Electronic Supplementary Material (ESI) for Analytical Methods.

A facile microwave - hydrothermal synthesis of fluorescent carbon quantum dots from bamboo tar and its application

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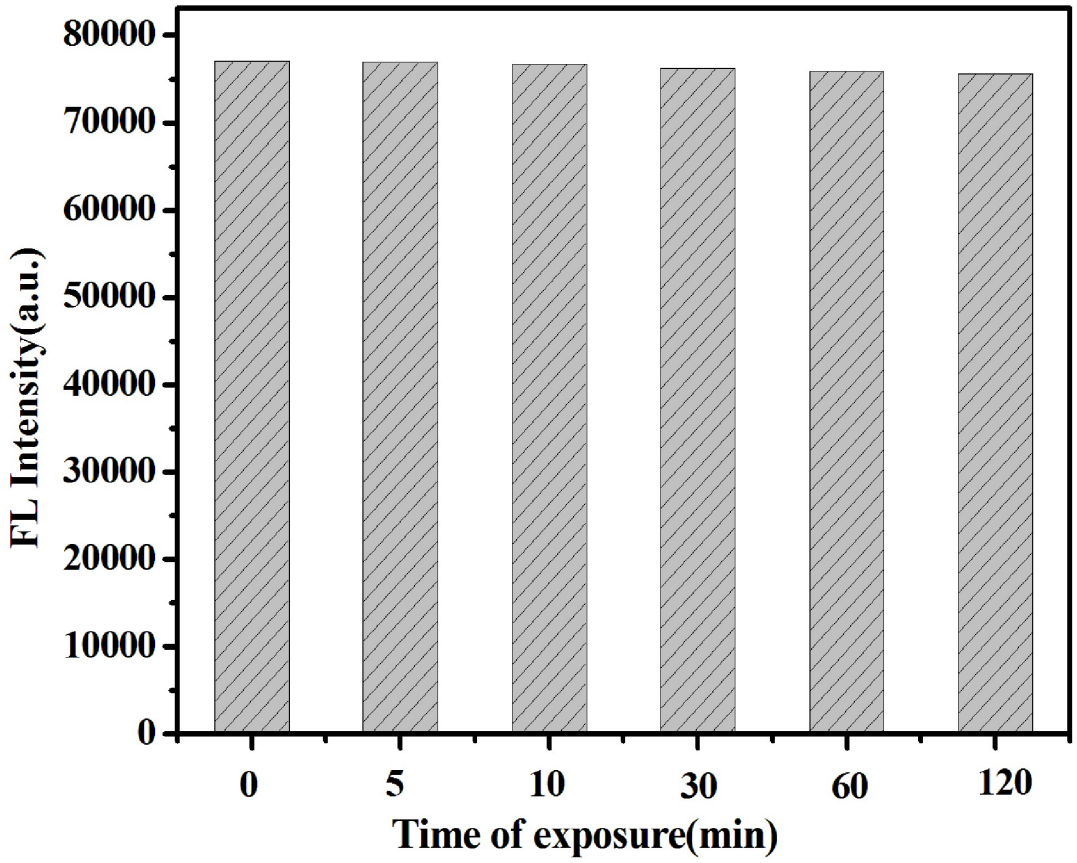

Fig. S1 Photostability of the CQDs under continuous irradiation for 2 h.

