Electronic Supplementary Material (ESI) for RSC Advances.

Facile preparation of fluorescent water-soluble none-conjugated polymer dots and fabricating acetylcholinesterase biosensor

Cai-Hong Li [a,b], Wei-Feng Wang [a,], Nsanzamahoro Stanislas [a,b], Jun-Li Yang [a,*]

[a] CAS Key Laboratory of Chemistry of Northwestern Plant Resources, Key Laboratory for Natural Medicine of Gansu Province, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences (CAS), Lanzhou 730000, P. R. China

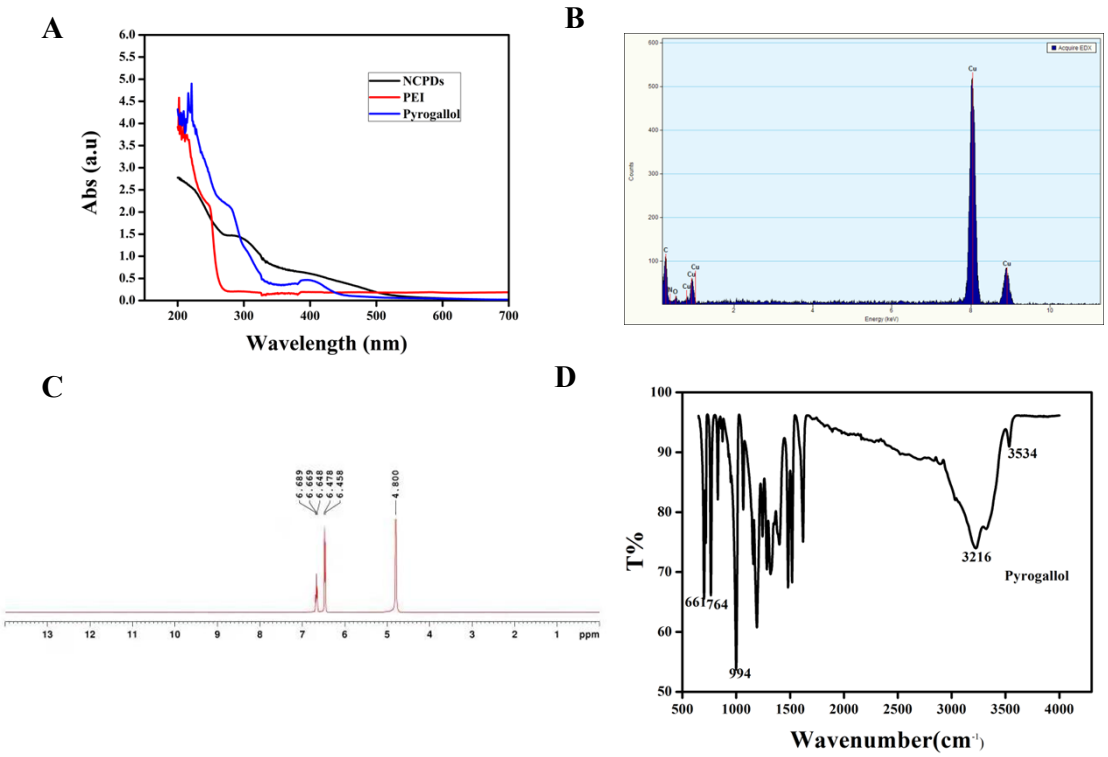
[b] University of Chinese Academy of Sciences, Beijing 100049, P. R. China

*Corresponding Author

Tel/Fax: +86-931-4968385. E-mail: yangjl@licp.cas.cn (J.-L. Yang).

