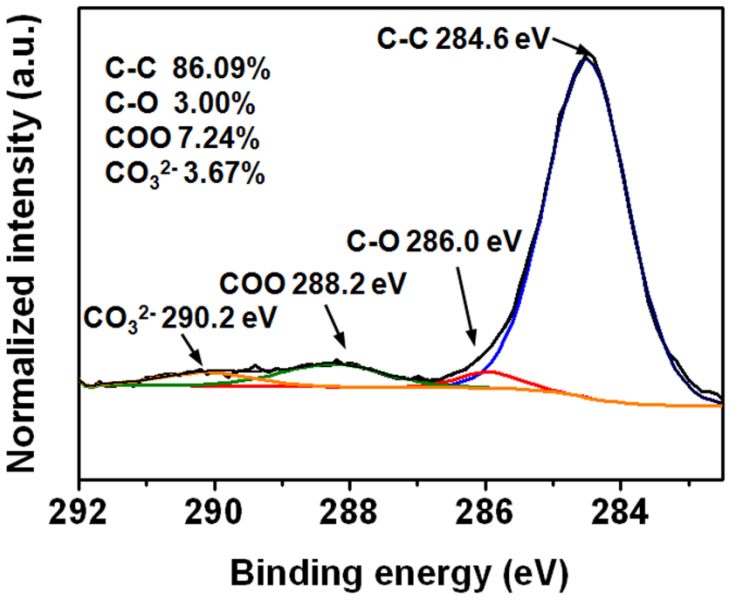

Fig. S1 Curve fit of the C1s peak of pristine GQD. The inset shows a quantification table indicating all carbon bonds observed in pristine GQD: (a) C-C bond (284.6 eV), (b) C-O bond (286.0 eV), (c) COO bond (288.2 eV), and CO_3^{2-} bond (290.2 eV).

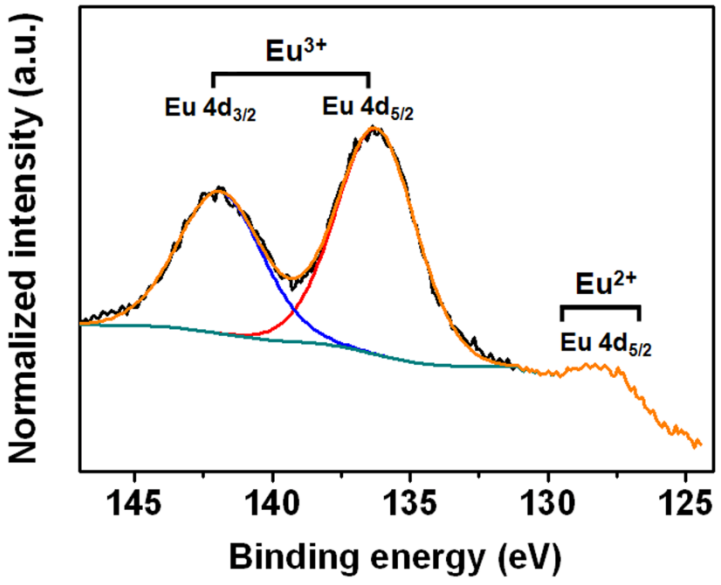

Fig. S2 Curve fit of the Eu 4d spectrum of Eu-GQD: (a) $Eu4d_{3/2}$ of Eu^{3+} (142 eV), (b) $Eu4d_{5/2}$ of Eu^{3+} (136.5 eV), and (c) $Eu4d_{5/2}$ of Eu^{2+} (128 eV).

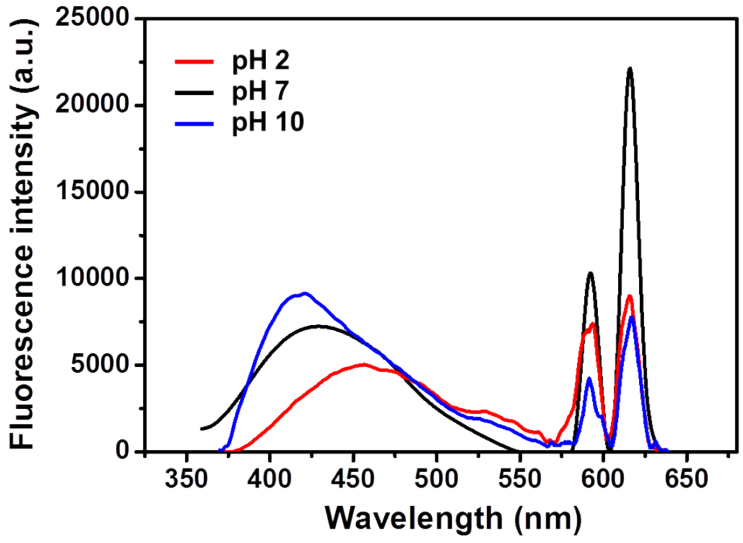

Fig. S3 Fluorescence spectra of 3-nm Eu-GQDs in the presence of 1 μM DPA depending on the pH values.