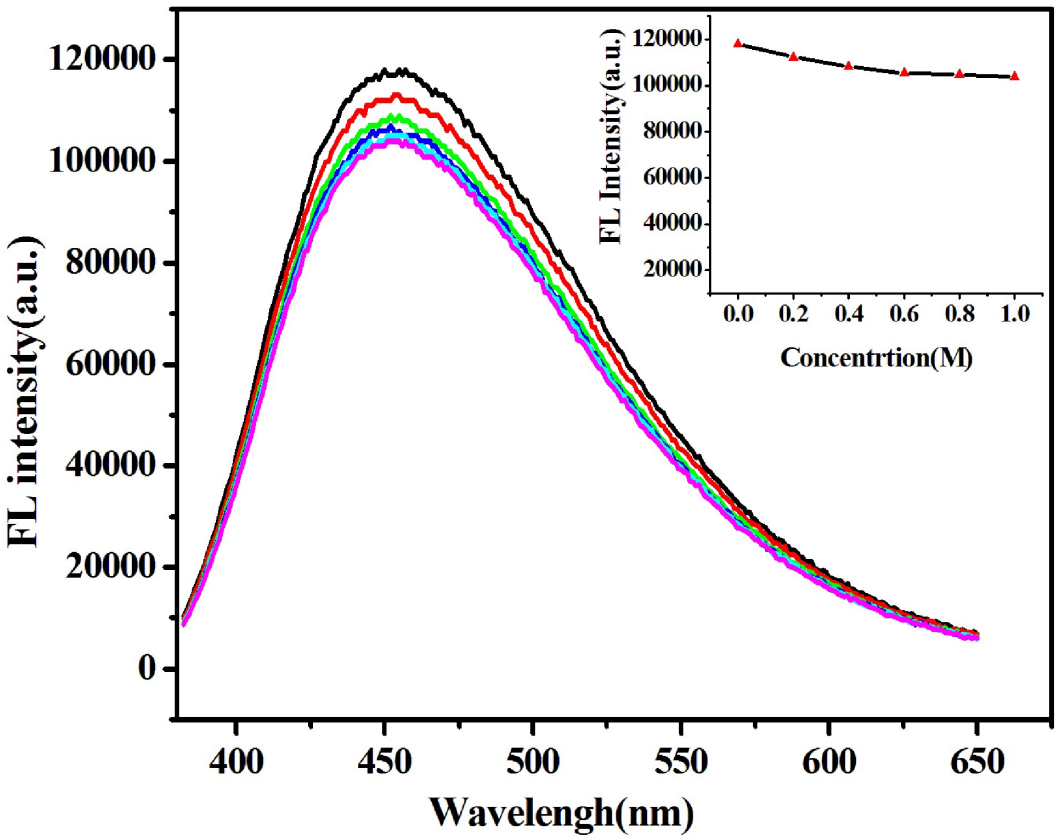

Fig. S2 The effect of NaCl concentration on CQDs fluorescence intensity.