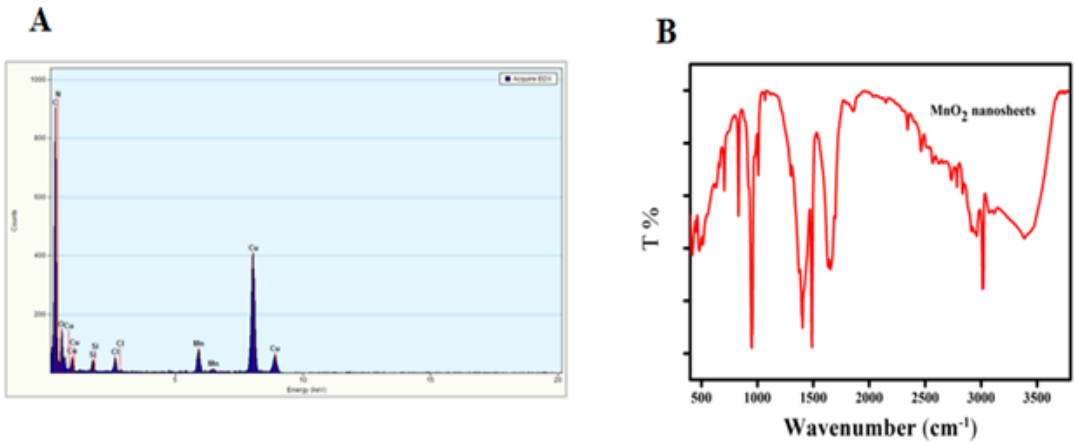
Content

Fig. S1



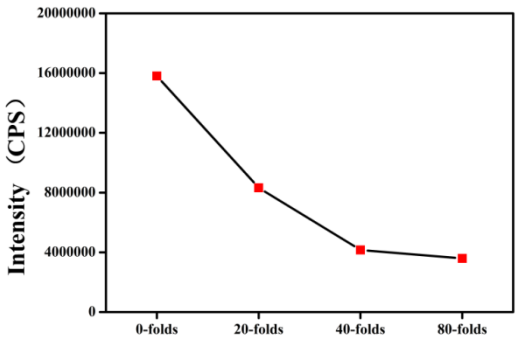
(A) UV−vis absorption spectra of NCPDs, PEI and Pyrogallol, respectively (B) The EDS of NCPDs(C) NMR spectra of Pyrogallol (D) FT-IR spectroscopy of Pyrogallol

Fig.S2



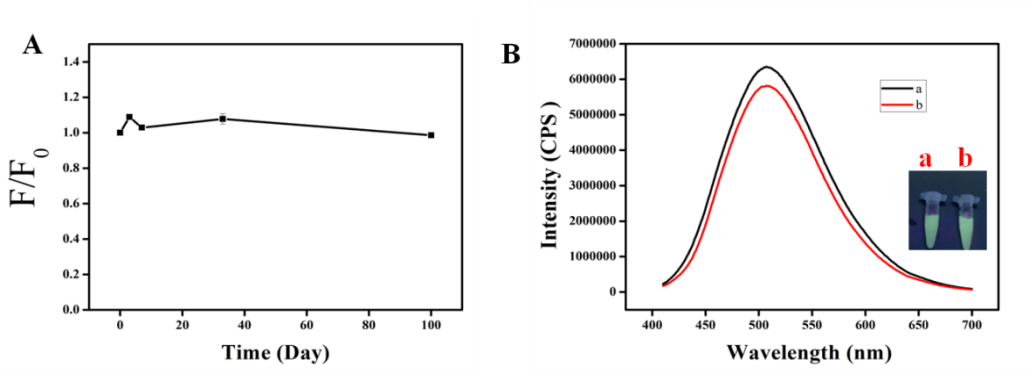
(A) The EDS of MnO_2 nanosheets (B) The FT-IR spectra of MnO_2 nanosheets