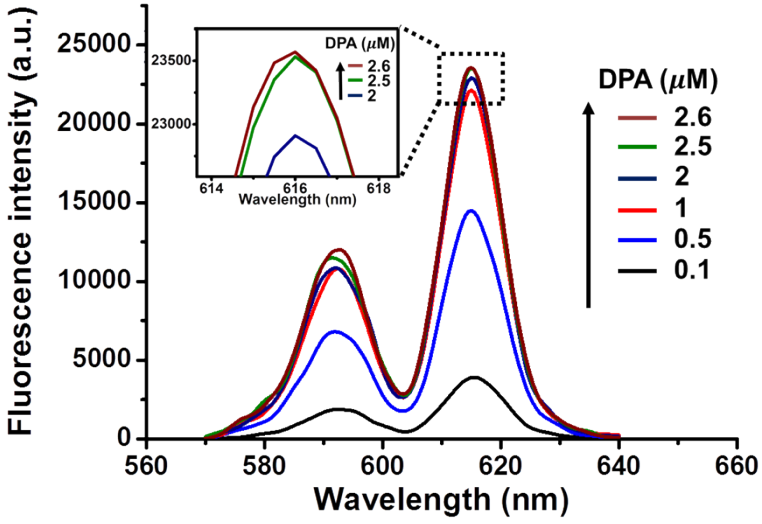

Fig. S4 Fluorescence spectra of 3-nm-diameter Eu-GQDs for various concentrations of DPA.

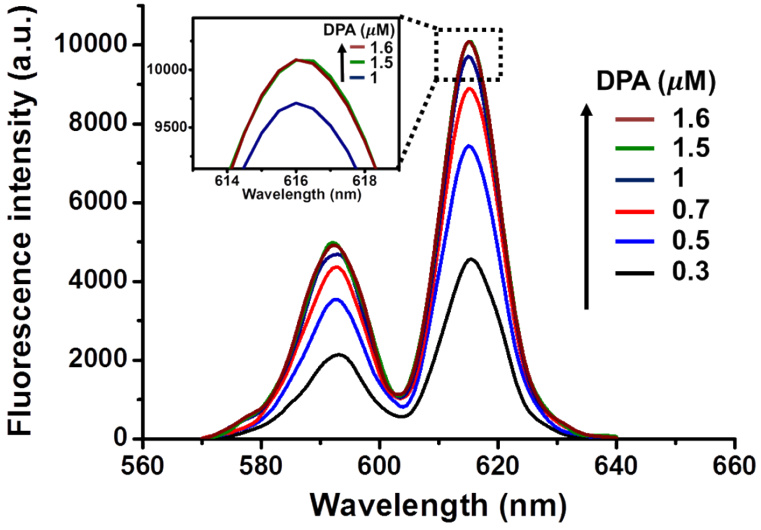

Fig. S5 Fluorescence spectra of 10-nm-diameter Eu-GQDs for various concentrations of DPA.

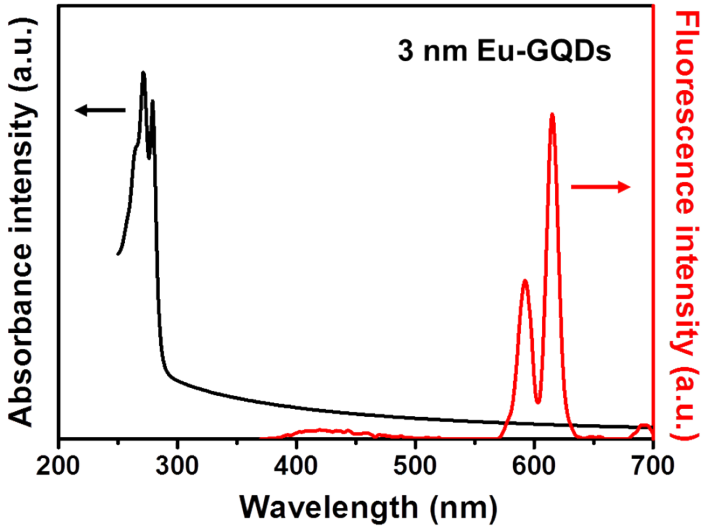

Fig. S6 UV-vis absorption and fluorescence spectra of the 3 nm Eu-GQDs saturated by addition of 2.5 μM DPA.

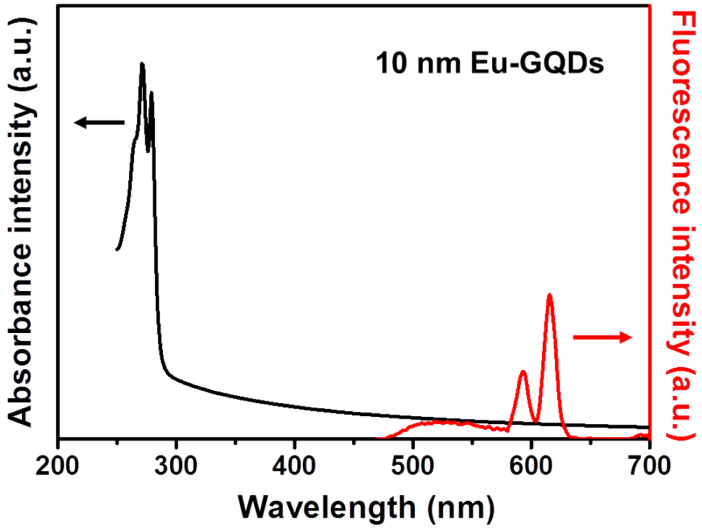

Fig. S7 UV-vis absorption and fluorescence spectra of the 10 nm Eu-GQDs saturated by addition of 1.5 μM DPA.