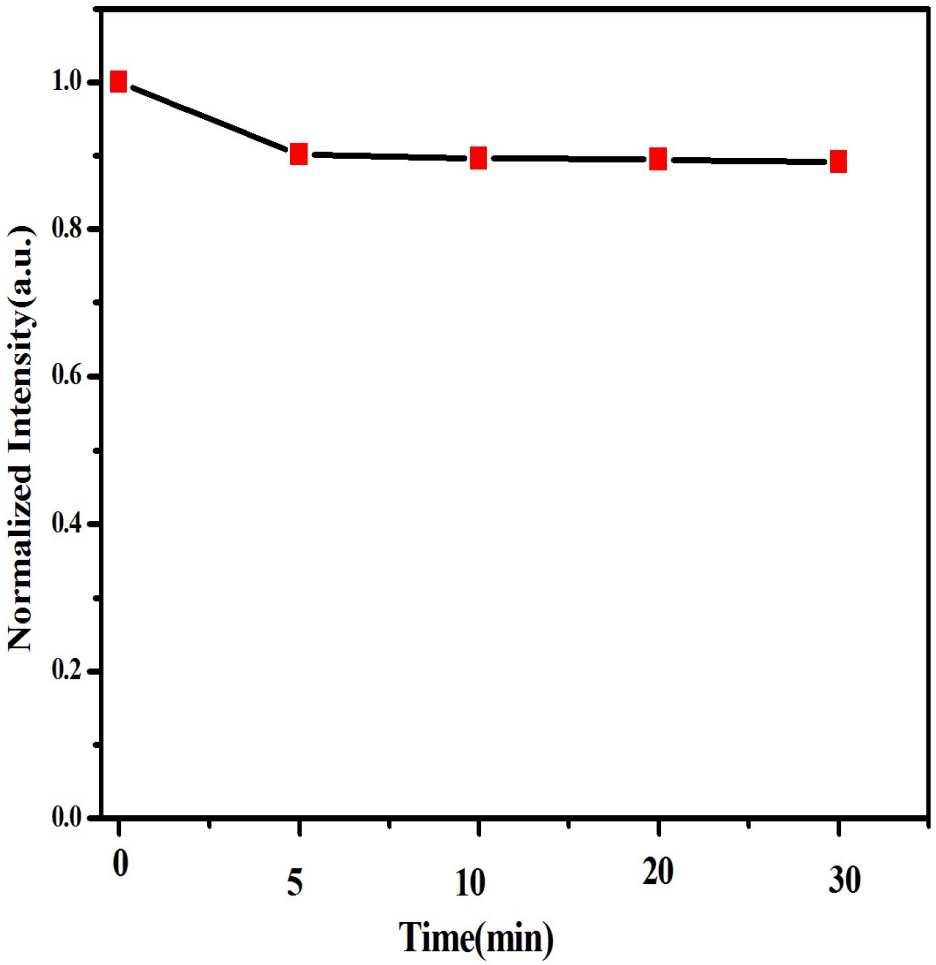

Fig. S3 Effect of incubation time on the fluorescence quenching of the CQDs based fluorescence sensor toward TNP analysis. Conditions: 50 μL CQDs + 200 μL BR buffer solution(pH 3.0) + 10 μM TNP.

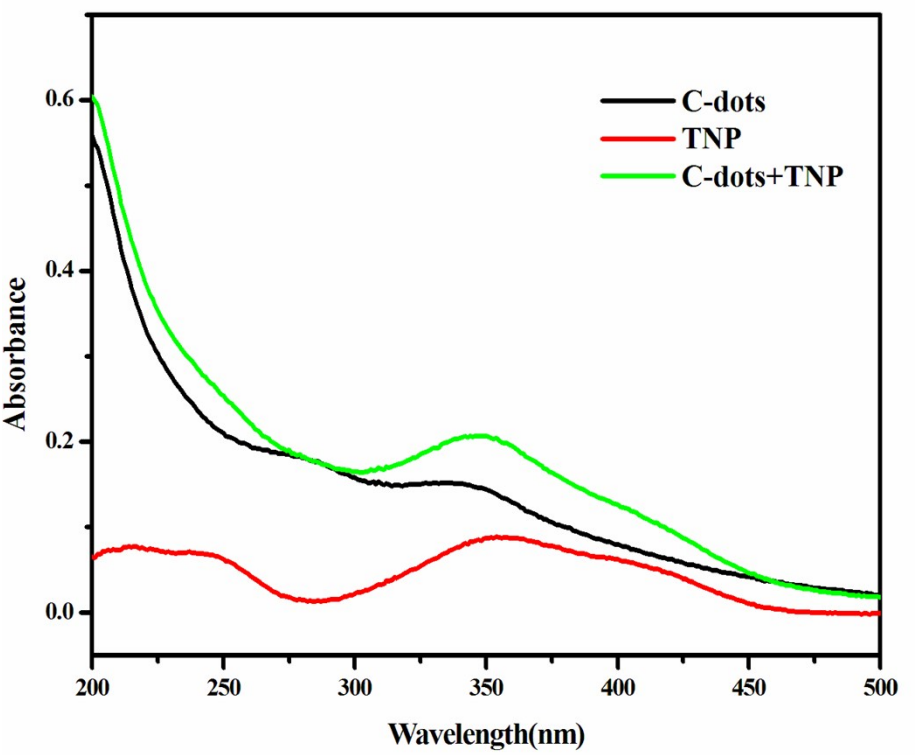

Fig. S4 UV-vis absorption spectra of CQDs (black), TNP (red), and CQDs in the presence of TNP(green).