Fig. S3



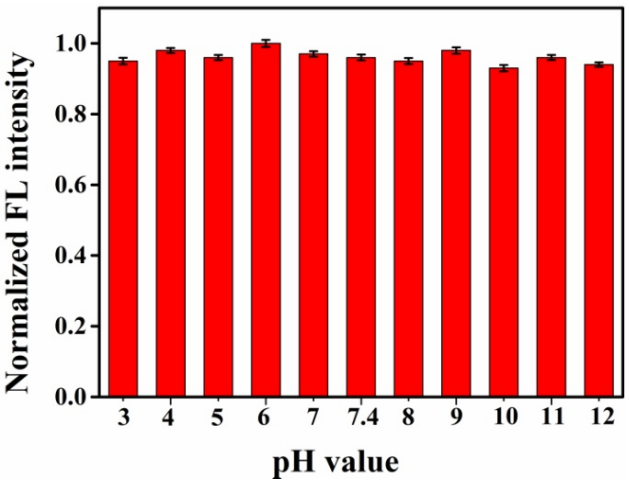
Relationship between fluorescent intensity and diluted folds of NCPDs

Fig. S4



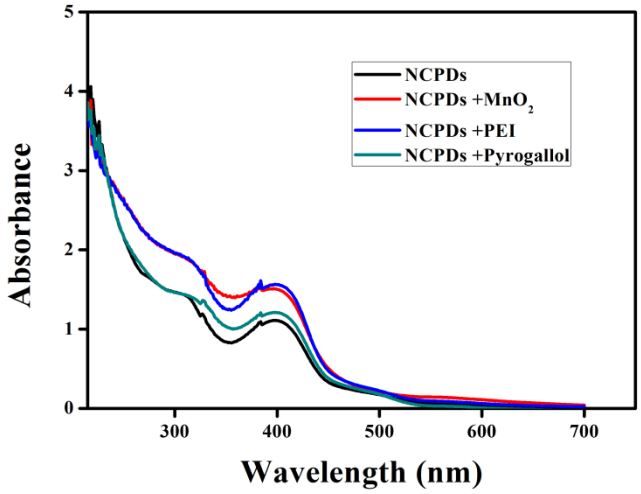
(A) The relationship between relatively fluorescent intensity (F/F_0) of NCPDs and storage time (B) Fluorescent emission spectra of NCPDs fresh prepared (black line) and after preserved 6 months (red line) The inset photographs showed new and old NCPDs under UV light

Fig. S5



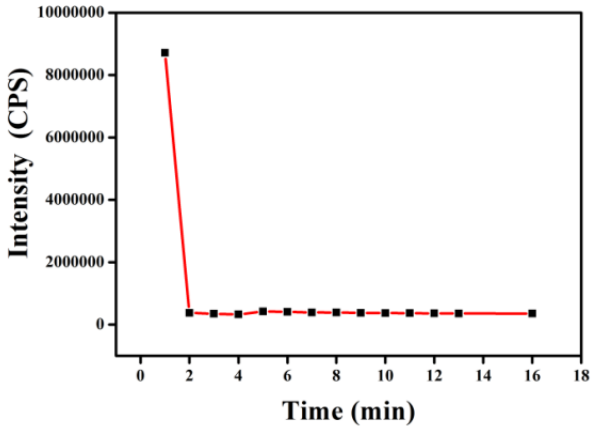
The stability of NCPDs at various PH values

Fig. S6



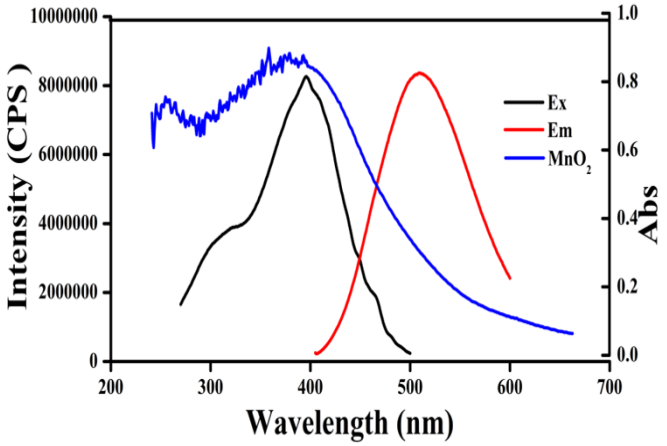
UV−vis absorption spectra of NCPDs adding withMnO_2 nanosheets, PEI and Pyrogallol