Table S3. Summary of maximum PL quantum yield of Eu-GQDs.

Eu-GQDs	Maximum PL quantum yield (%)[a]
3 nm	88.72
10 nm	38.45

[a]Maximum PL quantum yield = $I_{Em\ at\ 616\ nm}$ / $I_{Ex\ at\ 270\ nm}$

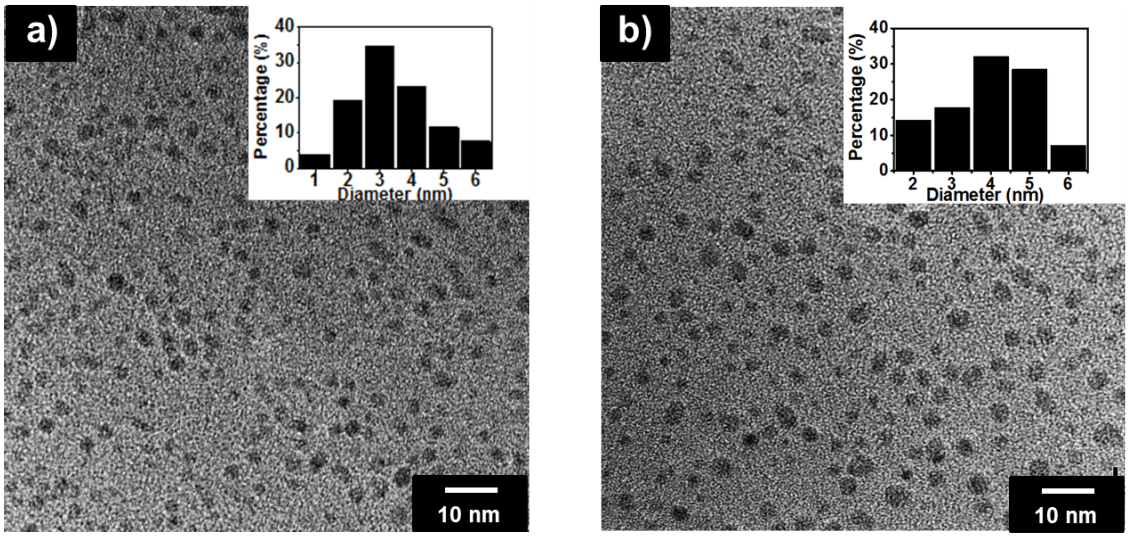

Fig. S8 TEM images of 3-nm-diameter (a) NH_2-GQDs and (b) Eu-GQDs.

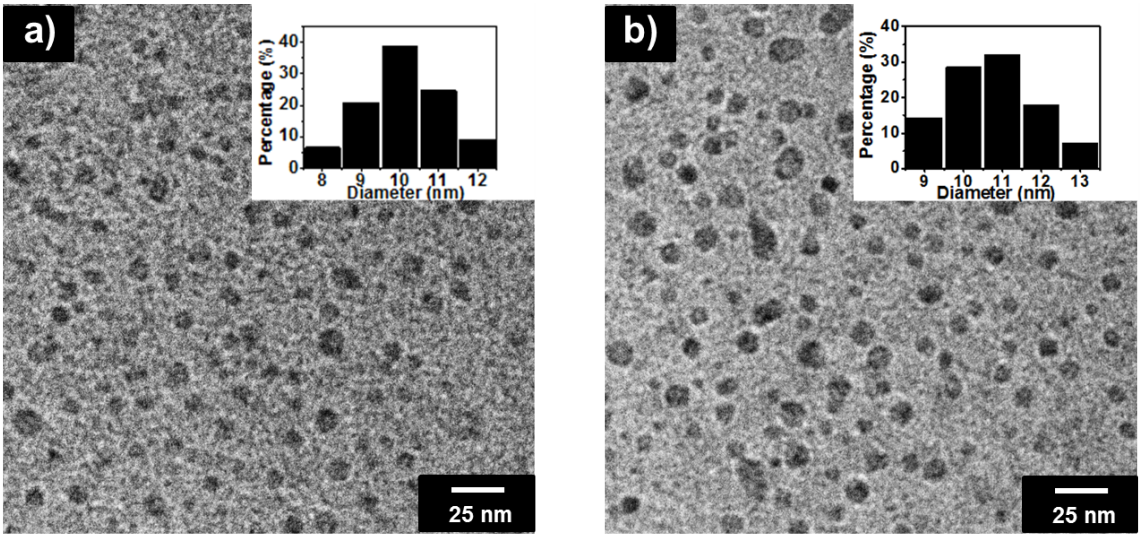

Fig. S9 TEM images of 10-nm-diameter (a) NH_2-GQDs and (b) Eu-GQDs.