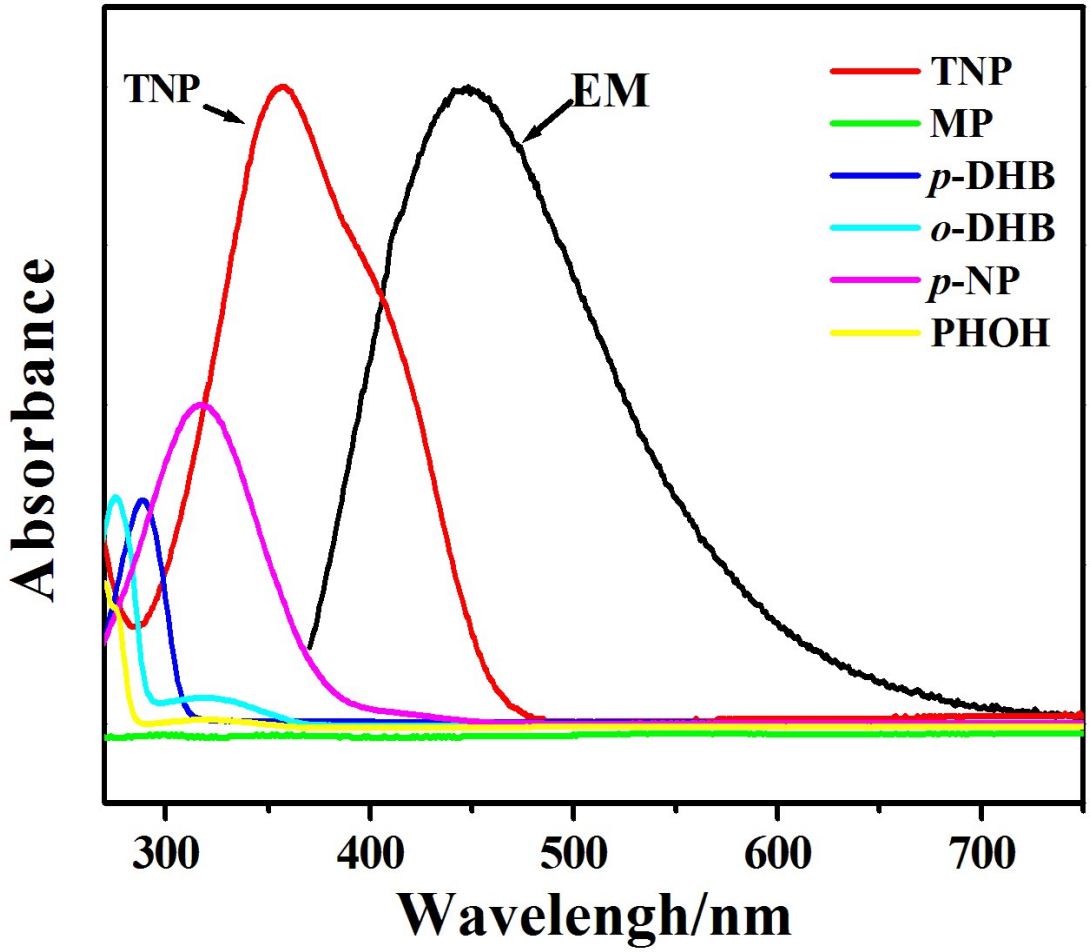

Fig. S5 The UV-Vis absorption spectra of all niteoaromatic explosives and the fluorescence emission of CQDs (blank).