Fig.S7



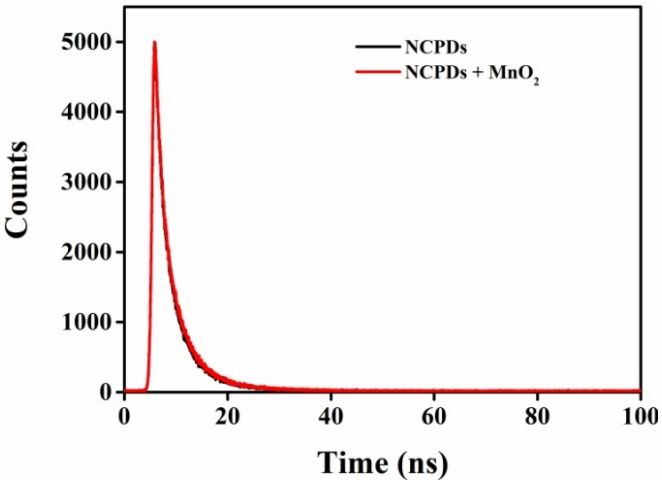
Response time of the NCPDs–MnO_2 biosystem (12.3 μM)

Fig. S8



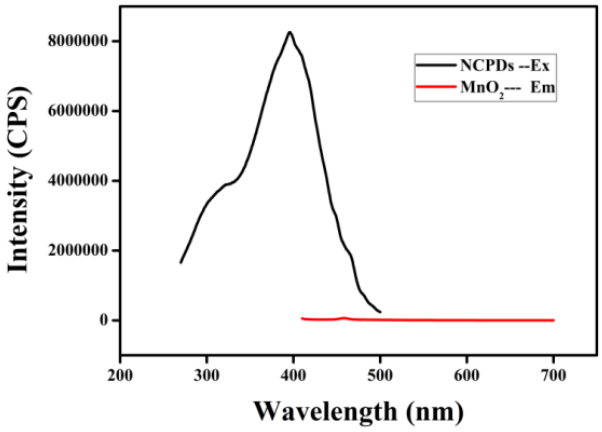
The overlap of excitation and emission spectra of NCPDs and UV−vis absorption spectra of MnO_2 nanosheets

Fig. S9



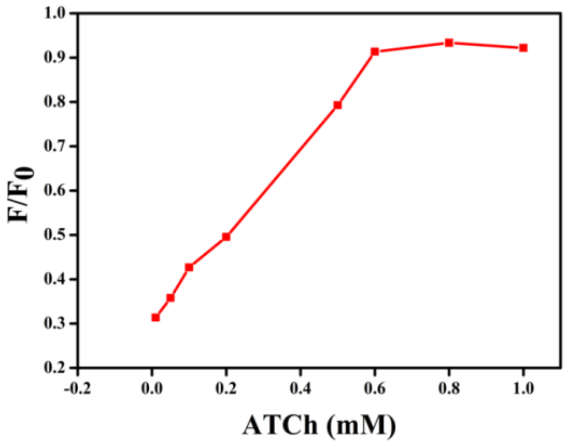
Decay curves of NCPDs in the absence (black curve) and presence (red curve) of MnO_2 nanosheets, λ_{ex} = 396 nm and λ_{em} = 507 nm

Fig. S10



The overlap of excitation spectra of NCPDs and emission spectrum of MnO_2 nanosheets

