

Supporting Information

N-doped Carbon Dots for Deep Blue emission and CD-LED device with 402 nm Electroluminescence

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1. PLQY Measurements

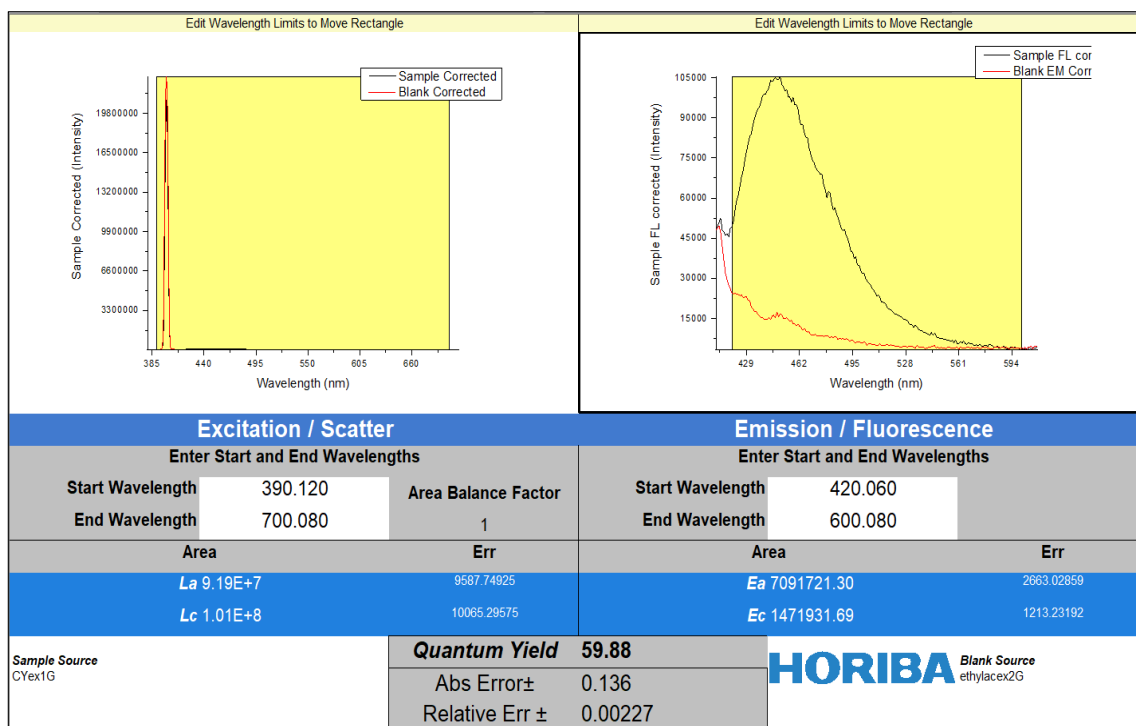


Fig. S1 Photoluminescence quantum yield (PLQY) of the synthesized nitrogen-doped CDs measured in toluene solvent.

2. Cyclic Voltametric analysis of Ferrocene:

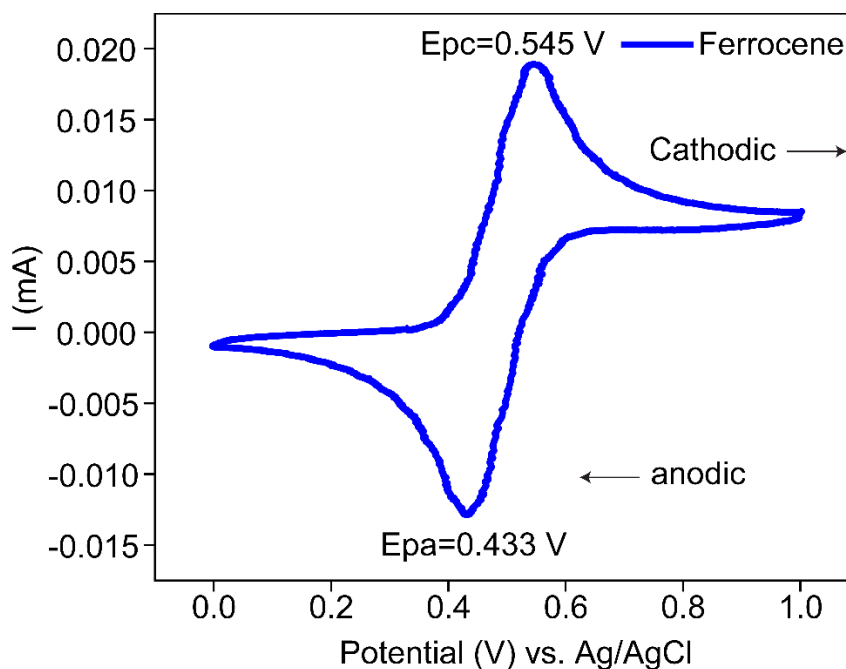


Fig. S2 Cyclic Voltametric analysis of Ferrocene in DCM using 0.1 M TBAP electrolyte, using Glassy Carbon, Platinum wire (Pt), and Ag/AgCl/KCl(saturated) as working, counter, and reference electrodes, scan rate 50 mV s⁻¹.

