Electronic Supplementary Information

Simple and green synthesis ofnitrogen-, sulfur- and phosphorus-co-doped carbon dots with tunable luminescence properties and sensing application

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Figures

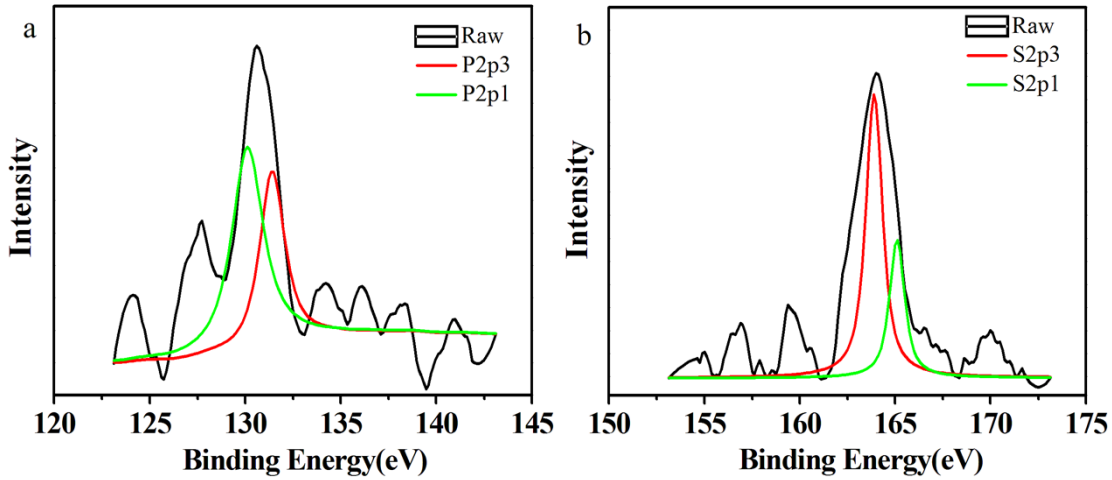
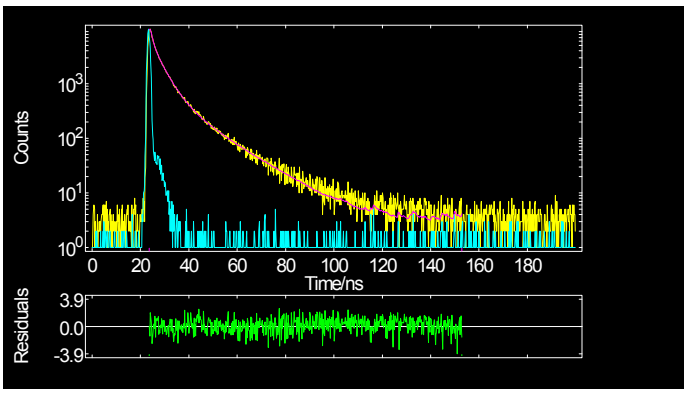


Fig. S1 High-resolution XPS spectra on P_{2p} (a) and S_{2p} (b) in N/S/P-CDs.

a



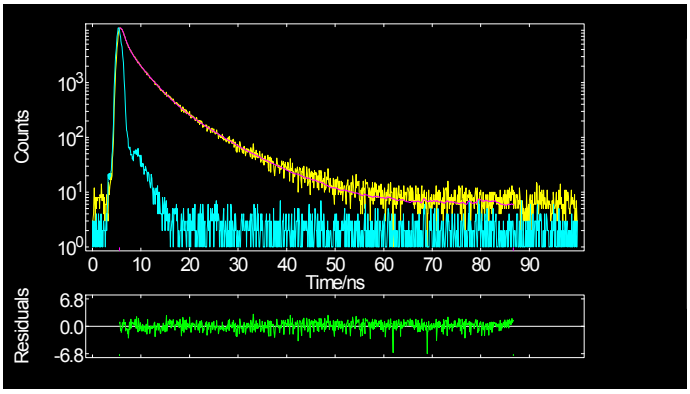
τ_1=0.99, τ_2=4.27, and τ_3=14.84;

B_1=0.170, B_2=0.101, and B_3=0.014;

A=1.86;

x^2=1.11

b



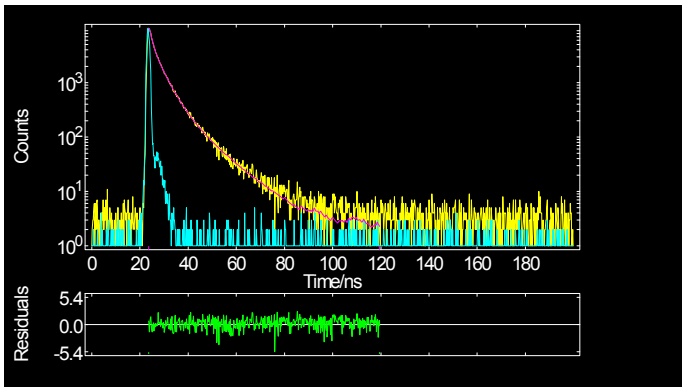
τ_1=1.15, τ_2=4.19, and τ_3=11.35;

B_1=0.173, B_2=0.094, and B_3=0.012;

A=1.12;

x^2=1.28

c



τ_1=0.73, τ_2=3.07, and τ_3=8.43;

B_1=0.113, B_2=0.05, and B_3=0.010;

A=4.40;

x^2=1.23

Fig. S2 Fluorescence decay curve and the exponential fitting curve of N/S/P-CDs-100 (a), N/S/P-CDs-120 (b) and N/S/P-CDs-150 (c) recorded at room temperature in aqueous solution. The fiting formula: $F(t) = A + B_1 e^{-t/\tau_1} + B_2 e^{-t/\tau_2} + B_3 e^{-t/\tau_3}$, where, t is time, A is a constant background, B_1, B_2, and B_3 are fractional intensities, τ_1, τ_2, and τ_3 are fluorescence lifetime. The amplitude-weighted average fluorescence lifetime, <τ>, was calculated by: $< \tau >= \frac{B_1\tau_1 + B_2\tau_2 + B_3\tau_3}{B_1 + B_2 + B_3}$.

Tables

Table S1 The quantum yield (QY) and average lifetimes of different N/S/P-CDs.

Sample	QY / %	Average lifetimes / ns
N/S/P-CDs-100	2.42	2.83
N/S/P-CDs-120	3.25	2.65
N/S/P-CDs-150	1.72	1.85

Table S2 Results of Hg^{2+} detection in river water using photoluminescent N/S/P-CDs-120 (*n*=3)

Sample	Added Hg^{2+} / μM	Found Hg^{2+} / μM	RSD / %	Recovery / %
river water 1	0	No detected	—	—
river water 2	20.0	20.2	1.7	101.0
river water 3	50.0	51.2	1.3	102.4