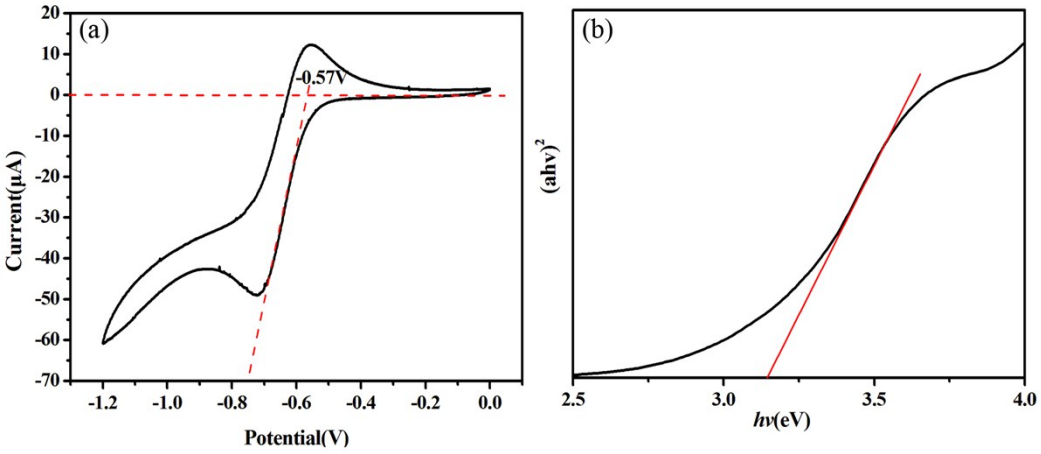

Fig. S6 (a) Cyclic voltammogram of the CQDs in 0.1 M Bu_4NPF_6/acetonitrile solution at 100 mV/s. (b) Optical bandgap of CQDs obtained from the UV-vis absorption spectrum.

The HOMO and LUMO energy levels of CQDs were estimated according to the following empirical formula:

$$E_{LUMO} = -(E_{red}+4.4)\ eV \quad (1)$$

where Ag/AgCl electrode is employed as the reference. A typical CV curve for a CQDs thin film, deposited on a glassy carbon working electrode, is presented in Fig. S6a.

The E_{red} was determined to be -0.57 eV. The corresponding E_{LUMO} was calculated to be -3.83 eV. The HOMO was then estimated to be -6.98 eV according to the following equation .

$$E_{HOMO} = E_{LUMO} - E_g \quad (2)$$

Where the band gap energies (E_g) were estimated to be 3.15 eV by plotting the square of the absorption cofficiency(α) and photon energy (hv) as a function of hv and extrapolating the linear portion to intercept the x abscissa (Fig. S6b).

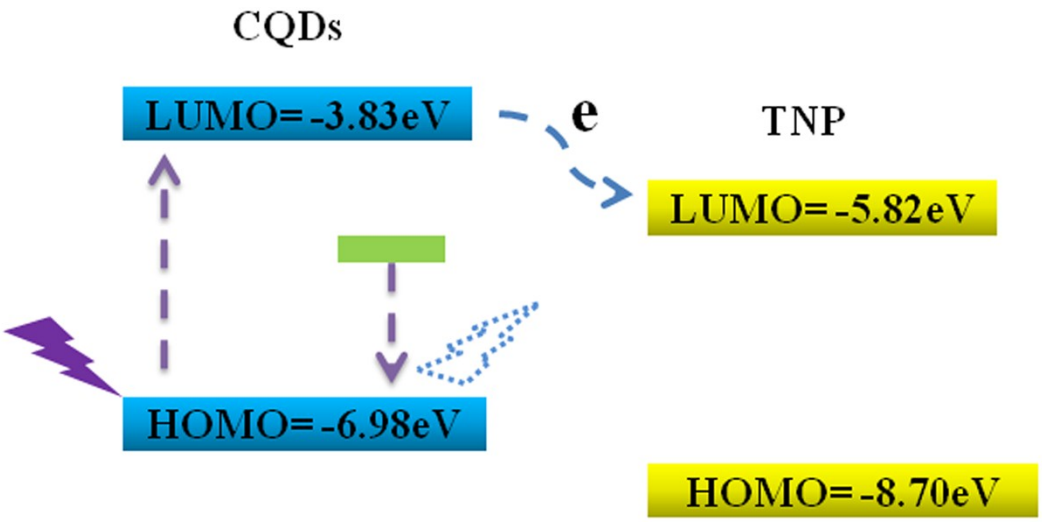

Fig. S7 The E_{HOMO} and E_{LUMO} of CQDs and TNP. Ex = 380 nm, Em = 450 nm.