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Electronic Supplementary Information to:

Microwave-assisted ultrafast and facile synthesis of fluorescent carbon nanoparticles from single precursor: Preparation, characterization and its application for highly selective detection of explosive picric acid

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Scheme S1. Proposed reaction scheme for the potential presence of citric acid and oligomer in the final product

Figure S1. ESI-MS spectrum of the as-prepared CNPs solution.



Figure S2. XRD patterns of ACD.

UV-vis spectra was used to obtain the band gap (E_g) of carbon nanoparticles¹, and the value of the direct optical band gap was determined by the extrapolation of the linear region to zero absorption (Eq. S1), and the extrapolating graph is illustrated in Fig. S3.



Figure S3. $(Ahv)^2$ versus the photon energy hv. The extrapolation of the linear region to zero absorption allows us to determine the gap energy of CNPs (the data from Fig. 3A)

The HOMO and LUMO energy levels could be estimated through onset potentials of cyclic voltammetry.^{1, 2} The onset potential of oxidation of CNPs from CV is shown in Fig. S4. The relationship between the onset potential of oxidation (E_{ox}) and HOMO energy levels can be expressed as the following equation:

 $E_{HOMO} = - (E_{ox}' + 4.4) eV$ (S2)

The LUMO energy levels of CNPs could be obtained by adding the HOMO energy levels and band gap as follows:

 $E_{LUMO} = E_{HOMO} + E_g$ (S3)



Figure S4. Cyclic voltammogram of fluorescent carbon nanoparticles in DMF with 0.1 M of (Bu)₄NPF₆.



Figure S5. Normalized time-dependent fluorescence decay data of CNPs suspension upon addition of picric acid solutions in DI water at the following concentrations: 0, 25, 50, 75, and 100 μ M.

References:

- 1. X. Sun, C. Brückner, M.-P. Nieh and Y. Lei, *J. Mater. Chem. A*, 2014, **2**, 14613-14621.
- 2. S. Zhu, Q. Meng, L. Wang, J. Zhang, Y. Song, H. Jin, K. Zhang, H. Sun, H. Wang and B. Yang, *Angew. Chem. Int. Ed.*, 2013, **52**, 3953-3957.