Fig. S11



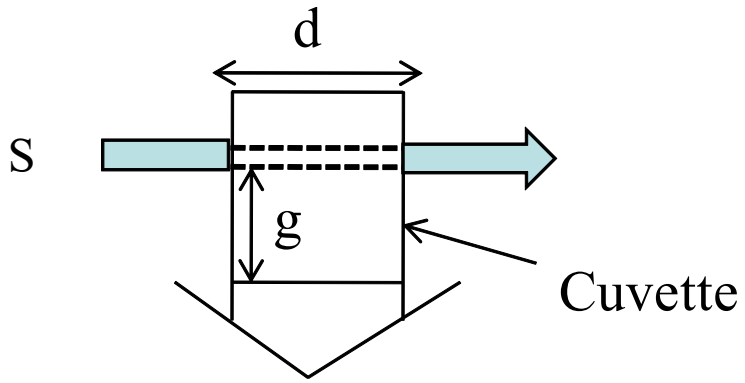
Optimization the substrate concentration

IE was analyzed by the following equation:

$$IE = \frac{F_{no\text{-}inhibitor} - F_{inhibitor}}{F_{no\text{-}inhibitor} - F_0} \quad (1)$$

$F_{inhibitor}$ and $F_{no\text{-}inhibitor}$ represent the fluorescent intensity of AChE-NCPDs-MnO_2 system and AChE-NCPDs-MnO_2-inhibitor system, respectively. F_0 refers to the fluorescent intensity of the NCPDs-MnO_2 system without AChE and inhibitor. [1]

Fig. S12



Cuvette geometry and parameters used in equation

$$\frac{F_{cor}}{F_{obsd}} = \frac{2.3\mathrm{d}A_{ex}}{1 - 10^{-\mathrm{d}A_{ex}}} 10^{\mathrm{g}A_{em}} \frac{2.3\mathrm{s}A_{em}}{1 - 10^{-\mathrm{S}A_{em}}} \quad (2)$$

Table S1 IFE of MnO_2nanosheets on the fluorescence of NCPDs

MnO_2 μM	A_{ex}	A_{em}	F_{obsd}	F_{cor}	CF	F_{cor} /F_{coro}
0.00	**0.28152**	**0.075**	**5.03E+06**	**7.44E+06**	**1.48**	**1.00**
1.27	**0.34388**	**0.095**	**4.40E+06**	**7.09E+06**	**1.61**	**1.05**
1.86	**0.36919**	**0.105**	**4.10E+06**	**6.84E+06**	**1.67**	**1.09**
2.92	**0.44468**	**0.129**	**3.85E+06**	**7.12E+06**	**1.85**	**1.13**
3.42	**0.49078**	**0.148**	**3.64E+06**	**6.57E+06**	**1.98**	**1.03**
6.81	**0.71132**	**0.229**	**2.78E+06**	**7.34E+06**	**2.64**	**1.01**

F_{obsd} is the observed fluorescence intensity and F_{cor} is the corrected fluorescence intensity by removing IFE contribution from . and represent the absorbance at the excitation wavelength (=396 nm) and maximum emission wavelength ($_m$=507 nm), respectively; s is the thickness of excitation beam (5 nm), g is the distance between the edge of the excitation beam and the edge of the cuvette

(0.60 cm in this case) and d is the width of the cuvette (1.00 cm) (Table S1 summarizes the parameters used in calculating the contribution of IFE to the fluorescence quenching process. Corrected factor (CF) is defined as CF= / $_{obsd}$. The maximum value of CF could not exceed 3; otherwise, the correction is not convincing. $_0$ and are the corrected fluorescence intensities of NCPDs in the absence and presence of MnO_2 nanosheets, respectively.

Calculation of the Quenching Efficiency

The quenching efficiency (E) was calculated according to the formula

$$E = \left(1 - \frac{F}{F_0}\right) \times 100\% \quad (3)$$

F_0 is the fluorescence intensity of NCPDs and F represents the fluorescence intensity of NCPDs quenched by MnO_2 nanosheets.

Reference:

1. Y. Zhang, T. Hei, Y. Cai, Q. Gao and Q. Zhang, *Anal. Chem*, 2012, **84**, 2830-2836.