The $E_{1/2}^{Ferrocene}$ of ferrocene is calculated by using the following empirical relation:

$$E_{1/2}^{Ferrocene} = \frac{E_{pa} + E_{pc}}{2} \dots \dots \dots (1)$$

Where E_{pa} is the anodic peak potential, and E_{pc} is the cathodic peak potential.^{1,2} By substituting these values in the above equation (1), the value of $E_{1/2}^{Ferrocene}$ is obtained as 0.49V.

3. XPS Survey scan:

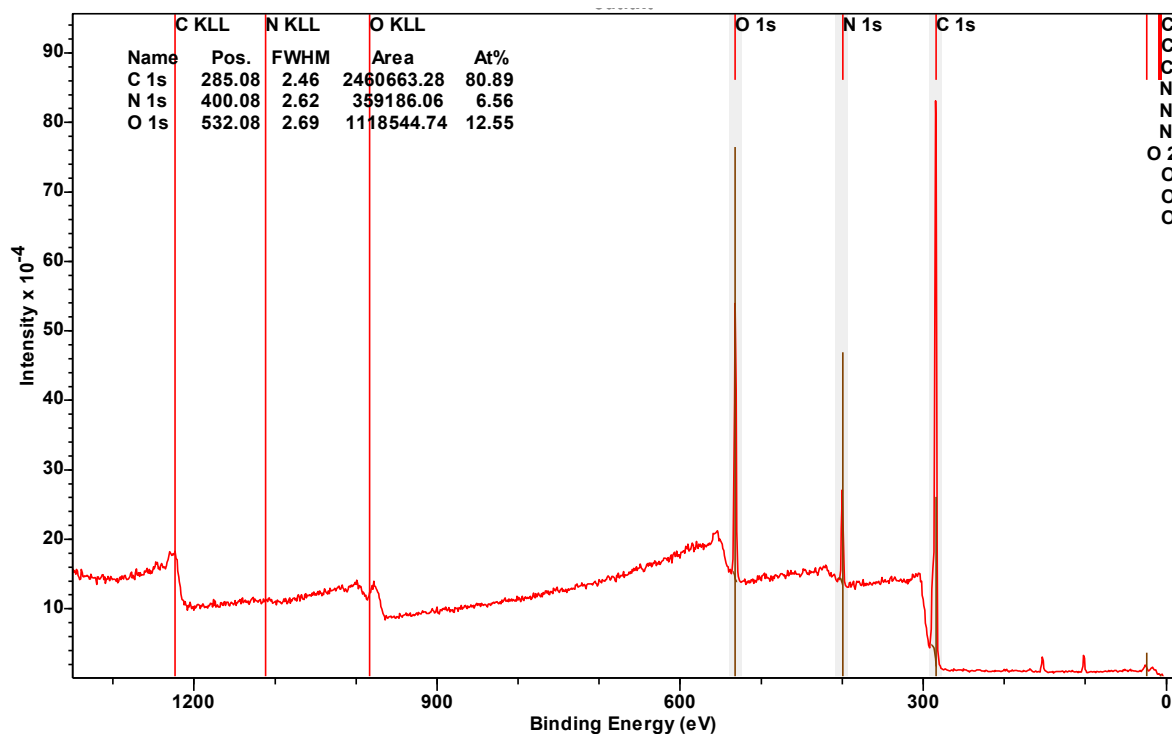


Fig. S3 XPS Survey scan of nitrogen-doped CDs showing the atomic percentage composition of C, N, and O in the synthesized CDs.

Table S1. Elemental composition of N-doped CDs determined by XPS survey scan analysis, confirming the doping of nitrogen in the synthesized carbon dots.³

Sample	C (%)	O (%)	N (%)
N-doped CDs	80.89	12.55	6.56

4. PL spectra of CBP-doped carbon dots in film

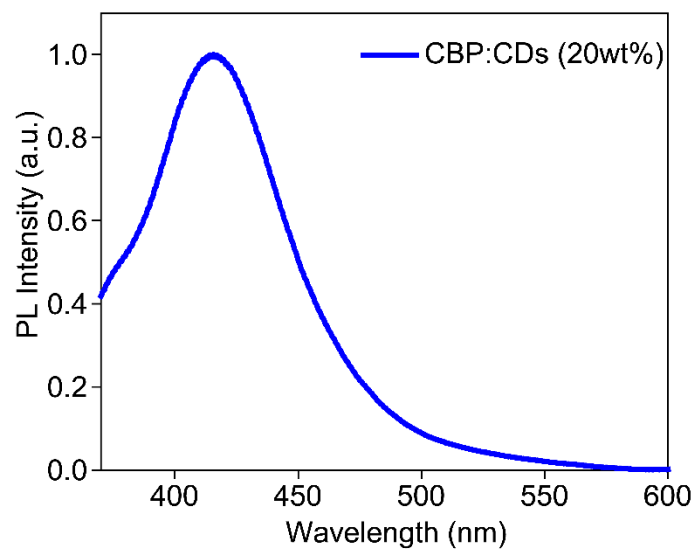


Fig. S4 PL spectra of carbon dots doped in CBP host matrix at (20 weight % of CDs) in a film state.

5. EL spectra of CD-LED at different operating Voltages

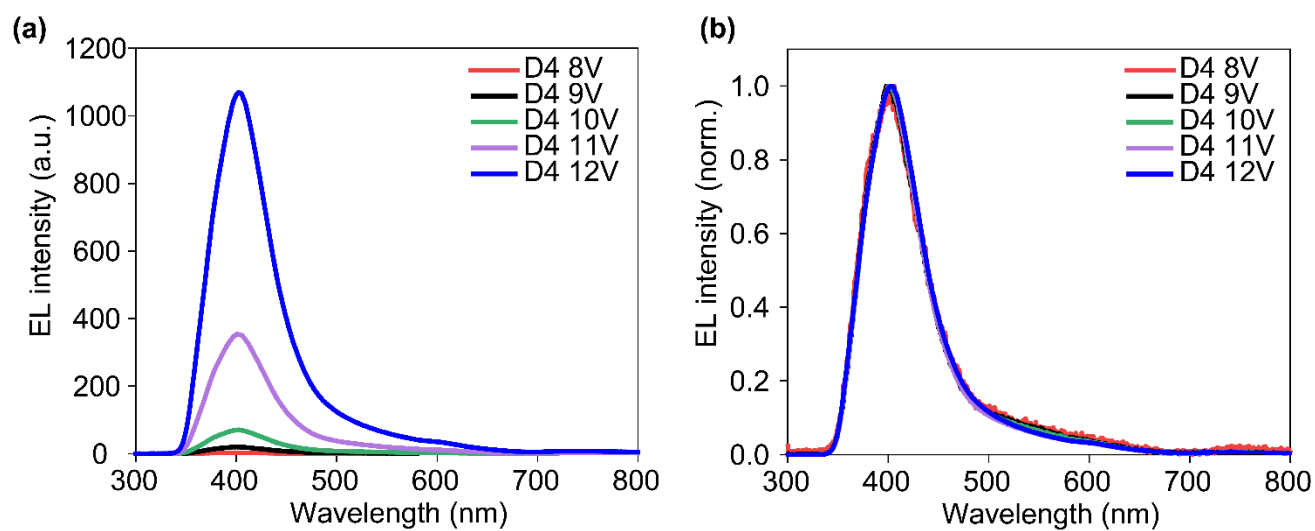


Fig. S5 (a) EL spectra. (b) Normalized EL spectra taken at different operating voltages ranging from 8 to 12V.

References:

- (1) Elgrishi, N.; Rountree, K. J.; McCarthy, B. D.; Rountree, E. S.; Eisenhart, T. T.; Dempsey, J. L. A Practical Beginner's Guide to Cyclic Voltammetry. *J Chem Educ* **2018**, *95* (2), 197–206. <https://doi.org/10.1021/acs.jchemed.7b00361>.
- (2) Tsierkezos, N. G. Cyclic Voltammetric Studies of Ferrocene in Nonaqueous Solvents in the Temperature Range from 248.15 to 298.15 K. *J Solution Chem* **2007**, *36* (3), 289–302. <https://doi.org/10.1007/s10953-006-9119-9>.
- (3) Zhang, X.; Liu, Y.; Kuan, C.-H.; Tang, L.; Krueger, T. D.; Yeasmin, S.; Ullah, A.; Fang, C.; Cheng, L.-J. Highly Fluorescent Nitrogen-Doped Carbon Dots with Large Stokes Shifts. *J Mater Chem C Mater* **2023**, *11* (34), 11476–11485. <https://doi.org/10.1039/D3TC02209A>.